Bibliography of Tritium Studies Related to Hydrology Through 1966

GEOLOGICAL SURVEY WATER-SUPPLY PAPER 1900

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By EDWARD C. RHODEHAMEL, VERONICA B. KRON, *and* VERDA M. DOUGHERTY

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BIBLIOGRAPHY OF TRITIUM STUDIES RELATED TO HYDROLOGY, THROUGH 1966

Compiled by EDWARD C. RHODEHAMEL, VERONICA B. KRON, and VERDA M. DOUGHERTY

ABSTRACT

This report is a compilation of publications throughout the world that are related to the use and application of tritium (T or ^3H) in hydrology during the 25 years 1942 through 1966. The bibliography consists of a main list of references classified as to the principal subject matter of each item, and an auxiliary bibliography containing background knowledge about radioactivity, analytical techniques, and the various environments in which tritium exists. The introduction provides: (1) a brief discussion of the nature, sources, abundance, and uses of tritium that are applicable to hydrology; and (2) a description of the bibliography formats.

INTRODUCTION

PURPOSE AND SCOPE

This bibliography on tritium is compiled in response to inquiries regarding the various uses and applications of tritium in hydrologic investigations. The effective use of tritium in the interdisciplinary science of hydrology often may become more involved than simplified discussions of radioactive tracers and dating techniques at first suggest. The purpose of this report is to provide the reader with extensive background information on the present status of the use of tritium in hydrology.

Widespread use, as well as the increased tendency toward the use of tritium in quantitative studies in hydrology during the past two decades, has resulted in a volume of literature of large scope and increasing complexity. The increased use of tritium in the science of hydrology apparently results from its (1) worldwide distribution, (2) variability of production and concentration, (3) relatively weak radioactive energy labeling characteristic, (4) moderately long half life, (5) ready incorporation into the water molecule, and (6) rather universal pervasion of many hydrologic environments. As such, the monitoring of tritium concentrations provides a useful tool for track-

ing various changes that may occur in worldwide environmental conditions.

Investigations in hydrology and its related sciences involving tritium are scattered throughout many of the world's scientific and technical publications. Many of these useful contributions, owing to their modes of publication and distribution, are not conveniently available to hydrologists. The objective of this bibliography is to provide worldwide coverage with topical classifications of the published material relating to the use of tritium in the field of hydrology. The period covered is from 1942 through most of 1966. However, it is necessary to mention the important and more recent (1967) publication of various earlier papers on the subject of tritium presented at an American Geophysical Union Symposium held at the University of Illinois, November 10–12, 1965, which is entitled "Isotope Techniques in the Hydrologic Cycle," edited by Glenn E. Stout, and published as Geophysical Monograph Series 11, 199 p.

Occasionally in compilation of this type it seems fitting to mention outstanding publications on the subject that are issued during the final preparation of the report but subsequent to the closing period. A convenient way of doing this is to acknowledge them in this text. Three such references are cited below because of either their summarizing treatments or extensive references.

Halevy, Elkana, compiler, 1968, Isotope techniques in hydrology, v. 1 (1957–1965): Vienna, Austria, Internat. Atomic Energy Agency Pub., Bibliog. Ser. 32, 228 p.

International Atomic Energy Agency, prepared by The Working Group on Nuclear Techniques in Hydrology of the International Hydrological Decade (HID), 1968, Guidebook on Nuclear Techniques in Hydrology: Vienna, Austria, Internat. Atomic Energy Agency Tech. Rept. Ser. 91, 214 p.

Jacobs, D. G., 1968, Sources of tritium and its behavior upon release to the environment: U.S. Atomic Energy Comm., Div. Tech. Inf., Div. Health Physics, AEC Critical Rev. Ser. Rept. 1, 85 p.

GENERAL NATURE, SOURCES, AND ABUNDANCE OF TRITIUM

Tritium (T or ^3H) as well as deuterium (D) are naturally occurring isotopes of the ordinary hydrogen atom (H) of mass one, which is called protium. Tritium is hydrogen with mass three and an isotopic weight of 3.01703. It has two neutrons and a proton. Chemically, tritium behaves like ordinary hydrogen. It is an unstable isotope and is therefore radioactive, whereas deuterium with mass two is a stable isotope. Both isotopes have been used as tracers in the natural and biological sciences.

The half life of tritium for some time has been generally accepted to be 12.26 years. A half life is the time required for the radioactivity

of a substance to decay to one-half its initial radioactive concentration. Tritium disintegrates into helium-3 by emission of very weak beta (β) particles. Inasmuch as there is no gamma emission in this reaction, tritium is a pure beta emitter. Beta particles have negative charges and are identical with electrons (e^-). The relatively low energy released amounts to about 0.018 million electron volts (Mev) at maximum and consequently tritium radiation is described as being "soft." The penetration power of beta particles is slight; in general, they do not penetrate through human skin. Tritium readily combines with oxygen to form the isotopic water, tritium oxide. The ability of T to replace normal hydrogen in the fundamental structure of the water molecule, to readily participate in the usual chemical reactions and various biological activities, as well as its moderately long lived radioactive half life, all make tritium a potentially useful tool in various modern hydrologic studies. Furthermore, manmade tritium is plentiful and relatively inexpensive; its weak β emissions reduce the storage and handling hazards well below those of many other radioactive tracers. On the other hand, certain interpretations regarding its concentrations and rates of movement are complicated because of its relatively large difference in mass from that of normal hydrogen. For example, a difference in mass causes a dilution and (or) an enrichment separation, called fractionation, whenever a physicochemical process relating to water takes place, either in nature or in the analytical laboratory.

Tritium can be formed artificially and naturally. Manmade production of tritium in atomic reactors occurs in various ways. However, neutron particles are required for this artificial production and consequently tritium can be made only at the sacrifice of the supply of fissionable material. At times, relatively small amounts of it enter the natural environment, sometimes by design and other times by accident. However, the amount of tritium introduced into the atmosphere by thermonuclear bomb explosions has been far greater than that from any other artificial source, and well-defined knowledge of variations in atmospheric abundance with each thermonuclear explosion in the atmosphere is of great importance to the interpretation of observed tritium concentrations in hydrologic investigations. According to Libby (1961a, b; 1963),[1] [2] the amount of tritium released during thermonuclear tests is proportionate to the energy released. Leipunsky (1957)[3] has estimated 0.7 kilogram of residual tritium per megaton of fusion energy yield from a thermonuclear bomb. A sporadic increase of tritium concentration in the earth's environments is char-

[1] See p. 92, present report.
[2] See p. 93, present report.
[3] See p. 91, present report.

acterized as a relatively short period tritium pulse separated by relatively long periods of lower concentrations. Owing to atmospheric circulation, distribution of precipitation events, and many interrelated natural phenomena, many such tritium pulses observed in the lower atmosphere and in the waters of the earth do not occur immediately following a release of tritium by a thermonuclear bomb explosion. A large part of the delayed occurrence of these artificial tritium pulses is due to the approximate 5 to 10 years of stratospheric residence time for tritium (Libby, 1965, p. 746).[4] As a result of the various thermonuclear bomb-testing programs, the amount of tritium in the atmosphere as molecular H and as tritiated H has increased by factors of about 20 and 5, respectively (Begemann, 1963).[5] Martell (1963, p. 3759–3761)[6] has produced an annual inventory of the bomb-produced tritium. Despite the large increase of tritium in the earth's environments, natural water that is not labeled by concentrated slugs of tritium remains a very dilute solution, requiring a high analytical accuracy for reliable measurement. Through electrolytic enrichment techniques, concentrations of tritium in amounts less than 1TU can be analyzed satisfactorily. One TU is equivalent to a T to H ratio of 10^{-18} (1TU = [tritium atoms/protium atoms] $\times 10^{18}$).

The quantity of tritium is generally expressed in terms of this standardized TU concentration, which in water produces about 7.2×10^{-3} T dpm/ml (distintegrations per minute per milliliter). This is approximately equal to 3.2 picocuries per liter. A natural tritium concentration of 5 TU will produce about 0.04 dpm/ml.

In nature, tritium is formed in two major ways: (1) by cosmic-ray bombardment of atmospheric nitrogen-14 gas, principally at high altitudes, and (2) in rocks by radioactive disintegration from lithium-6. By nuclear physics conventionalities, such nuclear reactions are represented as: Target (projectile, product) Residual. The nuclear reaction for the cosmic-ray bombardment of atmospheric nitrogen is written as ${}_7N^{14}$ (n, t) ${}_6C^{12}$, and the reaction denoting the radioactive disintegration of lithium-6 is represented as ${}_3Li^6$ (n, α) ${}_1H^3$. Here n represents a neutron particle, t is the product particle, tritium (^{3}H) and the product symbol α is an alpha particle (helium nucleus). Of these two sources, the production of tritium in the atmosphere is much greater. The cosmic-ray production of tritium in the atmosphere is believed by some to have been relatively stable for several billion years. However, short-term fluctuations in cosmic-ray and other solar activity, such as the variations in the intensity of solar winds, seem-

[4] See p. 93, present report.
[5] See p. 33, present report.
[6] See p. 97, present report.

ingly can produce some short-term variations in the production and abundance of tritium in the atmosphere. The average production rate of T atoms in the atmosphere is variously estimated to be from 0.1 to 1.2 T atoms/sec/[2] over the earth's surface. A value frequently cited is that of about one tritium atom/sec/cm^2.

Despite the long period of natural tritium production, the natural abundance of tritium on earth is notably minute, owing to both radioactive decay and to escape from the earth. In 1954 Dr. Willard F. Libby (1954b, p. 38),[7] a pioneer chemist in the study of tritium and its economic and scientific uses, estimated the total natural abundance of tritium to be about 2 pounds; most of this occurs in the oceans, forming an extremely dilute solution. Prior to the first thermonuclear bomb explosions, the concentration of tritium in rainwater was about 5 tritium units (TU). However, various estimates generally range from 2 to 10 TU, the range of values seemingly being influenced by geographical location.

The tritium "time clock" (12.26 yr half life) is on the order of 1 to 3 magnitudes too fast for many types of areal studies of the largest hydrologic domains such as the oceans, large deep landlocked seas, and the largest lakes. Viewed in this respect, it may be an almost totally inadequate tool for quantitative studies of regionally extensive artesian aquifers because the periods of mass transfer and mixing cycles generally are measured in centuries and millennia. Consequently, the use of tritium in hydrology seems better suited for investigations of highly permeable near-surface water-table aquifers, or surface-water bodies having relatively rapid cycling (less than several decades) between the locations of input and output.

In conclusion, (1) scarcity of tritium in nature, (2) the variation in amount of both naturally and artificially produced tritium, (3) its change in abundance with respect to both geographical position and the seasons of the year, (4) its universal distribution and dispersion both in the atmosphere and in the complex surface and near-surface environments of natural water, and (5) the possibility of isotope effects, all create special problems regarding adequate analytical techniques, proper applications, and valid interpretations of tritium usage in hydrology.

POSSIBLE APPLICATIONS OF TRITIUM IN HYDROLOGY

When the various factors and characteristics related to the nature, sources, and abundance of tritium are taken into consideration, as described in the previous section, it has been possible to use tritium

[7] See p. 92, present report.

to determine the age of "young waters" (water precipitated from the atmosphere less than 50 years before sampling). Although the use of tritium to date ground water was given much prominence during the early and middle 1950–60 decade, it probably has been more successfully applied as a pulse-tracing tool. As such, it has been applied in problems designed to obtain information on:

1. The process of recharging ground-water reservoirs.
2. The sources of ground-water pollution.
3. The permeability of aquifers and their interconnections.
4. The velocity and the direction of both ground-water and surface-water flow between specific locations.
5. The areal flow patterns and the stratification effects of different water masses.
6. The dispersion, mixing, and channeling phenomena in surface and ground waters.
7. The rates of soil-moisture movement.
8. Certain chemisorption phenomena of soils and water-bearing materials.
9. The biological intake and release of water.
10. The driving mechanisms involved in secondary recovery of protroleum resources.

If, as is proper, hydrology is defined as the science that relates to the waters of the earth, their occurrence, circulation, and distribution, their chemical and physical properties, and their reaction with all aspects of their environment, then there are a large number of ways in which tritium is rightfully of hydrologic interest. Throughout the compilation of the bibliography, this broadly defined concept of hydrology was used; consequently the range of subjects in the reference list is similarly broad in scope.

DESCRIPTION OF THE BIBLIOGRAPHY

This section describes the bibliography which contains numbered references compiled from the generally available worldwide sources of scientific literature for the period 1942–66. Many articles were consulted directly. A large number of the items were obtained by consulting Chemical Abstracts (C.A.) prepared by the American Chemical Society, and Nuclear Science Abstracts (N.S.A.) published by the U.S. Atomic Energy Commission for articles published during the decade 1957–66. References obtained from C.A., and N.S.A. sources are cataloged for the users convenience in the standard formats (for example, C.A. 32 : 2831) at the end of each such reference. Other sources consulted, although not exhaustively, were the publications of

United Nations and those of the International Atomic Energy Agency. The two deuterium and tritium bibliographies compiled by the U.S. National Bureau of Standards (Brown, Friedman, and Beckett, 1956, and Johnson, Brown, and Friedman, 1957)[8 9] are the sources for much of the literature cited prior to 1954. In addition, a wide range of geological and geophysical literature was consulted including the extensive bibliographies of "Geoscience Abstracts," published by the American Geological Institute, and the "Bibliography of North American Geology," published by the U.S. Geological Survey. In all, it is conservatively estimated that the contents of more than 8,000 different foreign and domestic journals, bulletins, and other publications were consulted by one means or another.

Every attempt has been made to make this bibliography complete with regard to those articles that actually pertain to the direct use of tritium in hydrologic investigations. Subjects impinging on the field of hydrology, for example, biology, various analytical methods, adsorption phenomena, and health physics are given prominent listing, but no attempt is made to make such bibliographic material complete beyond the expected needs of either the hydrologist or geochemist.

This bibliography has three major parts: (1) the main biblography, (2) a classification index (two parts), and (3) an auxiliary reference list. The main bibliography follows the general format of three earlier hydrogen isotope bibliographies (Kimball and others, 1949; Brown, Friedman, and Beckett, 1956; and Johnson, Brown, and Friedman, 1957).[10 11 12]

References are alphabetically arranged by the last name of the first-listed author and are chronologically arranged where more than one reference is by the same author (or authors). Each reference has a letter-number reference that is coded by the first letter of the first-listed author's name. This letter is followed by a number corresponding to the sequential number of the reference for that letter of the alphabet. Authors listed second-, third-, and so forth, are also arranged alphabetically, but without a reference to the title of their article. However, each such entry is cross indexed by name to the first author, and there the title of the article appears. No letter-number code is assigned to other than first-author listings.

Following each bibliographic reference is a coded classification of

[8] See p. 41, present report.

[9] See p. 80, present report.

[10] Kimball, A. H., compiler, Urey, H. C., and Kirshenbaum, Isidor eds., 1949 Bibliography of research on heavy hydrogen compounds, 1st ed.: New York, McGraw-Hill Book Co., 350 p.

[11] See p. 41, present report.

[12] See p. 80, present report.

the principal subject matter reported. Subordinate subject matter is not indicated always by the listed classification. The subject-matter classification used here follows, with appropriate modifications, the nomenclature classification used in the U.S. National Bureau of Standards bibliographies. Because this bibliography is compiled principally for hydrologic purposes, it is more limited in subject matter than these earlier bibliographies, but it is more detailed in regard to those classifications pertaining to hydrology. (For example, see the section entitled "Tracers and Indicators," of the report, p. 153.)

The second part of this bibliography, the classification index, consists of two parts: (1) a principal topics and subject code conveniently placed before the main bibliography, and (2) an alphabetically listed principal-subject index following the main bibliography. The main bibliography can be searched either directly by the author's name, listed alphabetically, or by any of the indexed subject classifications, where the appropriate specific letter-number-reference code assigned to each first-author entry is cross indexed.

The third part of this bibliography is an auxiliary reference list divided into broad fields of knowledge, such as pedology, atmosphere, analytical methods, and ground water. This part is alphabetically arranged by authors within these categories. These references do not refer to tritium studies as such, but are those closely related by the nature of the investigation or by the subject investigated (for example, the behavior of other isotopes in the ground-water environment). They are cited because they contain discussions that may be useful to the hydrologist or geochemist in organizing, carrying out, and interpreting investigations involving tritium. The attempt is not to make the auxiliary reference list exhaustive, but to make it both useful and up to date.

SERIAL PUBLICATIONS CITED IN BIBLIOGRAPHY OF TRITIUM

Acad. Polonaise Sci. Bull., Sér. Sci. Chim.—Bulletin de l'Académie Polonaise des Sciences, Série des Sciences Chimiques. Warsaw, Poland.

Acad. Romîne Studii şi Cercetări Chim.—Academia Republicii Populare Romîne, Studii şi Cercetări de Chimie. Bucharest, Rumania.

Acad. Romîne Studii şi Fizica Atomica—Académia Républicii Populare Romîne, Institutul de Fizica Atomica. Bucharest, Rumania.

Accad. Naz. Lincei Atti, Cl. Sci. Fis., Mat. e Nat. Rend.—Atti dell' Accademia Nazionale dei Lincei, Rendiconti della Classe di Scienze Fisiche, Matematiche, e Naturale. Rome, Italy.

Acta Chem. Scandinavica—Acta Chemica Scandinavica. Copenhagen, Denmark.

Acta Isotopica—Acta Isotopica. Rivista di medicina e biologia nucléare. Istituto di Semeiotica Medica dell' Universita. Padua, Italy.

Acta Physiologica Polonica—Acta Physiologica Polonica. Litterae Societatis Physiologorum Polonorum. Warsaw, Poland.

Advances Biol. and Med. Physics—Advances in Biological and Medical Physics. New York, N.Y.

Advances in Physics—Advances in Physics. [Quarterly supplement to the Philosophical Magazine.] Taylor and Francis, Ltd. London, England.

Advances in Radiation Biology—Advances in Radiation Biology. New York, N.Y.

Agronomy Jour.—Agronomy Journal. American Society of Agronomy. Madison, Wis.

Akad. Nauk SSSR Doklady—Akademiya Nauk SSSR Doklady [Academy of Sciences of the U.S.S.R. (formerly Comptes Rendus [Doklady] Akad. Sci. URSS)]. Moscow, U.S.S.R.

Akad. Nauk Uzbek. SSR Izv., Ser. Fiz.-Mat.—Akademiya Nauk Uzbekskoy SSR, Izvestiya, Seriya Fiziko-Mathematicheskikh. Tashkent, U.S.S.R.

Am. Chem. Soc. Jour.—Journal of the American Chemical Society. Washington, D.C.

Am. Geophys. Union Trans.—Transactions of the American Geophysical Union. Washington, D.C.

Am. Indus. Hygiene Assoc. Jour.—American Industrial Hygiene Association Journal. Baltimore, Md.

Am. Inst. Chem. Engineers Jour.—American Institute of Chemical Engineers Journal. New York, N.Y.

Am. Jour. Botany—American Journal of Botany. Botanical Society of America. Baltimore, Md.

Am. Jour. Diseases of Children—American Journal of Diseases of Children. American Medical Association. Chicago, Ill.

Am. Jour. Roentgenology, Radium Therapy, and Nuclear Medicine—American Journal of Roentgenology, Radium Therapy, and Nuclear Medicine. Springfield, Ill.

Am. Jour. Sci.—American Journal of Science. New Haven, Conn.

Am. Meteorol. Soc. Bull.—Bulletin of the American Meteorological Society. Boston, Mass.

Am. Nuclear Soc. Trans.—American Nuclear Society Transactions. Hinsdale, Ill.

Am. Phys. Soc. Bull.—Bulletin of the American Physical Society. New York, N.Y.

Am. Scientist—American Scientist, Society of the Sigma Xi. New Haven, Conn.

Am. Soc. Civil Engineers Proc., Jour. Hydraulics Div.—Proceedings of the American Society of Civil Engineers, Journal of the Hydraulics Division. New York, N.Y.

Am. Soc. Civil Engineers Proc., Jour. Sanitary Eng. Div.—Proceedings of the American Society of Civil Engineers, Journal of the Sanitary Engineering Division. New York, N.Y.

Am. Soc. Civil Engineers Trans.—Transactions of the American Society of Civil Engineers. New York, N.Y.

Am. Water Works Assoc. Jour.—Journal of the American Water Works Association. New York, N.Y.

Am. Zoologist—American Zoologist. American Society of Zoologists. Chicago, Ill.

Analyst—The Analyst. The Journal of the Society for Analytical Chemistry. Cambridge, England.

Anal. Biochemistry—Analytical Biochemistry. New York, N.Y.

Anal. Chemistry—Analytical Chemistry. American Chemical Society. Washington, D.C.

Anal. Chim. Acta—Analytica Chimica Acta. Amsterdam, Netherlands.

Anatomical Rec.—The Anatomical Record. Wistar Institute of Anatomy and Biology. Philadelphia, Pa.

Angew. Chemie—Angewandte Chemie. Gesellschaft Deutscher Chemiker Kuratorium. Weinheim, Federal Republic of Germany.

Angew. Chemie Internat.—Angewandte Chemie Internationale. (International Edition in English.) Weinheim, Federal Republic of Germany, and Academic Press, Inc. New York, N.Y.

Ann. Rev. Nuclear Sci.—Annual Review of Nuclear Science. Annual Reviews, Inc. Palo Alto, Calif.

Appl. Sci. Research, Sec. B—Applied Scientific Research, Section B. The Hague, Netherlands.

Archiv Gesamte Physiologie—Archiv für die Gesamte Physiologie des Menschen und der Tiere, Pflugers. Springer-Verlag, Berlin-Wilmersdorf, Germany.

Archives Biochemistry and Biophysics—Archives of Biochemistry and Biophysics. New York, N.Y.

Archives Disease Childhood—Archives of Disease in Childhood. British Medical Association. London, England.

Archives Environmental Health—Archives of Environmental Health. American Medical Association. Chicago, Ill.

Archives Internat. Physiologie et Biochimie—Archives Internationales de Physiologie et de Biochimie. Liège, Belgium.

Archives Pathology—Archives of Pathology. The American Society for Experimenal Pathology. Chicago, Ill.

Arid Zone—Arid Zone. United Nations Educational, Scientific, and Cultural Organization. Paris, France.

Assoc. Belge Développement Pacifique Énergie Atom. Bull. Inf.—Association pour le Développement Pacifique de l'Énergie Atomique, Bulletin d'Information. Brussels, Belgium.

Astron. Inst. Czech. Bull.—Astronomical Institutes of Czechoslovakia Bulletin. Czechoslovak Academy of Sciences. Prague, Czechoslovakia.

Astron. Soc. Pacific Pubs.—Astronomical Society of the Pacific Publications. California Academy of Science. San Francisco, Calif.

Astron. Zhur.—Astronomicheski Zhurnal. [Astronomical Journal.] Akademiya Nauk SSSR. Moscow, U.S.S.R.

Atomkernenergie—Zeitschrift für die Anwendung der Kernenergie in Wissenschaft, Technik und Wirtschaft. Munich, Federal Republic of Germany.

Atomlight—Atomlight. New England Nuclear Corporation. Boston, Mass.

Atomnaya Energiya—Atomnaya Energiya. [Atomic Energy.] Akademiya Nauk SSSR. Gosudarstvennyy Komitet Soveta Ministrov SSSR po Ispol'Zovaniyu Atomnoy Energii. Moscow, U.S.S.R.

Atompraxis—Atompraxis. Internationale Monatsschrift für Angewandte Atomenergie in Industrie, Landwirtschaft, Naturwissenschaften, und Med-

izin unter Besonderer Beruecksichtigung der Medizinischen. Strahlenbiologie Sowie des Strahlenschutzes. Karlsruhe, Federal Republic of Germany.

Atomtech.—Atomtechnikai Tajekoztate. [Atomtechnics Bulletin.] Budapest, Hungary.

Atomwirtschaft—Atomwirtschaft. Zeitschrift für die Wirtschaftlichen Fragen der Kernumwandlung. [Journal of Nuclear Industry.] Düsseldorf, Federal Republic of Germany.

Australasian Radiology—Australasian Radiology. Formerly Journal of College Radiologists. Sydney, New South Wales, Australia.

Australian Jour. Chemistry—Australian Journal of Chemistry. Commonwealth Scientific and Industrial Research Organization. Melbourne, Victoria, Australia.

Australian Jour. Sci.—Australian Journal of Science. Australian National Research Council. Science House, Sydney, New South Wales, Australia.

Ber. Bunsenges. Physik. Chemie—Berichte der Bunsengesellschaft für Physikalische Chemie. Weinheim, Federal Republic of Germany.

Biochem. Jour.—The Biochemical Journal. Cambridge, England.

Biochim. et Biophys. Acta—Biochimica et Biophysica Acta. International Journal of Biochemistry and Biophysics. Amsterdam, Netherlands.

Biofizika—Biofizika. [Biophysics.] Moscow, U.S.S.R.

Biokhimiya—Biokhimiya. [Biochemistry.] Moscow, U.S.S.R.

Biophys. Jour.—Biophysical Journal. The Rockefeller University Press. New York, N.Y.

Biul. Wojskowej Akad. Tech. imeni Jaroslawa Dabrowskiego.—Biuletyn Wojskowej Akademii Techniczenj imeni Jaroslawa Dabrowskiego. Warsaw, Poland.

Bol. Soc. Quím. Peru.—Boletín de la Sociedad Química del Peru. Lima, Peru.

Boll. Soc. Italiana Biologia Sperimentale—Bollettino della Società Italiana di Biologia Sperimenale. Naples, Italy.

British Jour. Clinical Practice—British Journal of Clinical Practice. London, England.

British Jour. Radiology—British Journal of Radiology. The British Institute of Radiology. London, England.

Bull. Inf. Sci. et Tech.—Bulletin d'Informations Scientifiques et Techniques. Commissariat à l'Énergie Atomique. Paris, France.

Bull. Soc. Chim. Belge. *See* Soc. Belge Chim. Bull.

Bull. Soc. Lorraine Sci.—Bulletin de la Société Lorraine des Sciences. Nancy, France.

California Medicine—California Medicine. California Medical Association. San Francisco, Calif.

Canadian Jour. Chemistry—Canadian Journal of Chemistry. National Research Council of Canada. Ottawa, Ontario, Canada.

Canadian Jour. Genetics and Cytology—Canadian Journal of Genetics and Cytology. The Genetics Society of Canada. Ottawa, Ontario, Canada..

Canadian Jour. Physics—Canadian Journal of Physics. National Research Council of Canada. Ottawa, Ontario, Canada.

Canadian Mining and Metall. Bull.—The Canadian Mining and Metallurgical Bulletin. Canadian Institute of Mining and Metallurgy. Montreal, Quebec, Canada.

Cancer Research—Cancer Research. American Association for Cancer Research, Inc. Chicago, Ill.

Chem. Rev.—Chemical Reviews. American Chemical Society. Washington, D.C.

Chem. Soc. Japan Bull.—Bulletin of the Chemical Society of Japan. Nippon Kagaku Zasshi. Tokyo, Japan.

Chemist-Analyst—Chemist-Analyst. J. T. Baker Chemical Co. Phillipsburg, N.J.

Chemistry and Industry—Chemistry and Industry. Society of Chemical Industry. London, England.

Chimia—Chimia. Aarau, Switzerland.

Chimie Anal.—Chimie Analytique. Les Presses Documentaires. Paris, France.

Circulation—Circulation. American Heart Association. New York, N.Y.

Clinica Chimica Acta—Clinica Chimica Acta. [International Journal of Clinical Chemistry.] Amsterdam, Netherlands.

Colln. Czech. Chem. Commun.—Collection of Czechoslovakia Chemical Communications. Prague, Czechoslovakia.

Colloid Chemistry—Colloid Chemistry. Reinhold Publishing Corp. New York, N.Y.

Comptes Rendus [France]—Académie des Sciences. Comptes Rendus Hebdomadaires des Séances.

Comptes Rendus [Doklady] Akad. Sci. URSS—Akademiya Nauk SSSR Doklady [Academy of Sciences of the U.S.S.R.]. Moscow, U.S.S.R.

Cryogenics—Cryogenics. London, England.

Current Sci.—Current Science, Current Science Association. Raman Research Institute. Bangalore, India

Dansk-Kemi—Dansk Kemi. Copenhagen, Denmark.

Deutsch. Akad. Wiss. Berlin Abh., Kl. Medizin—Abhandlung der Deutschen Akademie der Wissenschaften zu Berlin, Klasse für Medizin. Berlin, Germany.

Dôitai to Hôshasen—Dôitai To Hôshasen. [Isotopes and Radiation.] Tokyo, Japan.

Eau Potable Assainissement—Eau Potable Assainissement. Eaux Industrielles. Irrigation Revue Mensuelle. Paris, France.

Earth and Planetary Sci. Letters—Earth and Planetary Science Letters. Amsterdam, Netherlands.

Elektromedizin—Elektromedizin und Ihre Grenz gebiete. Zeitschrift für Klinik und Praxis eins chieslich Elektro-Pathologie. Berlin, Germany.

Energia es Atomtech.—Energia es Atomtechnika. [Energy and Atomic Technology.] Budapest, Hungary.

Energía Nuclear—Energía Nuclear. Junta de Energía Nuclear. Madrid, Spain.

Erdöl u. Kohle—Erdöl und Kohle [now Erdöl und Kohle, Erdgas, Petrochemie]. Deutsche Gesellschaft für Mineralölwissenschaft und Kohlechemie. Berlin, Germany.

Experientia—Experientia. [Experiment.] (Monthly Journal of Pure and Applied Science.) Birkhauser Verlag. Basel, Switzerland.

Experimental Cell Research—Experimental Cell Research. International Society for Cell Biology. New York, N.Y.

Faraday Soc. Trans.—Transactions of Faraday Society. Aberdeen, Scotland.

Federation Proc.—Federation Proceedings. Federation of American Societies for Experimental Biology. 9650 Rockville Pike, Bethesda, Md. 20014.

Fizikai Szemle—Fizikai Szemle. Eotvos Lorand Fizikai Tarsulat. Budapest, Hungary.

Fra Fysikkens Verden—Fra Fysikkens Verden. Norsk Fysisk Tidsskrift. Oslo, Norway.

Gazz. Chim. Italiana—Gazzetta Chimica Italiana. Rome, Italy.

Genetics—Genetics. University of Texas. Austin, Tex.

Genshiryoku Kogyo—Genshiryoku Kogyo. [Nuclear Engineering.] Tokyo, Japan.

Geochim. et Cosmochim. Acta—Geochimica et Cosmochimica Acta. Pergamon Press. London, England.

Geol. Fören. Stockholm Förh.—Geologiska Föreningens i Stockholm Förhandlingar. Stockholm, Sweden.

Geologiya Nefti i Gaza—Geologiya Nefti i Gaza. [Petroleum and Gas Geology.] Organ Gosudarstvennogo Nauchnotekhnicheskogo Komitet Soveta Ministrov SSSR. Moscow, U.S.S.R.

Geol. Soc. America Bull.—Geological Society of American Bulletin. Boulder, Colo.

Geotimes—Geotimes. American Geological Institute. Washington, D.C.

Grundförbättring—Grundförbättring. [Journal of Agricultural Efficiency Through Soil Improvement.] Uppsala, Sweden.

Health Physics—Health Physics. Journal of the Health Physics Society. New York, N.Y.

Helvetica Chimica Acta—Helvetica Chimica Acta. Endenda Curat Societas Chimica Helvetica. Basel, Switzerland.

Helvetica Physica Acta—Helvetica Physica Acta. Societas Physicae Helveticae. Basel, Switzerland.

Időjárás—Időjárás. [Weather.] Budapest, Hungary.

Indian Acad. Sci. Proc.—Proceedings of the Indian Academy of Sciences. Bangalore, India.

Indus. and Eng. Chemistry—Industrial and Engineering Chemistry. American Chemical Society. Washington, D.C.

Industries Atomiques—Industries Atomiques. Geneva, Switzerland.

Inst. Français Pétrole Rev.—Revue de l'Institut Français du Pétrole et Annales des Combustibles Liquides. Paris, France.

Internat. Angew. Chemie. *See* Angew. Chemie Internat.

Internat. Assoc. Sci. Hydrology Bull.—Bulletin of the International Association of Scientific Hydrology. Gentbrugge, Belgium.

Internat. Jour. Appl. Radiation and Isotopes—International Journal of Applied Radiation and Isotopes. Pergamon Press, Inc. New York, N.Y.

Internat. Jour. Radiation Biology—International Journal of Radiation Biology and Related Studies in Physics, Chemistry, and Medicine. London, England.

Isotopentechnik—Isotopentechnik. Zeitschrift für die Anwendung Radioaktiver und Stabiler Isotope. Leipzig, Germany.

Isotopes and Radiation Technology—Isotopes and Radiation Technology. U.S. Atomic Energy Commission. Washington, D.C.

Isotopes and Radiation (Tokyo). *See* Doitai To Hoshasen.

Jaderna Energia—Jaderna Energia. [Nuclear Energy.] Prague, Czechoslovakia.

Japanese Jour. Appl. Physics—Japanese Journal of Applied Physics. Published jointly by the Physical Society of Japan and The Japan Society of Applied Physics. Tokyo, Japan.

Jena Review—Jena Review. Jenaer Rundschau. Jena, Germany.

Jökull—Jökull. Ársrit Jöklarannsóknafélags Islands. Reykjavík, Iceland.

Jour. Agr. and Food Chemistry—Journal of Agricultural and Food Chemistry. American Chemical Society. Washington, D.C.

Jour. Am. Indus. Hygiene Assoc.—*See* Am. Indus. Hygiene Assoc. Jour.

Jour. Appl. Meteorology—Journal of Applied Meteorology. American Meteorological Society. Boston, Mass.

Jour. Appl. Physics—Journal of Applied Physics. American Institute of Physics. New York, N.Y.

Jour. Appl. Physiology—Journal of Applied Physiology. Washington, D.C.

Jour. Assoc. Official Agr. Chemists—Journal of the Association of Official Agricultural Chemists. Washington, D.C.

Jour. Atmos. and Terrest. Physics—Journal of Atmospheric and Terrestrial Physics. Pergamon Press. London, England.

Jour. Biochemistry—The Journal of Biochemistry. The Japanese Biochemical Society. Tokyo, Japan.

Jour. Biol. Chemistry—The Journal of Biological Chemistry. American Society of Biological Chemists, Inc. Baltimore, Md.

Jour. Biophys. and Biochem. Cytology—Journal of Biophysical and Biochemical Cytology. New York, N.Y.

Jour. Cellular and Comp. Physiology—Journal of Cellular and Comparative Physiology. Wistar Institute of Anatomy and Biology. Philadelphia, Pa.

Jour. Chem. Education—Journal of Chemical Education. American Chemical Society. Easton, Pa.

Jour. Chem. Physics—Journal of Chemical Physics. American Institute of Physics. New York, N.Y.

Jour. Chem. Soc.—Journal of the Chemical Society. London, England.

Jour. Chimie Phys. et Physicochimie Biol.—Journal de Chimie Physique et de Physicochimie Biologique. Paris, France.

Jour. Chromatography—Journal of Chromatography. Elsevier Publishing Co. Amsterdam, Netherlands.

Jour. Clinical Inv.—The Journal of Clinical Investigation. American Society for Clinical Investigations, Inc. New Haven, Conn.

Jour. College Radiologists Australasia. (Title changed to Australasian Radiology.) Sydney, New South Wales, Australia.

Jour. Electroanal. Chemistry—Journal of Electroanalytical Chemistry. Elsevier Publishing Co. Amsterdam, Netherlands.

Jour. Experimental Zoology—Journal of Experimental Zoology. Wistar Institute of Anatomy and Biology. Philadelphia, Pa.

Jour. Gas Chromatography—Journal of Gas Chromatography. Evanston, Ill.

Jour. Gen. Physiology—Journal of General Physiology. Rockefeller Institute Press. New York, N.Y.

Jour. Geology—Journal of Geology. University of Chicago Press. Chicago, Ill.

Jour. Geophys. Research—Journal of Geophysical Research. American Geophysical Union. Washington, D.C.

Jour. Hydrology—Journal of Hydrology. North-Holland Publishing Co. Amsterdam, Netherlands.

Jour. Hydrology—Journal of Hydrology. Marton, New Zealand.

Jour. Inorganic and Nuclear Chemistry—Journal of Inorganic and Nuclear Chemistry. Pergamon Press. London, England.

Jour. Inst. Petroleum—Journal of the Institute of Petroleum. London, England.

Jour. Lab. and Clinical Medicine—Journal of Laboratory and Clinical Medicine. Central Society for Clinical Research. St. Louis, Mo.

Jour. Lipid Research—Journal of Lipid Research. American Institute of Biological Sciences. Washington, D.C.

Jour. Natl. Cancer Inst.—Journal of the National Cancer Institute. National Institute of Health. U.S. Public Health Service. Washington, D.C.

Jour. Neurochemistry—Journal of Neurochemistry. Pergamon Press, Inc. New York, N.Y.

Jour. Nuclear Energy—Journal of Nuclear Energy. New York, N.Y.

Jour. Oceanog. Soc. Japan. *See* Oceanog. Soc. Japan Jour.

Jour. Petroleum Technology—Journal of Petroleum Technology. Society of Petroleum Engineers of the American Institute of Mining, Metallurgical, and Petroleum Engineers. Dallas, Tex. .

Jour. Phys. and Colloid Chemistry. *See* Jour. Phys. Chemistry. (Title was changed January 1947 to Journal of Physical and Colloid Chemistry. Title was changed back to Journal of Physical Chemistry in January 1952.)

Jour. Phys. Chemistry—Journal of Physical Chemistry. American Chemical Society. Washington, D.C.

Jour. Physiology—The Journal of Physiology. London, England.

Jour. Radiation Research—Journal of Radiation Research. Tokyo, Japan.

Jour. Radiologie, Électrologie, Médecine Nucléaire—Journal de Radiologie, d'Électrologie, et de Médecine Nucléaire. Paris, France.

Jour. Sci. Instruments—Journal of Scientific Instruments. The Institute of Physics and The Physical Society. London, England.

Jour. Water Pollution Control Federation—Journal of the Water Pollution Control Federation. (Formerly Sewage and Industrial Wastes.) Washington, D.C.

Kagaku (Kyoto)—Kagaku Hyoren. [Chemical Review.] Industrial Chemistry Laboratory. Kyoto University. Kyoto, Japan.

Kagaku No Ryoiki—Kagaku No Ryoiki. [Journal of Japanese Chemistry.] Toyko, Japan.

Kernenergie—Kernenergie. Zeitschrift für Kernforschung und Kerntechnik. Berlin, Germany.

Kerntechnik—Kerntechnik. Isotopentechnik und Chemie. Zeitschrift für Ingenieure aller Fachrichtungen. Munich, Federal Republic of Germany.

Kgl. Norske Vidensk. Selsk. Förh.—Det Kongelige Norske Videnskabers Selskabs, Förhandlinger. Trondheim, Norway.

Khimiya i Tekhnologiya Topliv i Masel —Khimiya i Tekhnologiya Topliv i Masel. [Chemistry and Technology of Fuel and Oil.] Organ Ministerstva Neftianoi Promyshlennosti SSSR. Moscow, U.S.S.R.

Kinetika i Kataliz—Kinetika i Kataliz. [Kinetics and Catalysts.] Izdatel'stvo Akademiya Nauk SSSR. Moscow, U.S.S.R.

Kisul Yon'guso Pogo—Kisul Yon'guso Pogo. (Formerly Kwayon Hwibo.) [Bulletin of the Scientific Research Institute.] Ministry of National Defense Seoul, Korea.

Kunststoffe—Kunststoffe. [Plastics.] Internationale Zeitschrift für das Gesamte Kunststoffgebiet, Solothurn, Switzerland.

Kwart. Geol.—Kwartalnik Geologiczny. Instytut Geologiczny. Warsaw, Poland.

Lab. Inv.—Laboratory Investigation. International Academy of Pathology. Baltimore, Md.

Lab. Practice—Laboratory Practice. Research Control, Teaching. London, England.

Lancet—The Lancet. (A Journal of British and Foreign Medicine.) London, England.

Magyar Kémiai Folyóirat—Magyar Kémiai Folyóirat. [Hungarian Journal of Chemistry.] Budapest, Hungary.

Magyar Kémikusok Lapja—Magyar Kémikusok Lapja. [Journal of the Hungarian Chemical Society.] Budapest, Hungary.

Medd. om Grønland—Meddelelser om Grønland. Udgivne af Kommissionen for Videnskabelige Undersøgelser i Grønland. Copenhagen, Denmark.

Medicina del Lavoro—La medicina del Lavoro. Milan, Italy.

Meditsinskaya Radiologiya—Meditsinskaya Radiologiya. [Medical Radiology.] Moscow, U.S.S.R.

Meidensha Jiho—Meidensha Jiho. [Meidensha Review.] Meidensha Electric Manufacturing Co., Ltd. Tokyo, Japan.

Microchem. Jour.—Microchemical Journal. Metropolitan Microchemical Society. New York, N.Y.

Mikrochim. Acta—Mikrochimica Acta. Vienna, Austria.

Minerva Nucleare—Minerva Nucleare. [International Review of Nuclear Biology and Medicine.] Turin, Italy.

Mutation Research—Mutation Research. Amsterdam, Netherlands.

Nature—Nature. (A Weekly Journal of Science.) Macmillan (Journals), Ltd. London, England.

Naturwissenschaften—Die Naturwissenschaften. Gesellschaft Deutscher Naturforscher und Arzte, und die Max-Planck-Gesellschaft zur Förderung der Wissenschaften. Berlin, Germany.

Neurologiia Psikhiatriia—Neurologiia Psikhiatriia. Ministry of Public Health and Welfare. Sofia, Bulgaria.

New Jersey Acad. Sci. Bull.—Bulletin of New Jersey Academy of Science. Madison, N.J.

New York Acad. Sci. Annals—Annals of the New York Academy of Sciences. New York, N.Y.

New Zealand Jour. Geology and Geophysics—New Zealand Journal of Geology and Geophysics. New Zealand Department of Scientific and Industrial Research. Wellington, New Zealand.

New Zealand Jour. Sci.—New Zealand Journal of Science. New Zealand Department of Scientific and Industrial Research. Wellington, New Zealand.

Nippon Dojo-Hiryogaku Zasshi—Nippon Dojo-Hiryogaku Zasshi. [Journal of the Science of Soil and Manure.] National Institute of Agricultural Sciences. Tokyo, Japan.

Nippon Kagaku Zasshi. *See* Chem. Soc. Japan Bull.

Nippon Nogeikagaku Kaishi—Nippon Nogeikagaku Kaishi. [Journal of the Agricultural Chemical Society of Japan.] Tokyo, Japan.

Nuclear Instruments and Methods—Nuclear Instruments and Methods. Amsterdam, Netherlands.

Nuclear Physics—Nuclear Physics. Amsterdam, Netherlands.

Nuclear Safety—Nuclear Safety. U.S. Atomic Energy Commission. Superintendent of Documents. Washington, D.C.

Nuclear Sci. Abs.—Nuclear Science Abstracts. Washington, D.C.

Nuclear Sci. and Eng.—Nuclear Science and Engineering. Journal of the American Nuclear Society. Hinsdale, Ill.

Nucleonics—Nucleonics. McGraw-Hill Publishing Co. New York, N.Y.

Nukleonik—Nukleonik, Berlin, Germany.

Nukleonika—Nukleonika. Polska Akademie Nauk. Komitet do Spraw Pokojowege Wykorzystania Energii Jadrowej. Polish Academy of Sciences Committee for Peaceful Uses of Nuclear Energy. Warsaw, Poland. (English translation for the U.S. Atomic Energy Commission and the National Science Foundation, Washington, D.C.)

Nuovo Cimento—Il Nuovo Cimento. Organo della Società Italiana di Fisica sotto gli Auspici del Consiglio Nazionale delle Ricerche. Bologna, Italy.

Observatory—The Observatory. The Royal Greenwich Observatory. Hailsham, Sussex, England.

Oceanog. Soc. Japan Jour.—Journal of the Oceanographical Society of Japan. [Nihon Kaiyo Gakkai.] Tokyo, Japan.

Oil and Gas Jour.—Oil and Gas Journal. Petroleum Publishing Co. Tulsa, Okla.

Oncologia—Oncologia. [Journal of Cancer Research, Prevention, Treatment, and Sociological Aspect] Basel, Switzerland.

Onde Élec.—Onde Électrique. Société des Radioélectriciens. Paris, France.

Oyo Butsuri—Oyo Butsuri. [Japanese Journal of Applied Physics.] Published jointly by the Physical Society of Japan and The Japan Society of Applied Physics. Tokyo, Japan.

Philos. Mag.—The Philosophical Magazine. (A Journal of Theoretical, Experimental, and Applied Physics.) Taylor and Francis, Ltd. London, England.

Phys. Blätter—Physikalische Blätter. Baden, Federal Republic of Germany.

Phys. Rev.—The Physical Review. American Institute of Physics. New York, N.Y.

Phys. Rev. Letters—Physical Review Letters. American Institute of Physics. New York, N.Y.

Physica—Physica. Physica Foundation. Amsterdam, Netherlands.

Physics—Physics. Physics Foundation. Amsterdam, Netherlands.

Physics Abs.—Physics Abstracts. *See* Sci. Abs., Section A.

Physics and Chemistry Glasses—Physics and Chemistry of Glasses. Section B *of* Journal of Glass Technology. Sheffield, England.

Physics in Medicine and Biology—Physics in Medicine and Biology. Hospital Physicists Association. London, England.

Physiol. Rev.—Physiological Reviews. Washington, D.C.

Plant Physiology—Plant Physiology. American Society of Plant Physiologists. Kutztown, Pa.

Postepy Biochemii—Postepy Biochemii. [Progress in Biochemistry.] Warsaw, Poland.

Prog. Biophysics and Biophys. Chemistry—Progress in Biophysics and Biophysical Chemistry. New York, N.Y.

Prog. Cardiovascular Diseases—Progress in Cardiovascular Diseases. New York, N.Y.

Prog. Elementary Particle and Cosmic Ray Physics—Progress in Elementary Particle and Cosmic Ray Physics. Amsterdam, Netherlands.

Prog. Medicine—Progress in Medicine. [Igaku No Ayumi.] Tokyo, Japan.

Pure and Appl. Chemistry—Pure and Applied Chemistry. London, England.

Radiation Botany—Radiation Botony. New York, N.Y.

Radiation Research—Radiation Research. New York, N.Y.

Radiochim. Acta—Radiochimica Acta. Frankfurt- am- Main, Federal Republic of Germany.

Radioisotopes—Radioisotopes. Nippon Hoshasen Doigenso Kyokai. The Japan Radioisotopes Association. Tokyo, Japan.

Radiokhimiya—Radiokhimiya. Akademiya Nauk SSSR. Moscow, U.S.S.R.

Radiologia Clinica—Radiologia Clinica. International Radiological Review. Basel, Switzerland.

Razved. i Okhrana Nedr—Razvedka i Okhrana Nedr. [Development and Conservation of Natural Resources.] Organ Ministerstva Geologii i Okhrany Nedr SSSR. Gosgeoltekhizdat. Moscow, U.S.S.R.

Referativnyi Zhur. Geofiz.—Referativnyi Zhurnal, Geofizika. [Abstract Journal, Geophysics.] Institut Nauchnoi Informatsii Akademiya Nauk SSSR. Moscow, U.S.S.R.

Repts. Prog. Physics—Reports on Progress in Physics. Institute of Physics and Physical Society. London, England.

Research—Research Applied in Industry. Butterworths Scientific Publications. London, England.

Rev. Fermentations Industries Alimentaires—Revue des Fermentations et des Industries Alimentaires. Société Belge de Zymologie Pure et Appliquée. Brussels, Belgium.

Rev. Inst. Français Petrole. *See* Inst. Français Petrole.

Rev. Med. Toulouse—Revue Medicale de Toulouse. Société de Medicine, Chirurgie, et Pharmacie. Toulouse, France.

Rev. Sci. Instruments—Review of Scientific Instruments. American Institute of Physics. New York, N.Y.

Ricerca Sci.—La Ricerca Scientifica. Rivista del Consiglio Nazionale delle Ricerche. Rome, Italy.

Riv. Meteorologia Aeronautica—Rivista di Meteorologia Aeronautica. Rome, Italy.

Scandinavian Jour. Haemotology—Scandinavian Journal of Haemetology. Copenhagen, Denmark.

Schweizer Archiv Angew. Wiss. Tech.—Schweizer Archiv für Angewandte Wissenschaft und Technik. Solothurn, Switzerland.

Science—Science. American Association for the Advancement of Science. Washington, D.C.

Sci. Abs.—Science Abstracts. Section A: Physics Abstracts, The Institute of Electrical Engineers, Savoy Place, Victoria Embankment, London, England.

Sci. Monthly. 1939–43. (Merged with Science.) American Association for the Advancement of Science. Washington, D. C.

Sewage and Industrial Wastes. (Name changed January 1960 to Journal of the Water Pollution Control Federation.)

Shitsuryo Bunseki—Shitsuryo Bunseki gakkai. [Mass Spectroscopy.] Tokyo, Japan.

Silicates Industriels—Silicates Industriels. Brussels, Belgium.

Soc. Belge Chim. Bull.—Société Chimique de Belgique (continuation of Bulletin de la Société Belge de Chimique). Brussels, Belgium.

Soc. Experimental Biology Medicine Proc.—Society for Experimental Biology and Medicine Proceedings. New York, N.Y.

Soc. Royale Sci. Liège Bull.—Société Royale des Sciences de Liège Bulletin. Liège, Belgium.

Soc. Vaudoise Sci. Nat. Bull.—Bulletin de la Société Vaudoise des Sciences Naturelles. Lausanne, Switzerland.

Soil Sci.—Soil Science. Williams and Wilkins Co. Baltimore, Md.

Soil Sci. Soc. America Proc.—Soil Science Society of America Proceedings. Madison, Wis.

Soviet Atomic Energy—Soviet Atomic Energy. (Formerly Soviet Journal of Atomic Energy. Translation of Atomnaya Ernergiya.) New York, N.Y.

Soviet Jour. Atomic Energy. *See* Soviet Atomic Energy.

Spectrochim. Acta—Spectrochimica Acta. Pergamon Press, Inc. New York, N.Y., and Oxford, England.

Stain Technology—Stain Technology. Biological Stain Commission. Baltimore, Md.

Strahlenschutz Forschung Praxis—Strahlenschutz in Forschung und Praxis. Verlag. Rombach & Co., Freiburg im Breisgau, Federal Republic of Germany.

Strahlentherapie—Strahlentherapie. Munich, Federal Republic of Germany.

Studii Cercetari Chim.—Studii si Cercertari de Chimie. Bucharest, Rumania.

Svensk Kem. Tidskr.—Svensk Kemisk Tidskrift. Svenska Kemistsamfundet Stockholm, Sweden.

Talanta—Talanta. [An International Journal of Analytical Chemistry.] Pergamon Press. London, England.

Tehnika—Tehnika. Belgrade, Yugoslavia.

Tellus—Tellus. [Earth. Swedish Geochemical Society] (A Quarterly Journal of Geophysics.) Svenske Geofysiska Föreningen. Stockholm, Sweden.

Tijdschr. Soc. Geneeskunde—Tijdschrift voor Social Geneeskunde Algemeine Nederlandische vereeneging. Delft, Netherlands.

Travaux Soc. Pharmacie Montpellier—Travaux de la Société de Pharmacie de Montpellier. Montpellier, France.

U.S. Natl. Bur. Standards Jour. Research—United States National Bureau of Standards Journal of Research. Gaithersburg, Md.

Uspekhi Khim.—Uspekhi Khimii. [Advances in Chemistry (for English translation see Russian Chemical Review).] Akademiya Nauk SSSR, Moscow, U.S.S.R.

Vacuum—Vacuum. International Journal and Abstracting Service for Vacuum Research and Technology. New York, N.Y.

Washington Acad. Sci. Jour.—Journal of the Washington Academy of Sciences. Washington, D.C.

Water and Sewage Works—Water and Sewage Works. Scranton Publishing Co. Chicago, Ill.

Water Resources Bull.—Water Resources Bulletin. American Water Resources Association. Urbana, Ill.

Water Resources Research—Water Resources Research. American Geophysical Union. Washington, D.C.

World Meteorol. Organization Bull.—World Meteorological Organization Bulletin. Geneva, Switzerland.

Yakugaku Zasshi—Yakugaku Zasshi. [Journal of the Pharmaceutical Society of Japan.] Tokyo, Japan.

cher Chemie. Springer-Verlag. Berlin, Germany.

Zeitschr. Anal. Chemie—Fresenius' Zeitschrift für Analytische Chemie. Unter Mitwirkung der Fachgruppe Analytische Chemie der Gesellschaft Deutscher Chemie. Springer-Verlag. Berlin, Germany.

Zeitschr. Angew. Physik—Zeitschrift für Angewandte Physik. Unter Mitwirkung des Verbandes Deutscher Physikalischer Gesellschaften. Berlin, Germany.

Zeitschr. Elektrochemie—Zeitschrift für Elektrochemie. Weinheim, Federal Republic of Germany.

Zeitschr. Naturforschung—Zeitschrift für Naturforschung. Verlag der Zeitschrift für Naturforschung. Tübingen, Federal Republic of Germany.

Zeitschr. Pflanzenernähr., Düngung Bodenkunde—Zeitschrift für Pflanzenernährung Düngung Bodenkunde. Weinheim, Federal Republic of Germany.

Zeitschr. Physik—Zeitschrift für Physik. Deutschen Physikalischen Gesellschaft. Springer-Verlag. Berlin, Germany.

Zentralblatt für Biol. Aerosol Forschung—Zentralblatt für Biologische Aerosol Forschung. Stuttgart, Federal Republic of Germany.

Zhur. Anal. Khimii—Zhurnal Analiticheskoi Khimii. [Journal of Analytical Chemistry.] Akademiya Nauk SSSR. Moscow, U.S.S.R.

Zhur. Fiz. Khimii—Zhurnal Fizicheskoi Khimii. [Journal of Physical Chemistry.] Akademiya Nauk SSSR. Moscow, U.S.S.R.

Zhur. Tech. Fiziki—Zhurnal Tekhnicheskoi Fiziki. Akademiya Nauk SSSR. [Journal of Technical Physics.] Leningrad, U.S.S.R.

CLASSIFICATION INDEX—
PRINCIPAL TOPICS AND SUBJECT CODE

Ab Abundance:
- Ab_{art} In laboratory and artificial production.
- Ab_{atm} In atmosphere and precipitation.
- Ab_{gw} In ground water (meteoric and connate brines).
- Ab_{Hy} In worldwide hydrologic environments and hydrologic cycle.
- Ab_{ju} In juvenile water.
- Ab_{ocean} In ocean water.
- Ab_{Pe} In pedology (soils) and agronomy.
- Ab_{snow} In snow, ice, and glaciers.
- Ab_{sw} In surface waters (rivers, lakes, ponds, reservoirs, and water supplies).
- Ab_{terr} In earth, rock, and aquifer materials.

AbG Geological and natural:
- AbG_{atm} In atmosphere and precipitation.
- AbG_{gw} In ground water (meteoric and connate brines).
- AbG_{Hy} In worldwide hydrologic environments.
- AbG_{ju} In juvenile water.
- AbG_{met} In meteorites.
- AbG_{ocean} In ocean water.
- AbG_{sat} In satellites.
- AbG_{snow} In snow, ice, and glaciers.
- AbG_{sw} In surface water (rivers, lakes, ponds, reservoirs, and water supplies).
- AbG_{terr} In earth, rock, and aquifer materials.

AbO Organic (including uptake, biological half life, and fractionation).

Ad Adsorption and sorption:
- Ad_{gw} Aquifers and filters.
- AdC Chromatography.
- AdG Gases on solids.
- AdL Liquids on solids.

An Analytical methods:
- AnC Counters, cloud chambers, electrometers, ionization chambers, photographic emulsions, and autoradiography.
- AnCl Colorimetric methods.
- AnDn Density methods.
- AnMs Mass spectrograph and mass spectrometer.
- AnSp Absorption spectra.
- AnTh Thermal conduction.

Bi Biological effects of tritium and tritium compounds:
- BiB Botanical.
- BiC Biochemical.
- BiZ Zoological.

Ec Electrochemical properties:
- EcC Conductivities and mobilities.

El Electromagnetic and optical properties (except spectra):
- ElCl Color effects.
- ElGd Gas discharges.
- ElMm Magnetic moments.
- ElSc Light scattering.

Eq Chemical equilibria:
- EqG Gaseous.
- EqH Heterogeneous.
- EqI Ionic.
- EqL Liquid and solution.

Ge General and review:
- Ab Abundance:
  - AbG Geological and natural.
  - AbO Organic.
- Ad Adsorption and sorption.
- An Analytical methods.
- Bi Biological effects of tritium and tritium compounds.
- Eq Chemical equilibria.
- Ha Handling, storage, contamination, health hazards, and safety.
- In Indicator and tracer techniques:
  - In_{art} Laboratory, reactors, and artificial production.
  - In_{atm} Atmosphere and precipitation.
  - In_{gw} Ground water (meteoric and connate brines).
  - In_{Hy} Worldwide hydrologic environments, hydrologic budgets and cycles, recharge, and evapotranspiration.
  - In_{hy} Hydraulics, rates of recharge and movement, velocities, reservoir volumes, dilution, yield, and analysis of flow character.
  - In_{met} Meteorites.
  - In_{ocean} Ocean water.
  - In_{Pe} Pedology (soils) and agronomy.
  - In_{sat} Satellites
  - In_{snow} Snow, ice, and glaciers.
  - In_{sw} Surface waters (rivers, lakes, ponds, and reservoirs).
  - In_{terr} Earth, rock, and aquifer materials.
  - InA Age determinations:
    - InA_{atm} Atmosphere and precipitation.
    - InA_{gw} Ground water (meteoric and connate brines).
    - InA_{sw} Surface waters (rivers, lakes, ponds, and reservoirs).
  - InBi Biological.
  - InG Geological nature.
  - InKi Reaction kinetics.
- Is Isotope effects:
  - IsEq Chemical equilibria.
  - IsKi Reaction kinetics.
- Ki Chemical kinetics:
  - KiB Biochemical.
  - KiG Gaseous.

Ge General and review—Continued
- Ki Chemical kinetics—Continued
  - KiI Ionic.
  - KiL Liquid and solution.
  - KiP Photochemical.
  - KiR Radiochemical.
- Me Mechanical properties:
  - MeDf Diffusion, dispersion, convection, mass transport, and permeability:
    - $MeDf_{atm}$ Atmosphere and precipitation.
    - $MeDf_{gw}$ Ground water (meteoric and connate brines).
    - $MeDf_{Hy}$ Worldwide hydrologic environments.
    - $MeDf_{ocean}$ Ocean water.
    - $MeDf_{Pe}$ Pedology (soils) and agronomy.
    - $MeDf_{sw}$ Surface waters (rivers, lakes, ponds, and reservoirs).
    - $MeDf_{terr}$ Earth, rock, and aquifer materials.
- No Nomenclature.
- Nu Nuclear properties:
  - NuB Beta-ray spectra.
- Sa Sampling techniques.
- Se Isotope separation and enrichment:
  - SeAd Adsorption (including chromatography and ion exchange).
    - $SeAd_{bi}$ Biology.
    - $SeAd_{gw}$ Ground water (meteoric and connate brines).
    - $SeAd_{Pe}$ Pedology (soils) and agronomy.
  - SeDf Diffusion (including thermal diffusion).
  - SeEl Electrolysis.
- Sy Synthesis and preparation of compounds.
- Th Thermodynamic and related properties.

Ha Handling, storage, contamination, health hazards, and safety.

In Indicator and tracer techniques:
- In_{art} Laboratory, reactors, and artificial production.
- In_{atm} Atmosphere and precipitation.
- In_{gw} Ground water (meteoric and connate brines).
- In_{Hy} Worldwide hydrologic environments, hydrologic budgets and cycles, recharge, and evapotranspiration.
- In_{hy} Hydraulics, rates of recharge and movement, velocities, reservoir volume, dilution, yield, analysis of flow character.
- In_{ju} Juvenile water.
- In_{met} Meteorites.
- In_{ocean} Ocean water.
- In_{Pe} Pedology (soils) and agronomy.
- In_{sat} Satellites.
- In_{snow} Snow, ice, and glaciers.
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- In_{terr} Earth, rock, and aquifer materials.
- InA Age determinations:
  - InA_{atm} Atmosphere and precipitation.
  - InA_{gw} Ground water (meteoric and connate brines).
  - InA_{Hy} Worldwide hydrologic environments, hydrologic budgets and cycles, recharge, and evapotranspiration.

In Indicator and tracer techniques—Continued
- InA Age determinations—Continued
  - InA_{met} Meteorites.
  - InA_{ocean} Ocean water.
  - InA_{Pe} Pedology (soils) and agronomy.
  - InA_{sat} Satellites.
  - InA_{snow} Snow, ice, and glaciers.
  - InA_{sw} Surface waters (rivers, lakes, ponds, and reservoirs).
  - InA_{terr} Earth, rock, and aquifer materials.
- InBi Biological.
- InG Geological nature.
- InKi Reaction kinetics.
- InSo Solubility determinations.
- InSp Spectra.

Is Isotope effects:
- Is_{Pe} Pedology (soils) and agronomy.
- IsCr Crystal structure.
- IsEq Chemical equilibria.
- IsKi Reaction kinetics.
- IsMs Mass spectra.
- IsSp Spectra.
- IsTh Thermodynamic properties.

Ki Chemical kinetics:
- KiB Biochemical.
- KiG Gaseous.
- KiH Heterogeneous.
- KiI Ionic.
- KiL Liquid and solution.
- KiP Photochemical.
- KiR Radiochemical.

Me Mechanical properties:
- MeD Density and molar volume.
- MeDf Diffusion, dispersion, convection, mass transport, and permeability.
  - $MeDf_{art}$ Laboratory and artificial production.
  - $MeDf_{atm}$ Atmosphere and precipitation.
  - $MeDf_{gw}$ Ground water (meteoric and connate brines).
  - $MeDf_{Hy}$ Worldwide hydrologic environments, hydrologic budgets and cycles, recharge, and evapotranspiration.
  - $MeDf_{met}$ Meteorites.
  - $MeDf_{ocean}$ Ocean water.
  - $MeDf_{Pe}$ Pedology (soils) and agronomy.
  - $MeDf_{snow}$ Snow, ice, and glaciers.
  - $MeDf_{sw}$ Surface waters (rivers, lakes, ponds, and reservoirs).
  - $MeDf_{terr}$ Earth, rock, and aquifer materials.
- MeSt Surface tension.
- MeV Viscosity.

No Nomenclature.

Nu Nuclear properties:

Nu Nuclear properties:
- **NuB** Beta-ray spectra.
- **NuH** Hyperfine structure.
- **NuIn** Interactions (absorption of radiation, ranges, and scattering).
- **NuM** Masses and binding energies.
- **NuP** Piles, reactors, and accelerators.
- **NuR** Reactions.
- **NuRe** Magnetic resonances.
- **NuS** Spins, states, and wave functions.
- **NuSt** Statistics.

Sa Sampling techniques:
- **Sa_{atm}** Atmosphere and precipitation.
- **Sa_{gw}** Ground water (meteoric and connate brines).
- **Sa_{sw}** Surface waters (rivers, lakes, ponds, and reservoirs).

Sd Solid state:
- **SdNu** Nuclear properties.
- **SdSp** Spectra.
- **SdTr** Transitions (including phase transitions).

Se Isotope separation and enrichment:
- **SeAd** Adsorption (including chromatography and ion exchange):
  - **$SeAd_{atm}$** Atmosphere and precipitation.
  - **$SeAd_{bi}$** Biology.
  - **$SeAd_{gw}$** Ground water (meteoric and connate brines).
  - **$SeAd_{Hy}$** Worldwide hydrologic environments, hydrologic budgets and cycles, recharge, and evapotranspiration.
  - **$SeAd_{ocean}$** Ocean water.
  - **$SeAd_{Pe}$** Pedology (soils) and agronomy.
  - **$SeAd_{sw}$** Surface waters (rivers, lakes, ponds, and reservoirs).
  - **$SeAd_{terr}$** Earth, rock, and aquifer materials.
- **SeDf** Diffusion (including thermal diffusion):
  - **$SeDf_{art}$** Laboratory, reactors, and artificial production.
  - **$SeDf_{gw}$** Ground water (meteoric and connate brines).
  - **$SeDf_{met}$** Meteorites.
  - **$SeDf_{sat}$** Satellites.
- **SeDs** Distillation.
- **SeEl** Electrolysis.
- **SeMs** Mass spectrometer and mass spectrograph.
- **SeSo** Solubility.

So Solubility:
- **SoO** In organic solvents.

Sp Spectra and spectroscopic constants:
- **SpEl** Molecular electronic.
- **SpFl** Fluorescence and luminescence.
- **SpVi** Vibrational (including Raman).
- **SpX** X-ray.

Sr Mass spectrometry.

St Molecular structure:
- **StD** Molecular constants (interatomic distances, bond angles, moments of inertia, and force constants).

St Molecular structure—Continued
Sy Synthesis and preparation of compounds.
Th Thermodynamic and related properties:
- ThD Diffusion and heat conduction.
- ThF Thermodynamic functions for pure substances and reactions between them (E, H, S, C_v, C_p, F, K, ΔH, ΔE, ΔS, ΔC_p, ΔF, data of state, and thermal expansion).
- ThP Phase equilibria (melting points, triple points, boiling points, heat of transition, critical constants, and vapor pressures).
- ThS Statistical mechanics and statistical thermodynamics.
- ThSo Properties of solutions (activities, fugacities, pH, vapor pressures, heat of solution and dilution, and colligative properties).

MAIN BIBLIOGRAPHY—BIBLIOGRAPHY AND AUTHOR INDEX

A

A1 **Abdullaev, A. A., Khaitov, B. K., Lobanov, E. M., and Khaidarov, A. A.,** 1962, Measurement of the activity of tritium in samples of water: Akad. Nauk Uzbek. SSR Izv., Ser. Fiz.-Mat., v. 6, no. 5, p. 40–44 [in Russian]. C.A. 58: 7721 h. AnC.

Ackerman, M. E. *See* Hodgson, T. S.

Aeberhardt, A. *See* Fallot, P.

Aebi, Hugo. *See* Zuppinger, Adolf.

A2 **Agranoff, B. W.,** 1957a, Low-level tritium counting techniques: Chicago, Ill., Northwestern Univ. Conf. on Liquid Scintillation Counting Proc., p. 220–222. C.A. 53: 5899 d. AnC.

A3 **Agranoff, B. W.,** 1957b, Silica vials improve low-level counting: Nucleonics, v. 15, no. 10, p. 106. C.A. 53: 7799 h; N.S.A. 12: 3074. AnC, Nu.

A4 **Ahnstroem, G., Ehrenberg, L., and Rosen, C.-G.,** 1965, Tritium labelling of cells *in vitro*: Acta Chemica Scandinavica, v. 19, p. 964–966. N.S.A. 19: 43651. BiC, InBi.

A5 **Akhtar, Sayeed, and Smith, H. A.,** 1964, Separation and analysis of various forms of hydrogen by adsorption and gas chromatography: Chem. Rev., v. 64, p. 261–276. N.S.A. 19: 20435. AbG_{atm}, AbG_{Hy}, AbG_{terr}, AdC, AnCl, AnMs, In_{gw}, InBi, Is, KiR, No, NuH, NuS, SeAd, SpVi, Th.

A6 **Akhtar, Sayeed, and Smith, H. A.,** 1965, Concentration, storage, and determination of tritium at activity levels of 10^{-8}–mole percent, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 491–504. An.

Aladzhalova, N. A. *See* Trusov, G. N.

Albenesius, E. L. *See* Reinig, W. C.

A7 **Albenesius, E. L., and Meyer, L. H.,** 1962, Analytical techniques for the use and control of tritium at Savannah River: U.S. Atomic Energy Comm. Pub., DP–771, 18 p. C.A. 58: 6417 h; N.S.A. 17:4455. Ge of: AnC: Ha, In_{atm}.

Alekseev, F. A. *See* Flerov, G. N.

A8 **Aleekseev, F. A., Bol'bek, G. P. Soĭfer, V. L., Vasil'eva, N. A. Maidebor, V. N., Sokolovskii, E. V., and Shan'gin, N. N.,** 1960, Tritium in the investigation of subterranean waters, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Conf. on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., RICC/318; U.S. Atomic Energy Comm. Pub., AEC–tr–4342, 16 p. N.S.A. 15: 9186. In_{gw}, In_{hy}.

A9 **Alekseev, F. A., Soĭfer, V. N., Filonov, V. A., and Finkel'shteĭn, Ya. B.,** 1958, Use of tritium in ground water as an indicator: Soviet Jour. Atomic Energy, v. 4, p. 396–399 [English trans. of Atomnaya Energiya]. C.A. 53: 12536 a. AnC, In, Sy.

A10 **Alekseev, F. A., ed.,** 1959, Yadernaya geofizika. (Sbornik statei po ispol'zovaniyu radioaktivnykh izluchenii i izotopov v geologii nefti) [Nuclear geophysics. (Symposium of articles on using radioactivity and isotopes in oil geology)]: Moscow, U.S.S.R., Gostoptekhizdat, 372 p. In_{gw}.

A11 **Aliprandi, Bianca, Cacace, Fulvio, and Guarino, Angelo,** 1964, Chemical effects of nuclear decay in doubly triated ethane at atmospheric pressure, *in* Chemical effects of nuclear transformations, v. 2, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium, Dec. 7–11, 1964, Proc., p. 471–482. N.S.A. 19: 42575. AdC, Is, NuB, NuR.

A12 **Allen, A. O.,** 1948, Radiation chemistry of aqueous solutions: Jour. Phys. and Colloid Chemistry, v. 52, p. 479–490. C.A. 42: 4454 g. EqH, EqI, KiR.

A13 **Allen, R. A., Smith, D. B., Otlet, R. L., and Rawson, D. S.,** 1966, Low-level tritium measurements in water: Nuclear Instruments and Methods, v. 45, no. 1, p. 61–71. AnC, In_{gw}, SeEl.

Almeida, I. G. *See* Marquez, L.

Alpert, N. L. *See* Bitter, F.

A14 **Al'tshuller, S. V.,** 1947, Mechenye Atomy (Tracer atoms): Moscow, Ser. Nauch Popular. Biblioteki, Gosudarst. Izdal. Tekh.—Teoret. Lit., 48 p. C.A. 44:953 d. Ge of: In.

Alvinerie, Jacques. *See* Lévéque, Paul.

A14.1 **Alvinerie, Jacques,** 1966, Study of the tritium activity of the basin pouring from Mont Cenis: Comptes Rendus [France] ser. D 262, p. 32–35 in [French]. N.S.D. 20: 16668. In_{sw}, $MeDf_{sw}$.

A15 **Alvinerie, Jacques, Degot, Bernadette, Lévéque, Paul, and Vigneaux, Michel,** 1966, Tritium activity and chemical characteristics of the water of Lake Pavin: Comptes Rendus [France], ser. D 262, No. 8, p. 846–849 [in French]. C.A. 64: 15569 g. AbG_{sw}, InA_{sw}, $MeDf_{sw}$.

A16 **Aman, J., Farkas, L., and Farkas, J.,** 1948, Some catalytic hydrogen exchange reactions of hydrocarbons: Am. Chem. Soc. Jour., v. 70, p. 727–732. C.A. 42: 4035 d. EqH, InKi, KiH, SeAd.

A17 **Amavis, René, and Vaccarezza, Jacques,** 1960, The use of an experimental device for [radioactive liquid waste] disposal into the ground at the Centre d'Etudes Nucléaires at Saclay, France: Saclay, France, Comm. à l'Énergie Atomique, Centre d'Etudes Nucléaires Rap., CEA–1791, p. 166–180. C.A. 55: 15788 ab. AdL, In, MeDf.

A18 **Ambroggi, R. P.,** 1966, Water under the Sahara: Sci. American, v. 214, no. 5, p. 21–29. AbG_{atm}, AbG_{gw}, In, InA, $MeDf_{atm}$, $Medf_{gw}$.

A19 **American Geological Institute,** 1960, Glossary of geology and related sciences, 2d ed.: Washington, Am. Geol. Inst., Glossary Rev. Comm., p. 305. No.

A20 **American Geological Institute,** 1962, Dictionary of geological terms: New York, Dolphin Books, Doubleday & Co., 541 p. (See especially p. 513.) No.

A21 **Ammar, R. G., Dunn, W., and Holland, M.,** 1962, Spin and binding of ΛH^3: Nuovo Cimento, v. 26, p. 840–843 [in English]. C.A. 58: 3064 a. Nu.

A22 **Anand, J. S., and Lal, Devendra,** 1964, Synthesis of methane from water for tritium measurement: Nature, v. 201, no. 4921, p. 775–777. C.A. 60: 11883 b; N.S.A. 18: 16075. AnC, Sy.

A23 **Anbar, M., Neta, P., and Heller, A.,** 1962, The radioassay of tritium in water in liquid scintillation counters—The isotopic exchange of cyclohexene with water: Internat. Jour. Appl. Radiation and Isotopes, v. 13, p. 310–312. C.A. 58: 2099 g; N.S.A. 16: 31544. AnC.

Anderson, E. C. See Trujillo, T. T.

A24 **Anderson, E. C., and Hayes, F. N.,** 1956, Recent advances in low-level counting techniques: Ann. Rev. Nuclear Sci., v. 6, p. 303–316. N.S.A. 11: 5499. Ge: of AnC (with 70 references).

A25 **Anderson, E. C., and Libby, W. F.,** 1957, The development and applications of low-level counting: Advances Biol. Med. Physics, v. 5, p. 385–423. N.S.A. 12: 8982. AbG, AnC, Ge of: In; Ha.

Andreev, B. J. *See* Shushunov, V. A.

A26 **Anonymous,** 1959, Schedule E, radioactive compounds: Chicago, Ill., Nuclear-Chicago Corp., 20 p. Sy.

A27 **Anonymous,** 1962, Disposal of low-level radioactive waste into Pacific coastal waters: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 985, 87 p. C.A. 58: 1234 a. Ab, Bi, Ha, InBi, MeDf.

A28 **Anonymous,** 1963, Nuclear Instrumentation, No. 16: Bull. Inf. Sci. et Tech. 70, supp., p. 1–47 [in French]. N.S.A. 17: 29206. AnC, In_{atm}.

A29 **Anonymous,** 1963, Continuous scintillation counting of weak beta emitters in flowing aqueous streams: Nuclear-Chicago Tech. Bull. 15, 4 p. In.

A30 **Anonymous,** 1963, Geological Survey finds new high levels of tritium in rain water: Water and Sewage Works, v. 110, no. 11, p. 401. Ab, In.

A31 **Anonymous,** circa 1964, Model 9160 tritium monitor: Austin, Texas, Texas Nuclear Corp., 1 p. An.

A32 **Anonymous,** 1964, Isotope technology development: [U.S. Atomic Energy Comm.] Isotopes and Radiation Technology, v. 1, no. 3, p. 225–244. N.S.A. 18: 22382. Sy.

A33 **Anonymous,** 1964, Nuclear Instrumentation. No. 20: Bull. Inf. Sci. et Tech. 84, sup. 1, p. 38 [in French]. N.S.A. 19: 4498. AnC, In_{atm}.

A34 **Anonymous,** 1964, Instrument development: [U.S. Atomic Energy Comm.] Isotopes and Radiation Technology, v. 1, no. 3, p. 268–274. N.S.A. 18: 22356. AnC, Ha.

A35 **Anonymous,** 1964, Paper and thin-layer chromatography of radioactively labelled compounds: Kerntechnik, v. 6, p. 268–269. AdC, An.

A36 **Anonymous,** 1964, Séminaire sur la protection contre les dangers du tritium (Seminar on Protection against the dangers from tritium): Le Vesinet, France, Service Central Protection Rayonnements Ionisants, 136 p. C.A. 65: 4236 a. Ha.

A37 **Anthony, J. D.,** 1959, Portable tritium monitor has gamma compensation: Nucleonics, v. 17, no. 4, p. 110–114. C.A. 53: 14747 f; N.S.A. 13: 11122. AnC, Ha.

Anzani, A. *See* Forte, M.

A38 **Apelgot, Sonia, Duquesne, Maurice,** 1961, Liquid scintillation counting applied to the quantitative measurement of tritium in bacteria: Jour. Chem. Physics, v. 58, p. 774–777. C.A. 56: 7779 a; N.S.A. 16: 6576. Ad, AnC, EcC, InBi.

A39 **Apelgot, Sonia, Duquesne, Maurice,** 1963, Energy dissipated by tritium in microorganisms: Internat. Jour. Radiation Biology, v. 7, no. 1, p. 65–74 [in French]. C.A. 60: 9574 e; N.S.A. 18: 19633. BiB, InBi.

A40 **Arizumi, A., and Kondo, O.,** 1963, Investigation of the movement of infiltrating acidic hot-spring water in the ground by means of radioisotopes, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5, 9, 1963, Proc., p. 365–381. N.S.A. 18: 1928. In_{Pe}, In_{gw}, In_{sw}, InA_{gw}, $MeDf_{gw}$, SeAd.

Armstrong, F. E. *See* Heemstra, R. J.

Armstrong, F. E. *See* Whisman, M. L.

Arnheim, J. *See* Eidinoff, M. L.

Arnold, J. R. *See* Merrill, J. R.

A41 **Arnold, J. R.,** 1959, Studies of natural and induced radioactivities: U.S. Atomic Energy Comm. Pub., OOR–1574.5, 88 p. N.S.A. 13: 20329. AbG_{atm}.

A42 **Arnold, J. R.,** 1961, Liquid scintillation counting of tritium, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 69–75 [1963]. C.A. 58: 9845 b; N.S.A. 17: 18477. AnMs, Ge of: AnC, Sy.

A43 **Arnold, J. R., and Martell, E. A.,** 1959, The circulation of isotopes: Sci. American, v. 201, no. 3, p. 84–94. Ad, BiB, Ha, InA_{earth}, InBi, Is, NuB, $SeAd_{ocean}$, $SeAd_{terr}$. Ge of: AbG_{atm}, AbG_{ocean}, AbG_{terr}, $MeDf_{atm}$, $MeDf_{sw}$, $MeDf_{gw}$, $MeDf_{ocean}$.

Aronoff, S. *See* Gage, R. S.

A44 **Athavale, R. N., Lal, Devendra, and Rama,** 1965, Indian Acad. Sci. Proc. [Publication referenced in Lal, Devendra, and Rama, 1965, as cited in this bibliography.] Ab, In.

A45 **Atomic Energy of Canada, Ltd. [AECL],** 1964, Activities of AECL in the fields of biology, health physics, and medicine: Atomic Energy Canada, Ltd., Pub., AECL–2107, 34 p. NSA 19: 10719. AbO, BiB, In_{gw}, InBi.

A46 **Aujeszky, L.,** 1949, Isotopes in the atmosphere: Időjárás, v. 53, p. 289–292. C.A. 46: 3413 b. AbG_{atm}.

A47 **Ault, W. U., and Hardaway, J. E.,** 1965, Subsurface tracing with radioisotopes: Isotopics, v. 2, no. 1, 8 p., 123 Woodland Ave., Westwood, N.J. Isotopes, Inc. Ge: of In_{gw}.

A48 **Aussel, P., Chanal, J. L., and Marignan, R.,** 1965, A study of the diffusion 25, no. 2, p. 145–150 [in French]. C.A. 65: 9781 b. An, IsCr, MeDf.

Avinur, P. *See* Dostrovsky, I.

A49 **Avinur, P., and Nir, Aharon,** 1958, Tritium exchange between toluene and aqueous sulfuric acid: Israel Research Council Bull. 7A, p. 74–79. C.A. 52: 10745 d. In, KiI, SeAd.

B

B1 **Back, William, and Hanshaw, B. B.,** 1965, Chemical geohydrology, *in* Chow, V. T., ed., Advances in hydroscience, v. 2—1965: New York, Academic Press, p. 49–109. AbG_{atm}, InA_{gw}, InA_{ocean}, InA_{sw}, Me, $MeDf_{gw}$, NuB, SeAd, Th.

B2 **Baden, H. P.,** 1964, Improved technique for determination of ^{14}C and ^{3}H by flask combustion: Anal. Chemistry, v. 36, no. 4, p. 960. C.A. 61: 38 c; N.S.A. 18: 15973. AnC.

B8 **Baggett, Billy, Presson, T. L., and Coey, J. C.,** 1965, Correction for quenching of samples from an oxygen flask combustion method for tritium analysis: Anal. Biochemistry, v. 10, no. 2, p. 367–370. C.A. 62: 16620 g, C.A. 55: 23647 c; N.S.A. 19: 15356. AnC.

B4 **Bahcall, J. N.,** 1964, Neutrino-spectroscopy of the solar interior: Phys. Rev. Letters, v. 13, p. 332–333. N.S.A. 19: 8058. AbG_{atm}, NuB.

Bainbridge, A. E. *See* Ehhalt, D. H.

Bainbridge, A. E. *See* Östlund [Oestlund], H. G.

B5 **Bainbridge, A. E.,** 1959, Corrections to be applied to the electrolytic enrichment factor of deuterium and tritium when water is being lost from

the cell by entrainment and by evaporation: U.S. Atomic Energy Comm. Pub., NS–1, 24 p. N.S.A. 13: 14240. AnC, SeAd, SeDs, SeEl, ThSo.

B6 **Bainbridge, A. E.,** 1962, Tritium in surface waters of the North Pacific, *in* Nuclear Geophysics: Washington, D.C., [U.S.] Natl. Acad. Sci.—Natl. Research Council Conf. on Nuclear Geophysics, held at Woods Hole, Mass., June 7–9, 1962, Proc. U.S. Atomic Energy Comm. Pub., NAS–NRC–1075, p. 129–137 [1963]. N.S.A. 17: 25462. Ab_{ocean}, In_{ocean}, InA_{ocean}, $MeDf_{ocean}$, No.

B7 **Bainbridge, A. E.,** 1963, Tritium in the North Pacific surface waters: Jour. Geophys. Research, v. 68, no. 13, p. 3785–3790. C.A. 59: 3646 e; N.S.A. 17: 30698. AbG_{atm}, AbG_{ocean}, In_{atm}, In_{ocean}, InA_{ocean}, $MeDf_{ocean}$.

B8 **Bainbridge, A. E.,** 1965, Determination of natural tritium: Rev. Sci. Instruments, v. 36, no. 12, p. 1779–1782. C.A. 64: 4244 h. AnC, SeEl.

B9 **Bainbridge, A. E., and O'Brien, B. J.,** 1961, Levels of tritium in a variety of New Zealand waters and some tentative conclusions from these results, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., v. 1, p. 33–39 [1962]. C.A. 57: 9587 h; N.S.A. 16: 16079. Ab_{atm}, Ab_{sw}, Ab_{gw}, Ab_{Hy}, Ab_{ocean}, AbG_{atm}, AnC, InA_{gw}, InA_{snow}, $MeDf_{atm}$, $MeDf_{Hy}$.

B10 **Bainbridge, A. E., Sandoval, Paula, and Suess, H. E.,** 1961, Natural tritium measurements by ethane counting: Science, v. 134, no. 3478, p. 552–553. C.A. 56: 11149 f; N.S.A. 15: 27578. AnC, SeAd, Sy.

B11 **Bainbridge, A. E., Suess, H. E., Friedman, Irving, Bishop, K. F., Taylor, B. T., and Eggleton, A. E. J.,** 1961, Isotopic composition of atmospheric hydrogen and methane [contains a supplemental discussion by last three listed authors]: Nature, v. 192, p. 648–649. N.S.A. 16: 4381. Ab_{atm}, AbG_{atm}, AbG_{sw}.

B12 **Bainbridge, A. E., Suess, H. E., and Wanke, H.,** 1962, The tritium content of three stony meteorites and one iron meteorite: Geochim. et Cosmochim. Acta, v. 26, p. 471–473. C.A. 57: 5635 f; N.S.A. 16: 20827. AbG_{atm}, AbG_{met}, Ad, AnC, InA_{atm}, InA_{met}.

Bal, George. *See* Begault, J. C.

B13 **Bal, George,** 1964, Protection against the radioactivity of tritium: France, Comm. à l'Énergie Atomique, Note 468, 16 p. [in French]. C.A. 62: 1294 c. Ab, An, Ha, In, Nu.

B14 **Balkwell, W. R., and Kubose, D. A.,** 1965, Determination of the total tritium activity adsorbed on the surface of various metals: U.S. Atomic Energy Comm., Accession 47018, Rept. USN–RDL–tr–890, 22 p. C.A. 65: 6654 g. Ha, In.

Ballard, L. F. *See* Ely, R. L., Jr.

B15 **Ballard, L. F., and Ely, R. L., Jr.,** 1963, A sensitive tritium monitor: U.S. Atomic Energy Comm. Pub., ORO–491, 39 p. C.A. 61: 9134 a: N.S.A. 17: 29124, N.S.A. 18: 2085. AnC, Ha, In_{atm}.

Ballentine, R. *See* Bernstein, W.

Ballou, J. E. *See* Thompson, R. C.

B16 **Balmain, J. H., Folley, S. J., and Glascock, R. F.,** 1951, Stimulation by insulin of *in vitro* fat synthesis by mammary tissue studied with carbon^{14} and tritium: Nature, v. 168, p. 1083–1084. C.A. 47: 4462 e. BiC, Ha, InBi.

B17 **Banerji, B. K.,** 1948, Viscosity of liquids and temperature: Current Sci., v. 17, p. 214. C.A. 43: 2835 e. MeV.

B18 **Banks, T. E., Blow, L. W., and Francis, G. E.,** 1956, A windowless flow-type Geiger counter for the assay of solid materials containing soft

β-emitting isotopes: Jour. Biochemistry, v. 64, p. 408–411. C.A. 51: 3309 i. AnC.

B19 **Banks, T. E., Crawhall, J. C., and Smyth, D. G.,** 1956, Some techniques in the assay of tritium: Jour. Biochemistry, v. 64, p. 411–416. C.A. 51: 3309 i: N.S.A. 11: 1989. Ge of: AnC.

Banville, B. *See* Sannes, F.

B20 **Banville, B.,** 1965, Calibration of tritium-in-air monitors: Atomic Energy Canada, Ltd., Pub., AECL–2265, 22 p. N.S.A. 19: 36800. An, Ha, In_{atm}.

B21 **Banwell, C. J.,** (no date shown), Oxygen and hydrogen isotopes in New Zealand thermal areas, *in* Tongiorgi, Ezio, ed., Nuclear geology on geothermal areas: Pisa, Italy, Consiglio Nazionale delle Ricerche, Laboratorio di Geologia Nucleare, paper presented at conference, 1963, Spoleto, Italy, p. 95–138 [pub. distribution, 1967]. AbG_{gw}, AbG_{ju}.

Barclay, F. R. *See* Goldsmith, P.

B22 (Reference deleted.)

Barnett, C. R. *See* Feely, H. W.

B23 **Barrett, E. W., and Huebner, Leonid,** 1960, Atmospheric tritium analysis: U.S. Atomic Energy Comm. Tech. Prog. Rept. 2, AECU–4739, 33 p. N.S.A. 14: 10685. Ab_{atm}, An, InA_{atm}, $MeDf_{atm}$, Nu.

B24 **Barrett, E. W., and Huebner, Leonid,** 1961, Atmospheric tritium analysis: U.S. Atomic Energy Comm. Tech. Prog. Rept. 3, TID–14425, 65 p. N.S.A. 16: 4375, N.S.A. 16: 6369. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

B25 **Barth, C. A., and Suess, H. E.,** 1960, The formation of molecular hydrogen through photolysis of water vapor in the presence of oxygen: Zeitschr. Physik, v. 158, p. 85–95 [in English]. C.A. 54: 7298 h. Ab, EqI, In, KlI, KiP.

Barth, H. *See* Von Buttlar, Haro.

Baserga, Renato. *See* Samuels, L. D.

B26 **Baserga, Renato, Lisco, Hermann, and Kisieleski, W. E.,** 1962, Further observations on induction of tumors in mice with radioactive thymidine: Soc. Experimental Biol. Medicine Proc., v. 110, p. 687–690. N.S.A. 16: 31498. BiZ, Ha.

B27 **Bateman, A. J., and Chandley, A. C.,** 1962, Mutations induced in the mouse with tritiated thymidine: Nature, v. 193, p. 705–706. N.S.A. 16: 9881. BiC, BiZ, Ha.

B28 **Baugnet-Mahieu, L., Goutier, R., and Semal, M.,** 1964, Anomalous behavior of tritiated thymidine during the course of its phosphorylation *in vitro*: Archives Internat. Physiologie et Biochimie, v. 72, no. 2, p. 312–313. C.A. 60: 16127 de. BiB, InBi, MeDf.

Bayhurst, B. P. *See* McClelland, Jean.

B29 **Bayly, J. G., Booth, R. J., and Stevens, W. H.,** 1962, An improved infra-red method of monitoring heavy water: U.S. Atomic Energy Comm. Pub., CRRP–1099, 17 p. N.S.A. 16: 32918. AnSp, In_{atm}, Sp.

Bazan, Fernando. *See* Feely, H. W.

Bazan, Fernando. *See* Giletti, B. J.

B30 **Becker, K.,** 1961, Photographic determination of T in H_2O: Atompraxis, v. 7, p. 358–360 [in German]. C.A. 56: 3094 h; N.S.A. 16: 1707. Ha, In, KiP, KiR.

Beckett, C. W., *See* Brown, L. M.

B31 (Reference deleted.)

B32 **Begault, J. C., and Bal, George,** 1964, The tritium content of laboratory

air: France, Comm. à l'Énergie Atomique, Note 469, 6 p. C.A. 61:9144 f. An, Ha.

Begemann, Friedrich. *See* White, D. E.

B33 **Begemann, Friedrich,** 1956, Nuclear processes in geologic settings: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 400, p. 166, AbG, InA_{atm}.

B34 **Begemann, Friedrich,** 1957a, Distribution of artificially produced tritium in nature: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 400, p. 166–171. C.A. 51:17475 d. Ab_{H_2}, AbG, InA, MeDf.

B35 **Begemann, Friedrich,** 1957b, Tritium assays of natural waters measured in 1956–57: U.S. Atomic Energy Comm. Pub., AF OSR–tr–58–51. N.S.A. 12:8224. Ab_{atm}, Ab_{sw}, Ab_{snow}, AbG_{atm}, In_{atm}, In_{sw}, In_{snow}, In_{gw}, In_{H_2}, $MeDf_{atm}$, $MeDf_{sw}$.

B36 **Begemann, Friedrich,** 1958a, Tritium assays of natural waters: Chicago, Ill., Chicago Univ., Final Rept. AF 18–(600)–569, p. 21-24. Ab_{atm}, Ab_{gw}, Ab_{sw}, Ab_{ocean}, Ab_{snow}, In_{atm}, In_{gw}, In_{sw}, In_{ocean}, In_{snow}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{ocean}$, $MeDf_{snow}$.

B37 **Begemann, Friedrich,** 1958b, New measurements on the worldwide distribution of natural and artificially produced tritium: Geneva, Switzerland, 2d Internat. Conf. on Peaceful Uses of Atomic Energy, 1958, Proc., v. 18, p. 545–550 [1959]. C.A. 54:7259 h; N.S.A. 13:6033. Ab_{atm}, Ab_{snow}, In_{atm}, In_{snow}, $MeDf_{atm}$.

B38 **Begemann, Friedrich,** 1959a, Nouvelle détermination du taux de désintégration terrestre et naturel du tritium. Origine du tritium "naturel" [New determination of rates of disintegration of terrestrial and natural tritium]: Zeitschr. Naturforschung, v. 14a, p. 334–342; France, Comm. à l'Énergie Atomique Rap., CEA–tr–A–820, 38 p. N.S.A. 15:11870, N.S.A. 13:13819. AbG_{atm}, AbG_{snow}, Nu.

B39 **Begemann, Friedrich,** 1959b, Redetermination of the decay rate of natural tritium and origin of "natural" tritium [New determination of the natural terrestrial tritium decay rate and the question of the origin of "natural" tritium]: Zeitschr. Naturforschung, v. 14a, p. 334–342, [in German]. C.A. 53:16720 fg: N.S.A. 13:13819 AbG_{atm}, In_{snow}, $MeDf_{atm}$, NuB.

B40 **Begemann, Friedrich,** 1962a, The "natural" tritium distribution [economy] in the earth and the question of its temporal variation: Chimia, v. 16, p. 1–10 [in German]. C.A. 57:469 b; N.S.A. 16:15006, N.S.A. 16:27435, Ge of: AbG_{atm}, In_{ocean}, In_{gw}, In_{sw}, In_{terr}, In_{H_2}, In_{atm}.

B41 **Begemann, Friedrich,** 1962b, Tritium determinations in atmospheric gases and meteorites. Summary report 1, November 1, 1960–October 31, 1961: U.S. Atomic Energy Comm. Pub., AF CRL–62–295, 13 p. AbG_{atm}, AbG_{met}, AnC, In_{atm}.

B42 **Begemann, Friedrich,** 1963a, Tritium determinations in atmospheric gases and meteorites: Natl. Aeronautics Space Adm. Accession N64–21907, Rept. AD 601129, 42 p. C.A. 62:7541 e. AbG_{atm}, AbG_{met}, InA, MeDf, SeAd.

B43 **Begemann, Friedrich,** 1963b, The tritium content of atmospheric hydrogen and atmospheric methane: Jour. Geophys. Research, v. 68, no. 13, p. 3757–3758. N.S.A. 17:30694. Ab_{atm}, Ab_{art}, In_{atm}, In_{art}.

B44 **Begemann, Friedrich,** 1963c, The tritium content of atmospheric hydrogen and atmospheric methane, *in* Geiss, Johannes, and Goldberg, E. D., eds., Earth science and meteoritics: Amsterdam, Netherlands, North-

Holland Publishing Co., p. 169–187. C.A. 61:482 d; N.S.A. 18:12363. AbG_{atm}, AbG_{Hy}, In_{atm}, $MeDf_{atm}$ with many references.

B45 **Begemann, Friedrich,** circa 1963d, New measurements on the worldwide distribution of natural and artificially produced tritium: U.S. Atomic Energy Comm. Pub., A/CONF–15/P/1963, 14 p. N.S.A. 13:6033. Ab_{atm}, Ab_{snow}, In_{atm}, In_{snow}, $MeDf_{atm}$.

B46 **Begemann, Friedrich,** 1966, Tritium content of two chondrites: Earth Planetary Sci. Letters, v. 1, no. 4, p. 148–150 [in English]. C.A. 65:12013 ab. AbG_{atm}.

B47 **Begemann, Friedrich, Eberhardt, P., and Hess, D. C.,** 1959, Helium-3-tritium radiation age of a stone meteorite: Zeitschr. Naturforschung, v. 14a, p. 500–503. C.A. 53:19739 c. AbG_{met}, InA_{met}.

B48 **Begemann, Friedrich, and Friedman, Irving,** 1959, Tritium and deuterium contents of atmospheric hydrogen: Zeitschr. Naturforschung, v. 14a, p. 1024–1031, C.A. 54:9397 b. Ab_{atm}, Ab_{sw}, AbG_{atm}, AbG_{sw}, $MeDf_{atm}$, $MeDf_{sw}$, Th.

B49 **Begemann, Friedrich, Geiss, Johannes, and Hess, D. C.,** 1957, Radiation age of meteorite from cosmic-ray-produced He^3 and H^3: Phys. Rev., v. 107, p. 540–542. AbG_{met}, InA_{met}.

B50 **Begemann, Friedrich, and Libby, W. F.,** 1957, Continental water balance, ground-water inventory and storage times, surface ocean mixing rates, and worldwide water circulation patterns from cosmic-ray and bomb tritium: Geochim. et Cosmochim. Acta, v. 12, p. 277–296; U.S. Atomic Energy Comm. Pub., OSR–TN–56–561, 38 p. N.S.A. 11:2220. AbG_{atm}, AbG_{gw}, AbG_{ocean}, In_{atm}, In_{ocean}, In_{gw}, In_{Hy}, In_{snow}, InA_{atm}, InA_{ocean}, InA_{gw}, InA_{Hy}, InA_{snow}, $MeDf_{gw}$, $MeDf_{ocean}$, $MeDf_{atm}$.

B51 **Begemann, Friedrich, and Turkevich, Anthony,** 1957, Tritium assays of natural waters measured in 1956–1957: U.S. Dept. Commerce, Office Tech. Ser. Publication Board Rept. 133,669, 32 p. AbG, In, MeDf.

B52 **Belcher, E. H.,** 1960, The assay of tritium in biological material by wet oxidation with perchloric acid followed by liquid scintillation counting: Physics in Medicine and Biology, v. 5, p. 49–56. N.S.A. 14:23862. AnC, BiC, InBi, Sy.

B53 **Belgium, Centre d'Étude de l'Énergie Nucléaire,** 1965, Radiologie cellulaire et biochimique, Rapport final, 1964 [Cellular and biochemical radiobiology, Final report, 1964]: Mol, Belgium, Centre d'Étude de l'Énergie Nucléaire. European Atomic Energy Community (EURATOM) Pub., EUR–2201. f, 25 p. N.S.A. 19:29896. BiC, BiZ, InBi, Is.

B54 **Belikov, M. P., Emil'yanov, V. A., and Nesterov, V. E.,** 1961, Primenenie radioaktivnyhh izotopov v gidrotekhnicheskom stroitel'stve (Applications of radioisotopes to hydrotechnology): Moscow, U.S.S.R. Gosstroiizdat. 164 p. N.S.A. 17:302. Ha. Ge of: In_{gw}, In_{hy} (with 55 references included).

Bell, C. G., Jr. *See* Huiswaard, P. J.

Bell, R. M. *See* Knoche, H. W.

Belter, W. G. *See* Peckham, A. E.

B55 **Benioff, P. A.,** 1957, Calculation of the tritium production rate from cosmic-ray data and experimental cross sections: La Jolla, Calif., Scripps Inst. Oceanography Conf. on Recent Research in Climatology, 1957, Proc., p. 74–76. C.A. 53:12029 f. AbG, Nu.

B56 **Benley, R.,** 1950, Mass spectrometry: London, England, Inst. Petroleum, p. 117–126. [Report of a conference organized by the Mass Spectrometry

Panel of the Institute of Petroleum, held at Manchester, England.] C.A. 46:9972 c. AnMs, InBi.

B57 **Bennett, Richmond,** 1965, Carbon–14 dating of ground water in an arid basin, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 590–596. AbG_{gw}, InA_{gw}.

Bennis, E. A. *See* Engelke, M. J.

B58 **Benson, R. H., and Maute, R. L.,** 1962a, Liquid scintillation counting of tritium—Improvements in sensitivity by efficient light collection, *in* Transactions of the American Nuclear Society 1962 Annual Meeting, Boston, Massachusetts, June 18–21, 1962: Am. Nuclear Soc. Trans., v. 5, no. 1, p. 203–204, N.S.A. 16:25429. AnC.

B59 **Benson, R. H., and Maute, R. L.,** 1962b, Liquid scintillation counting of tritium—Improvements in sensitivity by efficient light collection: Anal. Chemistry, v. 34, p. 1122–1124. C.A. 57:10738 fg; N.S.A. 16:24578. AnC.

B60 **Benson, S. W., and Marchi, R. P.,** 1965, New lattice model for statistical mechanics of quantum fluids, I; Liquid hydrogen and its isotopes: Jour Chem. Physics, v. 42, no. 2, p. 574–578. C.A. 62:5913 fg. Is, Ki, MeV, NuM, SdNu, Se, ThP, ThS.

Bentz, L. L. *See* Curtis, M. L.

Berlin, N. I. *See* Prentice, T. C.

B61 **Bernotas, V. I., Pirogov, Yu. A., and Filippov, O. A.,** 1962, The measurement of the activity of thick tritium-labeled samples: Tekh. Izmerenli Radioaktivnye Preparatov Sbornik Statei, p. 51–55. C.A. 59:4759 a. AnC.

B62 **Bernstein, W., and Ballentine, R.,** 1950, Gas phase counting of low-energy β-emitters: Rev. Sci. Instruments, v. 21, p. 158–162. C.A. 44:6732 d. AnC.

Berry, C. E. *See* Washburn, H. W.

Bersin, R. L. *See* Brinkerhoff, J. M.

Berthold, F. *See* Simon, Helmut

B63 **Berthold, F.,** 1965, Recent methods for the automatic evaluation of thin-layer and paper radiochromatograms, *in* Radioisotope sample-measurement techniques in medicine and biology: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioisotope Sample Measurement Techniques in Medicine and Biology, May 24–28, 1965, Proc. Preprint SM–61/31, 14 p. U.S. Atomic Energy Comm. Pub. CONF–650507–4, 14 p. N.S.A. 19:32597. AdC, InBi, KiR.

Bhat, I. S. *See* Kamath, P. R.

Bianchi, W. C. *See* Haskell, E. E., Jr.

Bibron, Roland. *See* Tamers, M. A.

B64 **Bibron, Roland,** 1959, Measurement of weak activities in carbon 14 and tritium by a scintillation method: Onde Élec. v. 39, p. 40–45. U.S. Atomic Energy Comm. Pub., AEC–tr–3849, 11 p. N.S.A. 13:22286. AnC.

B65. **Bibron, Roland,** 1965, Détection du tritium atmosphérique par scintillation. Évolution de sa concentration en France (Detection of atmospheric tritium by scintillation. Variations in its concentration in France): Centre d'Études Nucléaires, 104 p.; France, Comm. à l'Énergie Atomique Rap., CEA–R–2629, 104 p. N.S.A. 19:24700. AnC. In_{atm}, $MeDf_{atm}$, SeEl.

B66 **Bibron, Roland, Delibrias, Georgette, Labeyrie, Jacques,** 1961, Increase of atmospheric tritium from thermonuclear explosions: Bull. Inf. Sci. et

Tech., no. 54, p. 11–15 [in French]. C.A. 56: 6865 f; N.S.A. 16: 4414. Ab_{art}, AbG_{atm}, AnC, In_{atm}, $MeDf_{atm}$, SeEl.

B67 **Bibron, Roland, Delibrias, Georgette, Labeyrie, Jacques,** 1963, The concentration of tritium in rain waters in France: Comptes Rendus [France], v. 256, p. 4951–4954. C.A. 59: 9557 a; N.S.A. 17: 29144. AbG_{atm}, In_{atm}, $MeDf_{atm}$.

B68 **Bibron, Roland, Delibrias, Georgette, and Léger, Concele,** 1959, Apparatus for the detection of carbon-14 and tritium: v. 2, Internat. Atomic Energy Agency Symposium on Nuclear Electronics, held at Paris, France, 1958, Proc., p. 157–161 [in French]. N.S.A. 14: 5462. AnC.

B69 **Biddulph, O.,** 1953, Translocation of radioactive nutrients in plants: U.S. Atomic Energy Comm. Pub., TID–5098 (April 1953). C.A. 48: 4637 i. BiB.

B70 **Biddulph, O., and Cory, R.,** 1957, Analysis of the translocation in the phloem of the bean plant by using water-H^3, phosphorus-32, and carbon-14: Plant Physiology, v. 32, p. 608–619. C.A. 52: 7453 i. BiB, In.

B71 **Bigeleisen, Jacob,** 1949, The validity of the use of tracers to follow chemical reactions: Science, v. 110, p. 14–16. C.A. 43: 7332 i. Ge of: InKi; IsKi, Ki.

B72 **Bigeleisen, Jacob,** 1950, Dissociation and exchange equilibria of the tritium halides: Jour. Chem. Physics, v. 18, p. 481–485. C.A. 44: 9267 d. EqG, ThF.

B73 **Bigeleisen, Jacob,** 1962, Correlation of tritium and deuterium isotope effects: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., v. 1, p. 161–168. C.A. 57: 11901 a. An, Ec, Eq, IsEq, IsTh, SeAd, GeDs.

B74 **Bigeleisen, Jacob, and Kerr, E. C.,** 1955, Vapor pressure of HT: Jour. Chem. Physics, v. 23, p. 2442–2443. C.A. 50: 3824 b. Ki, ThP.

B75 **Biggar, J. W., and Nielsen, D. R.,** 1962, Miscible displacement; pt. 2, Behavior of tracers: Soil Sci. Soc. America Proc., v. 26, no. 2, p. 125–128; v. 25, p. 1–5 [1961]. C.A. 60: 10379 h. Ad, In, MeDf, SeAd.

B76 **Biggs, M. W., and Kritchevsky, D.,** 1951, Radioactive hydrogen-3 in experimental atherosclerosis: Circulation, v. 4, p. 34–42. C.A. 45: 8132 g. BiC, KiB.

Bigler, W. A. See Wylie, K. F.

Bishop, K. F. *See* Bainbridge, A. E.

B77 **Bishop, K. F., Delafield, H. J., Eggleton, A. E. J., Peabody, C. O., and Taylor, B. T.,** 1961, The tritium content of atmospheric methane, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci. May 3–10, 1961, Proc., v. 1, p. 55–67 [1962]. N.S.A. 16: 16079. Ab_{atm}, In_{atm}, $MeDf_{atm}$, No.

B78 **Bishop, K. F., and Taylor, B. T.,** 1960, Growth of the tritium content of atmospheric molecular hydrogen: Nature, v. 192, p. 649. C.A. 54: 12799 i. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

B79 **Bishop, K. F., Taylor, B. T., and Eggleton, A. E. J.,** 1961a, Isotopic composition of atmospheric H and CH_4: Nature, v. 192, p. 648–649. AbG_{atm}, In_{atm}, $MeDf_{atm}$.

B80 **Bishop, K. F., Taylor, B. T., and Eggleton, A. E. J.,** 1961 b, Growth of the tritium content of atmospheric molecular hydrogen: Nature, v. 185, no. 4705, p. 26–27. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

B81 **Bitter, F., Alpert, N. L., Poss, H. L., Lehr, C. G., and Lin, S. T.,** 1947,

Nuclear magnetic resonances at low temperatures: Phys. Rev., v. 71, p. 738. C.A. 41:4706 g. NuRe, SdNu.

Bizzell, O. M. *See* Magin, G. B., Jr.

B82 **Black, C., Joris, G. G., and Taylor, H. S.,** 1948, The solubility of water in hydrocarbons: Jour. Chem. Physics, v. 16, p. 537–543. C.A. 42:4819 h. InSo, SoO.

Blake, C. A., Jr. *See* Brown, K. B.

B83 **Blake, C. A., Jr., Brown, K. B., and Crouse, D. J.,** 1965, Chemical applications of nuclear explosions (CANE): U.S. Atomic Energy Comm. Prog. Rept., ORNL–TM–1275, 19 p. N.S.A. 20:469. In_{gw}, InA_{gw}, $SeAd_{gw}$.

Blanchard, P. *See* Soudain, G.

B84 **Blanco, R. E.,** 1960, Monthly progress report, April 1960: U.S. Atomic Energy Comm. Pub., Chem. Technology Div. Chem. Devel. Sec. B., CF–60–5–106, 64 p. N.S.A. 15:11044. IsKi, SeAd.

Blavoux, Bernard. *See* Fontes, J. C.

B85 **Blavoux, Bernard, Glangeaud, Louis, Lévéque, Paul, Olive, Philippe,** 1964, Hydrodynamics and content of tritium in the waters of the Evian basin, France: Comptes Rendus [France], v. 259, p. 4323–4326 [in French]. N.S.A. 19:13636. In_{gw}, InA_{gw}, $MeDf_{gw}$.

B86 **Blavoux, Bernard, and Olive, Philippe,** 1966, First results on the tritium content of the waters of Lake Leman: Comptes Rendus [France], ser. D, v. 262, no. 24, p. 2445–2448 [in French]. C.A. 65:10327 c. Ab_{sw}, InA_{sw}, $MeDf_{sw}$.

B87 **Bleeker, W., and Junge, C. E.,** 1963, Introduction to international symposium on trace gases and natural and artificial radioactivity in the atmosphere: Jour. Geophys. Research, v. 68, no. 13, p. 3745. AbG_{atm}, InA.

B88 **Blim Stoyle, R. J., and Papageorgiou, S.,** 1965, The β-decay process in one-, two-, and three-nucleon systems: Nuclear Physics v. 64, no. 1, p. 1–7 [in English]. C.A. 62:6070 c. NuIn, NuR, SeAd.

B89 **Blomeke, J. O.,** 1964, Management of fission product tritium in fuel processing wastes: U.S. Atomic Energy Comm. Pub., ORNL–TM–851, 13 p. N.S.A. 18:24978. Ab_{atm}, Ab_{sw}, Ha, In_{sw}.

Blow, L. W. *See* Banks, T. E.

Boato, G. *See* Craig, Harmon.

Bockrath, R. C., Jr. *See* Person, Stanley.

B90 **Bockris, J. O'M., Srinivasan, S., and Devanathan, M. A. V.,** 1963, A method for the determination of electrolytic hydrogen-tritium separation factors: Jour. Electroanal. Chemistry, v. 6, no. 3, p. 205–210. C.A. 60:4760 d; N.S.A. 18:530. An, SeEl.

B91 **Bödvarsson, G.,** 1962, The use of isotopes of hydrogen and oxygen for hydrological purposes in Iceland: Jökull, v. 12, p. 49–54. Ab_{atm}, Ab_{gw}, Ab_{ju}, Ab_{sw}, Ha, In_{atm}, In_{gw}, In_{ju}, In_{sw}, Sa, SeEl, Sy.

B92 **Bogdanov, K. M., Shal'nov, M. I., and Shtukkenberg, Yu. M.,** 1959a, Investigation of tritium oxide metabolism in organisms: Biofizika, v. 4, no. 4, p. 58–67. N.S.A. 14:13552. Bi, BiC, InBi.

B93 **Bogdanov, K. M., Shal'nov, M. I., Shtukkenberg, Yu. M.,** 1959b, Dynamics of tritium oxide metabolism in the organism: Biofizika, v. 4, p. 437–445. C.A. 54:10027 i. Bi, BiZ, Ha.

B94 **Bogandov, K. M., Shal'nov, M. I., Shtukkenberg, Yu. M.,** cira 1959c, Some results of the use of tritium tracer in biological research: U.S. Atomic Energy Comm. Pub., A/CONF–15/P/2070, 27 p. N.S.A. 13:6268. BiZ, Ha, InBi, SeDf.

Bol'bek, G. P. *See* Alekseev, F. A.

Bolin, Bert. *See* Eriksson, Erik.

B95 **Bolin, Bert,** 1958, On the use of tritium as a tracer for water in nature: Geneva, Switzerland, 2d Internat. Conf. on Peaceful Uses of Atomic Energy, Proc., v. 18, p. 336–343. Ab_{atm}, InA_{atm}, SeDs, Th.

B96 **Bolin, Bert,** 1959, Use of tritium in the study of vertical exchange in the atmosphere, *in* Landsberg, H. E., and van Mieghem, J., eds., Advances in geophysics: New York, Academic Press, p. 297–298. C.A. 54: 3810 i. In, MeDf.

B97 **Bolin, Bert,** 1961, An investigation of tritium in atmospheric moisture, rainwater, and the sea in the European area: Stockholm, Sweden, Stockholm Univ. Ann. Prog. Rept., Contract At (30–1) 2458, U.S. Atomic Energy Comm. Pub., TID–13376, 57 p. N.S.A. 15: 27863, Ab_{atm}, AbG_{atm}, AnC, In_{atm}, Sa, SeEl.

B98 **Bolin, Bert,** 1962a, An investigation of tritium in atmospheric moisture, rainwater, and the sea in the European area—Annual progress report, July 1, 1961–June 30, 1962, and renewal proposal: U.S. Atomic Energy Comm. Pub., TID–16272, 13 p. N.S.A. 16: 25619. Ab_{atm}, Ab_{ocean}, In_{atm}, In_{ocean}.

B99 **Bolin, Bert,** 1962b, Seasonal and geographical variations of the tritium content of rain in northwest Europe and selected sea-water samples: Paper presented at 1st Symposium on Trace Gases and Natural and Artificial Radioactivity in the Atmosphere, held at Utrecht, Netherlands. Ab.

B100 **Bolin, Bert,** 1964, Gross-atmospheric circulation as deduced from radioactive tracers, *in* Research in Geophysics, v. 2: Cambridge, Mass., Massachusetts Inst. Technology, p. 479–508. N.S.A. 19: 16247. Ab_{atm}, Ge of: In_{atm}; $MeDf_{atm}$.

Boling, E. A. *See* Vaughan, B. E.

B101 **Boling, E. A.,** 1963, Determination of ^{42}K, ^{24}Na, ^{82}Br, and tritiated water concentration in man: New York Acad. Sci. Annals, v. 110, pt. 1, p. 246–254. C.A. 60: 13563 a. AbO, AnC, BiZ, Ha, InBi.

Bond, V. P. *See* Cronkite, E. P.

Bond, V. P. *See* Rubini, J. R.

B102 **Bond, V. P., and Feinendegen, L. E.,** 1966, Intranuclear tritiated thymidine: Dosimetric radiobiological and radiation protection aspects: Health Physics, v. 12, p. 1007–1020. U.S. Atomic Energy Comm. Pub., BNL–9435. N.S.A. 20: 38624. BiC, BiZ, Ha, InBi, NuB.

B103 **Bond, W. D.,** 1962, Production of tritium by contained nuclear explosions in salt; I, Laboratory studies of isotopic exchange of tritium in the hydrogen-water system: U.S. Atomic Energy Comm. Pub., ORNL–3334, 20 p. C.A. 58: 6409 f; N.S.A. 17: 2664. Ab_{gw}, Ab_{art}, In_{gw}, $MeDf_{gw}$, $SeAd_{gw}$, $SeDf_{gw}$.

B104 **Bond, W. D.,** 1964, Production of tritium by contained nuclear explosions in salt; II, Laboratory studies of the reduction of alkaline earth sulfates by hydrogen: U.S. Atomic Energy Comm. Pub., ORNL–3334, 29 p. C.A. 61: 14128 b. Ab_{art}, AbG, EqI, KiR, NuR, Th.

B105 **Boorman, C., and Kronberger, H.,** 1958, Separation of hydrogen and tritium by thermal diffusion, *in* International Symposium on Isotope Separation, Proceedings: Amsterdam, Netherlands, North-Holland Publishing Co., p. 471–482. C.A. 52: 11597 g. Ge of: SeDf (with three references).

Booth, R. J. *See* Bayly, J. G.

B106 **Boreskov, G. K.,** and Vasilevich, A. O., 1959, Mechanism of isotopic exchange in molecular hydrogen on platinum films: Akad. Nauk SSSR, Doklady, v. 127, p. 1033–1036 [in Russian]. N.S.A. 13: 20921. Ad, Is, IsTh, SeAd.

Borkowski, C. J. *See* Cannon, C. V.

B107 **Borowitz, J. L., and Gat, J. R.,** 1964, Evaluation of elution gas chromatography as a method for the pre-enrichment of T for low-level counting: Internat. Jour. Appl. Radiation and Isotopes, v. 15, no. 7, p. 401–406. C.A. 61: 11582 e; N.S.A. 18: 34011. AdC, An, SeAd.

Bosco, R. *See* Dulcino, J.

B108 **Bost, W. E.,** 1961, Tritium handling, A literature search: U.S. Atomic Energy Comm. Pub., TID–3570, 23 p. C.A. 56: 5598 i; N.S.A. 16: 5609. An, Ge of: Ha (with 157 references).

Bothe, H. K. *See* Langer, H.

Bothe, H.–K. *See* Paerisch, M.

B109 **Botter, Fernande, Molinari, Philippe, and Dirian, Grégoire,** 1964, Physicochemical separations of stable isotopes: U.S. Atomic Energy Comm. Pub., A/CONF–28/P/90, 17 p. N.S.A. 18: 37576. AdC, SeAd, SeDf.

Botter, R. *See* Nief, G.

Bowman, R. L. *See* Karmen, Arthur.

Boyce, I. S. *See* Cameron, J. F.

B110 **Boyce, I. S., Cameron, J. F., and Tayler, K. J.,** 1960, Simple plastic scintillation counter for tritiated hydrogen: Internat. Jour. Appl. Radiation and Isotopes, v. 9, p. 122–123. C.A. 55: 17274 b. AnC.

B111 **Boyce, I. S., and Cameron, J. F.,** 1961, A low-background liquid-scintillation counter for the assay of low-specific-activity tritiated water, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sciences, May 3–10, 1961, Proc., p. 231–247 [1962]. C.A. 57: 10739 a; N.S.A. 16: 16093. AnC, ElSc, SpFl.

Boyle, J. *See* Cannon, C. V.

Bozhinov, S. *See* Iordanov, B. Iv.

B112 **Bradley, J. E. S., and Bush, D. J.,** 1956, A simple method for the assay of tritium in water samples: Internat. Jour. Appl. Radiation and Isotopes, v. 1, p. 233–234. C.A. 51: 9409 e. AnC, Sy.

B113 **Braun, V. G., Kaplan, L., Van Dyken, A. R., and Vil'tsbakh, K. Ye.,** 1956, Tritium in industrial and chemical investigations (Tritium as a tool in industrial and chemical research), *in* Symposium on the application of radioactive isotopes in industry, medicine, and agriculture: Moscow, U.S.S.R., Sbornik Acad. Sci., p. 94–112. C.A. 54: 7354 g; N.S.A. 12: 7204. AdC, AnC, In, InBi, IsEq, IsKi, Nu, SeAd, Th.

B114 **Bray, G. A.,** 1960, A simple efficient liquid scintillator for counting aqueous solutions in a liquid scintillation counter: Anal. Biochemistry, v. 1, p. 279–285. C.A. 55: 20062 i. AnC.

Brecher, George. *See* Cronkite, E. P.

Brewen, J. G. *See* Olivieri, G.

Brewer, L. W. *See* Everett, R. J.

B115 **Briére, Michel,** 1958, Limit of measurement of weak[low] activities by using ionization chambers: France, Comm. à l'Énergie Atomique Rap. 942, 25 [27] p. [in French]: U.S. Atomic Energy Comm. Pub., CEA–942, 27 p.; HW–tr–22, 29 p. [in English]. C.A. 54: 16205 i; N.S.A. 14: 5325, N.S.A. 15: 9038. AnC.

Briesmeister, A. C. *See* Robinson, E. C.

Brinkerhoff, J. M. *See* Ziegler, C. A.

B116 **Brinkerhoff, J. M., and Bersin, R. L.** 1958, Radiation sensitive system: U.S. Patent 3,084,255, Apr. 2, 1963 (to Lab. for Electronics, Inc.). N.S.A. 17: 18650. AnC, Ha, In_{atm}.

B117 **Brinkerhoff, J. M., Ziegler, C. A., Bersin, R. L., and Chleck, D. J.,** 1959, Continuous air monitor for hydrogen-3: Nucleonics, v. 17, no. 2, p. 76–81. C.A. 53: 6802 f. AnC, Ha, In_{atm}.

B118 **Brinkmann, Roland, Eichler, Roland, Ehhalt, D., Munnich, K. O.,** 1963, Über den deuterium—gehalt von niederschlags—und grundwasser [The deuterium concentration in rainwater and ground water]: Naturwissenschaften, v. 50, p. 611–612. N.S.A. 18: 2392. $SeAd_{gw}$, $SeAd_{Pe}$.

Broecker, W. S. *See* Grosse, A. V.

Brooks, H. *See* Riley, C. J.

B119 **Brooks, R. O. R.,** 1960, Biological monitoring of persons working with radioelements: British Jour. Clinical Practice, v. 14, p. 465–473. C.A. 58: 11669 d. Bi, Ha.

B120 **Brown, D. A.,** 1957, Tritium separation factor in the calcium water reaction: U.S. Atomic Energy Comm. Pub., DP–217, 8 p. N.S.A. 12: 3785. AnC, SeAd.

Brown, D. J. *See* Haney, W. A.

B121 **Brown, D. J.,** 1964, Chemical effluents technology waste disposal investigations, January–December 1964: U.S. Atomic Energy Comm. Pub., HW–84549, 23 p. N.S.A. 19: 21719. Ab_{gw}, Ha, In_{Pe}, In_{gw}.

Brown, F. *See* Goldsmith, P.

B122 **Brown, F., Goldsmith, P., Green, H. F., Holt A., and Parham, A. G.,** 1961, Measurements of the water vapor tritium and carbon-14 content of the middle stratosphere over southern England: Tellus, v. 13, p. 407–416 [in English]. N.S.A. 16: 13384. Ab_{art}, Ab_{atm}, AnMs, In_{atm}, InA_{atm}, $MeDf_{atm}$.

Brown, G. F. *See* Thatcher, L. L.

B123 **Brown, I. C.,** 1962, Chemical methods as an aid in hydrogeology, *in* Third Hydrology Symposium; Ground Water, Calgary, Alberta, Canada, Proc.: p. 181–191; discussion, p. 205–206. In_{gw}.

Brown, K. B. *See* Blake, C. A., Jr.

B124 **Brown, K. B., and Blake, C. A., Jr.,** 1965, Chemical applications of nuclear explosions: U.S. Atomic Energy Comm. Pub., ORNL–TM–1191, 17 p. N.S.A. 19: 40706. In_{gw}, KiR, $SeAd_{gw}$.

Brown, L. M. *See* Johnson, V. R.

B125 **Brown, L. M.,** 1956a, Reaction kinetics of deuterium and tritium compounds; IV, Exchange and substitution reactions: U.S. Atomic Energy Comm. Pub., NBS–4611, 80 p. A review, 108 references. C.A. 50: 13573 f. Eq, Ge, Ki.

B126 **Brown, L. M.,** 1956b, A review of the reaction kinetics of deuterium and tritium compounds; V, Association—addition and elimination reactions: U.S. Atomic Energy Comm. Pub., NBS–4674, 25 p. Ge, Ki (with 64 references).

B127 **Brown, L. M.,** 1956c, A review of the reaction kinetics of deuterium and tritium compounds; VI, Solvolysis reactions: U.S. Atomic Energy Comm. Pub., NBS–4712, 18 p. N.S.A. 11: 133. Ge of: Ki.

B128 **Brown, L. M.,** 1956d, Reaction kinetics of deuterium and tritium compounds; VII, Oxidation—reduction reactions: U.S. Atomic Energy Comm.

Pub., NBS–4877, 25 p. C.A. 51:7813 a; N.S.A. 11:4832. Ge of: Eq, Ki (with 52 references).

B129 **Brown, L. M., Friedman, A. S., and Beckett, C. W.,** 1956, Bibliography of research on deuterium and tritium compounds, 1945 to 1952: U.S. Natl. Bur. Standards Circ. 562, 85 p. Ge.

Brown, R. M. *See* Östlund [Oestlund], H. G.

B130 **Brown, R. M.,** 1961, Hydrology of tritium in the Ottawa Valley: Geochim. et Cosmochim. Acta, v. 21, no. 3–4, p. 199–215. C.A. 55:11713 b; N.S.A. 15:11333. AbG_{atm}, AbG_{gw}, AbG_{sw}, AnC, In_{gw}, In_{sw}, In_{Hy}, InA_{gw}, InA_{Hy}, InA_{sw}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, Sy.

B131 **Brown, R. M., and Grummitt, W. E.,** 1956, The determination of tritium in natural waters: Canadian Jour. Chemistry, v. 34, p. 220–226. AbG_{atm}, Ec, InA_{atm}, $MeDf_{atm}$.

Brown, W. G. *See* Wilzbach, K. E.

B132 **Brown, W. G., Kaplan, L., Van Dyken, A. R., and Wilzbach, K. E.,** 1955, Tritium as a tool for industrial and chemical research: Geneva, Switzerland, Internat. Conf. on Peaceful Uses of Atomic Energy, held at the United Nations, New York, N.Y., Aug. 1955, Proc., v. 15, p. 16–23 [1956]. C.A. 50:13531 a. Ge of: In (with 44 references).

B133 **Brues, A. M., Stroud, A. N., and Rietz, L.,** 1952, Toxicity of tritium oxide to mice: Soc. Experimental Biology Medicine Proc., v. 79, p. 174–176. C.A. 46:4659 e. BiZ.

Buettner, K. *See* Paerisch. M.

Buncombe, W. G. *See* Glascock, R. F.

B134 **Burdon, D. J., Ericksson, Erik, Payne, B. R., Papadimitropoulos, T., and Papakis, N.,** 1963, The use of tritium in tracing karst ground water in Greece, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 309–320. N.S.A. 18:1925. In_{gw}, InA_{gw}.

Burgy, R. H. *See* Lewis, D. C.

B135 **Burns, H. G., and Glass, H. I.,** 1963, The assay of tritium-labelled compounds in faeces: Internat. Jour. Appl. Radiation and Isotopes, v. 14, p. 627–628. N.S.A. 18:12009. AnC, AnCl, Ha, InBi.

B136 **Burns, I., Drury, T., and Roberts, J. P.,** 1965, Use of tritiated water for tracer work on water in glasses: Silicates Industriels, v. 30, no. 7, p. 403–407. C.A. 63:9633 f. AnC, In, MeDf.

B137 **Burns, R. W., Jr.,** 1965a, The enrichment and determination of tritium in water: Columbus, Ohio, Ohio State Univ., unpub. thesis, 85 p. Ge of: Ad, AnC, AnMs.

B138 **Burns, R. W. Jr.,** 1965b, Enrichment and determination of tritium in water: U.S. Atomic Energy Comm. Accession 1728, Rept. AD 618552, 85 p. Ge of: Ad, AnC, AnMS.

B139 **Burr, J. G.,** 1961, Isotope effects accompanying use of tritium and deuterium in the study of organic radiation chemistry, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 137–152 [1962]. N.S.A. 16:16086. AbO, EqI, Ge of: Se; KiR, No.

Burt, A. K. *See* Gibson, J. A. B.

B140 **Burt, A. K., and Gibson, J. A. B.,** 1964, Scintillation counting of tritiated water and other beta-activity solutions: Harwell, Berks, England, United

Kingdom Atomic Energy Authority, Research Group, Atomic Energy Research Establishment Pub., AERE–R–4638, 8 p. N.S.A. 18: 29967. AnC.

Buser, W. See Feitknecht, W.

Bush, D. J. *See* Bradley, J. E. S.

B141 **Bush, E. T.,** 1963, General applicability of the channels ratio method of measuring liquid scintillation counting efficiencies: Anal. Chemistry, v. 35, no. 8, p. 1024–1029. C.A. 59: 6007 a. AnC.

B142 **Butler, E. B.,** 1955, Counting tritiated water at high humidities in the Geiger region: Nature, v. 176, p. 1262–1264. C.A. 50: 6945 b. AnC.

B143 **Butler, F. E.,** 1961, Determination of tritium in water and urine, liquid scintillation counting and rate-of-drift determinations: Anal. Chemistry, v. 33, p. 409–414. C.A. 55: 16651 b; N.S.A. 15: 10860. AnC, In, Sy.

B144 **Butler, F. E.,** 1964, Assessment of tritium in production workers: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Assessment of Radioactivity in Man, held at Heidelberg, Federal Republic of Germany, May 1964, Proc., v. 2, p. 431–441 [in English]. U.S. Atomic Energy Comm. Pub., DPSPU–63–30–37, 17 p. C.A. 63: 8951 d; N.S.A. 19: 15343. AbO, AnC, BiZ, Ha, InBi.

Butler, H. L. *See* Van Wyck, R. W.

B145 **Butler, H. L.,** 1962, Observed effective half life of tritium at the Savannah River plant: U.S. Atomic Energy Comm. Pub., DP–831, p. 38–45. C.A. 60: 946 a; N.S.A. 17: 33785. AbO, BiZ, Ha, InBi.

B146 **Butler, H. L.,** circa 1963, Tritium hazards in heavy-water-moderated reactors: Nuclear Safety, v. 4, no. 3, p. 77–82. N.S.A. 17: 23581. Ge of: Ha; In_{atm}, InBi.

B147 **Butler, H. L., and LeRoy, J. H.,** 1964, Biological half life of tritium: U.S. Atomic Energy Comm. Pub., DPSPU–64–30–9, 9 p.; CONF–642–24, 9 p. C.A. 63: 7313 c: N.S.A. 19: 10740. AbO, AnC, BiZ, Ha, InBi.

B148 **Butler, H. L., and Van Wyck, R. W.,** 1959, A synopsis of studies related to tritium monitoring and personnel protective techniques: U.S. Atomic Energy Comm. Pub., DP–329, 17 p. [1960]. N.S.A. 15: 19663. An, InBi, MeDf, Th. Ge of: Ha, In.

B149 **Buu-Hoi', Ng. Ph.,** 1957, Convenient method for labeling biologically interesting carboxylic acids with tritium: Nature, v. 180 p. 385–386. C.A. 52: 7140 g. AnC, Bi, InBi, Sy.

Buyske, D. A. *See* Kelly, R. G.

Buyske, D. A. *See* Peets, E. A.

B150 **Buyske, D. A., Kelly, R. G., Florini, J., Gordon, S., and Peets, E.,** 1961, Determination of T and C^{14} in biological samples by rapid combustion techniques: Atomlight, v. 1961, no. 20, p. 1–6. C.A. 56: 10493 i; N.S.A. 16: 4143. AnC, InBi, Sy.

C

Cacace, Fulvio. *See* Aliprandi, Bianca.

C1 **Cacace, Fulvio,** 1961, Labeled organics in gas chromatography: Nucleonics, v. 19, no. 5, p. 45–50. N.S.A. 15: 16889. Ge of: AdC, AnC, In.

C2 **Cacace, Fulvio, Ciranni, Giovanna, and Guarino, Angelo,** 1966, Chemical effects of nuclear decay; I, Mechanism of reactions subsequent to decay of a T atom in the methane (CT_4) molecule: Accad. Naz. Lincei Atti, Cl. Sci. Fis., Mat. e Nat. Rend., v. 40, no. 2, p. 264–270 [in Italian]. C.A. 65: 12066 g. Ad, AnMs, Ki, KiR, Nu.

Cacciari, I. *See* Giovannozzi-Sermanni, G.

C3 **Caddock, B. D., and Davies, P. L.,** 1960, The use of tritium to study the solubility of water in hydrocarbon liquids: Jour. Inst. Petroleum, v. 46, p. 391–396. C.A. 55: 5923 c. AnC, In, IsTh.

Calvin, M. *See* Moses, V.

Camera, V. *See* Guibileo, M.

C4 **Camera, V., and Guibileo, M.,** 1962, Liquid scintillator tritium determination in the urines of staff members of a nuclear center: 25th Natl. Cong. on Labor Medicine, held at Taormina, Sicily, Oct. 1962. U.S. Atomic Energy Pub., CONF–142–1, 16 p. N.S.A 17: 36088. AbO, BiC, BiZ, Ha, InBi.

Cameron, J. F. *See* Boyce, I. S.

Cameron, J. F. *See* Kannuna, M. M.

Cameron, J. F. *See* Payne, B. R.

Cameron, J. F. *See* Seligman, H.

C5 **Cameron, J. F.,** 1955, Measurement of tritium in water samples: Nature, v. 176, p. 1264. C.A. 50: 6945 a. AnC.

C6 **Cameron, J. F.,** 1965, A survey of systems for low-background counting and concentration of tritium, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 465. Ge of: AnC.

C7 **Cameron, J. F., and Boyce, I. S.,** 1960, Liquid scintillation counting of tritiated water: Internat. Jour. Appl. Radiation and Isotopes, v. 8, p. 228–229. C.A. 55: 17274 d. AnC.

C8 **Cameron, J. F., and Payne, B. R.,** 1965, Apparatus for concentration and measurement of low tritium activities, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ. 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 454–471. AnC, SeEl.

C9 **Cameron, J. F., and Pucket, B. J.,** 1960, Geiger gas counting methods of assaying tritiated hydrogen and tritiated water: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Wantage Radiation Lab. Pub., AERE–R–3092, 26 p. N.S.A. 14: 11590. AnC.

Campbell, E. E. *See* Milligan, M. F.

Campbell, I. G. *See* Payne, P. R.

Campbell, I. G. *See* White, D. F.

C10 **Campbell, U. G., White, D. F., and Payne, P. R.,** 1951, The uptake of tritium-labelled water vapor by the mammalian lung: British Jour. Radiology, v. 24, p. 682. C.A. 46: 4113 d. AbO, BiZ.

Cannon, C. V. *See* Jenks, G. H.

C11 **Cannon, C. V., Shapiro, E., Jenks, G., Boyle, J., McClinton, L. T., Elliot, N., Borkowski, C. J., Pomerance, H. S., and Metcalf, R. P.,** 1945, The production and purification of tritium: U.S. Atomic Energy Comm. Pub., MonC–35, 36 p. [Declassified 1957]. N.S.A. 11: 13687. AbG_{terr}, Sy.

C12 **Carlston, C. W.,** 1964a, Use of tritium in hydrologic research—Problems and limitations: Internat. Assoc. Sci. Hydrology Bull, v. 9, no. 3, p. 38–42. AbG, In_{gw}, InA_{gw}, $MeDf_{gw}$.

C13 **Carlston, C. W.,** 1964b, Tritium-hydrologic research—Some results of the U.S. Geological Survey research program: Science, v. 143, no. 3708, p. 804–806. N.S.A. 18: 12372. Ab_{atm}, Ab_{gw}, Ab_{sw}, InA_{atm}, InA_{gw}, InA_{Hy}, InA_{sw}, $MeDf_{atm}$, $MeDf_{gw}$, Nu.

C14 **Carlston, C. W., and Thatcher, L. L.,** 1961, Tritium studies in the United States Geological Survey, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 75–81 [1962]. Ab_{atm}, Ab_{gw}, AnC, In_{gw}, In_{hy}, InA_{gw}, SeEl.

C15 **Carlston, C. W., Thatcher, L. L., and Rhodehamel, E. C.,** 1960, Tritium as a hydrologic tool—The Wharton Tract Study: Helsinki, Finland, Gen. Assembly, Internat. Assoc. Sci. Hydrology Pub. 52, p. 503–512. Ab_{gw}, Ab_{atm}, In_{gw}, In_{Hy}, InA_{gw}, $MeDf_{atm}$, $MeDf_{gw}$.

Carman, P. C. *See* Miller, L.

C16 **Caro, L. G., and Schnös, M.,** 1965, Tritium and phosphorus-32 in high-resolution autoradiography: Science, v. 149, no. 3679, p. 60. AnC.

Carr, D. R. *See* Kulp, J. L.

C17 **Carr, D. R.,** 1957, New developments in the use of radioisotopes in reservoir engineering [Paper presented at Symposium on Tritium in Tracer Applications, New York, N.Y., Nov. 22, 1957]: In_{Hy}, InA_{gw}.

C18 **Carr, D. R.,** 1958, Tritium tracing—A rediscovery: Nucleonics, v. 16, no. 3, p. 62–67. AdC, AnC, Ge of: AdG (with 40 references); Ha, In_{gr}, InA_{gw}, InBi, KiR, Nu.

C19 **Carr, D. R.,** 1961, New developments in the use of radioisotopes in reservoir engineering, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 263–264 [1963]. N.S.A. 17: 18501. In_{Hy}, InA_{gw}.

C20 **Carson, A. S., Cooper, R., and Stranks, D. R.,** 1960, Vapour-pressure determinations on tritium-labelled organic compounds, *in* Radioisotopes in the physical sciences and industry, v. 3, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Conf. on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., p. 495–502 [1962] N.S.A. 16: 23589. AnC, In, ThSo.

Carter, E. H., Jr. *See* Smith, H. A.

C21 **Carter, E. H., Jr.,** 1962, Separation of hydrogen isotopes by gas chromatography: Knoxville, Tenn., Tennessee Univ. thesis, 170 p. N.S.A. 17: 4875. Ge of: AdC, An, Se.

C22 **Carter, E. H., Jr., and Smith, H. A.,** 1963a, Separation and detection of hydrogen, tritium hydride, and tritium at low-level tritium activities by gas chromatography: Jour. Phys. Chemistry, v. 67, p. 535–336. C.A. 58: 10942 g. AdC, AnC, SeAd, SeDf.

C23 **Carter, E. H., Jr., and Smith, H. A.,** 1963b, The separation of hydrogen, hydrogen deuteride, tritium hydride, deuterium tritium deuteride, and tritium mixtures by gas chromatography: Jour. Phys. Chemistry, v. 67, no. 7, p. 1512–1516. C.A. 59: 3493 f; N.S.A. 17: 37150. AnC, In, SeAd, Sy.

C24 **Casaletto, G. J., Gevantman, L. H., and Nash, J. B.,** 1962, The self-radiation oxidation of tritium in oxygen and air: U.S. Atomic Energy Comm. Pub., USN RDL–Tr–565, 25 p.. N.S.A. 16: 23717. IsKi, NuR, Th.

C25 **Cason, Maggie,** 1957, Tritium: U.S. Atomic Energy Comm. Pub., UCRL–5067, 8 p. N.S.A. 12: 9102. Ge of: BiC, Ha, InBi.

Cavallo, L. M. See Seliger, H. H.

Ceranic, Tatjama. *See* Maksimovic, Zoran.

Chaikoff, I. L. *See* Werbin, Harold.

C26 **Chamberlain, J., Hughes, Alun, Rodgers, A. W., and Thomas, G. H.,** 1964, An evaluation of the available techniques for the autoradiography

of tritium on chromatograms: Nature, v. 201, no. 4921, p. 774–775. C.A. 60: 11355; N.S.A. 18: 15984. AdC, AnDn, Ge: of AnC.

Chanal, J. L. *See* Aussel, P.

Chandley, A. C. *See* Bateman, A. J.

Chapius, A. M. *See* Soudain, G.

C27 **Chapius, A. M., and Soudain, G.,** 1960, Dosimetry of tritium in the atmosphere [Determination of tritium in the atmosphere]: Bull. Inf. Sci. et Tech., no. 43, p. 52–57 [in French]; U.S. Atomic Energy Comm. Pub., AEC–tr–4551, 7 p. C.A. 55: 12155 b; N.S.A. 15: 9252, N.S.A. 15: 15563. AnC, In_{atm}.

C28 **Chapman-Andresen, C.,** 1953, Autoradiographs of algae and ciliates exposed to tritiated water: Experimental Cell Research, v. 4, p. 239–242. C.A. 47: 10038 e. BiB.

C29 **Charalambus, St., and Goebel, K.,** 1962, Tritium and argon-39 in the Bruderheim meteorite: Geochim. et Cosmochim. Acta, v. 26, p. 659–663 [in English]. C.A. 57: 16212 ab; N.S.A. 16: 27444. AbG_{atm}, AbG_{met}.

C30 **Charalambus, St., and Goebel, K.,** 1963a, Low-level proportional counter for tritium: Nuclear Instruments and Methods, v. 25, no. 1, p. 109–117. C.A. 60: 5038 fg, C.A. 59: 3507 e; N.S.A. 17: 18593. AnC.

C31 **Charalambus, St., and Goebel, K.,** 1963b, Low-level proportional counter for tritium: Geneva, Switzerland, European Organization Nuclear Research Pub. CERN, v. 63–4, 28 p. C.A. 59: 3507 e. AnC.

C32 **Charalambus, St., and Goebel, K.,** 1965, Enrichment of tritium by diffusion through Pd: Zeitschr. Naturforschung, v. 20a, p. 1085–1087 [in English]. C. A. 63: 12344 a. AnC, Se.

Chatters, R. M. *See* Crosby, J. W., 3d.

C33 **Chatters, R. M., and Olson, E. A.,** 1965, Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc. 784 p. N.S.A. 20: 29438. In, InA.

Chen, Ru-yong. See Reed, R. D.

C34 **Chen, Ru-yong, Henderson, D., and Reed, R. D.,** 1965, Cell model for quantum fluids; III, Compressional waves in liquid hydrogen: Australian Jour. Chemistry, v. 18, p. 1308–1316. N.S.A. 20: 1089. ThSo.

C35 **Chernyaev, V. I.,** 1939, Hydrogen isotope of mass three: Uspekhi Fiz. Nauk [Advances in Phys. Sci.], v. 21, p. 466–477. U.S. Atomic Energy Comm. Pub., NP–tr–993, 25 p. N.S.A. 17: 22570. AbG_{atm}, AnMs, Me, Nu, Th.

C36 **Chiu Sheung Choi, Ivan,** 1965, The movement of tritiated water in plants: Ann Arbor, Mich., Michigan Univ., Univ. microfilm 6,512,446, 144 p. BiB, InBi.

Chleck, D. J. *See* Brinkerhoff, J. M.

Chleck, D. J. *See* Ziegler, C. A.

Chmutov, K. V. *See* Finkel, E. E.

C37 **Chorney, W., Scully, N. J., and Dutton, H. J.,** 1965, Radiation effects of carbon–14 and tritium on growth of soybeans: Radiation Botany, v. 5, p. 257–263. N.S.A. 19: 33890. BiB, InBi.

Christianson, Charles. *See* Maggio, R. C.

C38 **Christman, D. R.,** 1957, Tritium counting in glass proportional counting tubes: Chemist-Analyst, v. 45, p. 5–6. C.A. 51: 12682 c; N.S.A. 11: 12144. AnC.

C39 **Christman, D. R., and Paul, C. M.,** 1960, Gas-proportional counting of carbon-14 and tritium and the dry combustion of organic compounds: Anal. Chemistry, v. 32, p. 131–132. N.S.A. 14: 5239. AnC, Sy.

Chung, H. P. *See* Kim, T. S.

Chung, Hack Phil. *See* Kang, Man Sik.

Churaev, N. V. *See* Volarovich, M. P.

C40 **Chwalinski, Stanislaw, Mikulski, Andrzej, and Kossakowska, Maria,** 1965, Application of liquid scintillation counting for tritium measurements in determining total water in rats: Acta Physiologica Polonica, v. **16, no.** 1, p. 141–149 [in Polish]. C.A. 64: 7115 h. AnC, BiZ, InBi.

C41 **Ciccarone, P. A., Thomas, G., and Verly, W. G.,** 1959, Determination of tritium in a proportional counter: II, Preparation of samples: Nukleonik, v. 1, p. 329–332 [in French]. N.S.A. 14: 6269. AnC, Sy.

Ciranni, Giovanna. *See* Cacace, Fulvio.

C42 **Clark, D. O., and Distenfeld, Carl,** 1962, New monitoring means for airborne tritium determination: Health Physics Soc. 8th Ann. Mtg., New York, 1963. U.S. Atomic Energy Comm. Pub., CONF–67–27, 13 p. N.S.A. 17: 33779. AnC, Ha, In_{atm}.

C43 **Clark, W. E.,** 1963, The ORNL [Oak Ridge National Laboratory] gas sampling experiment in connection with the Tamalpais event: U.S. Atomic Energy Comm. Pub., ORNL–TM–445, 6 p. In_{Hy}, $MeDf_{Hy}$, $SeAd_{Hy}$.

C44 **Clayton, C. G., and Smith, D. B.,** 1963, A comparison of radioisotope methods for river flow measurement, *in* Radioisotopes in hydrology Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., STI/PUB/71, p. 1–24 [1964]. N.S.A. 18: 1912. AbG_{sw}, Ad, AnC, In_{hy}, In_{sw}, InG, $MeDf_{sw}$, Sa_{sw}.

C45 **Clebsch, Alfred, Jr.,** 1961a, The possibility of ground-water contamination by fallout, *in* Klement, A. W., Jr., ed., Radioactive fallout from nuclear weapons tests: U.S. Atomic Energy Comm., Div. Biology and Medicine, Fallout Studies Branch Conf., held at Germantown, Md., Nov. 15–17, 1961, Proc., U.S. Atomic Energy Comm. Pub., TID–7632, p. 306–311 [1962]. N.S.A. 16: 22453. Ab_{gw}, Ab_{sw}, Ha, In_{gw}, In_{sw}, $SeAd_{gw}$, $SeAd_{Pe}$.

C46 **Clebsch, Alfred, Jr.,** 1961b, Tritium-age of ground water at the Nevada Test Site, Nye County, Nevada, *in* Short papers in the geologic and hydrologic sciences: U.S. Geol. Survey Prof. Paper 424–C, p. C122–C125. In_{gw}, InA_{gw}, $MeDf_{gw}$.

C47 **Clewell, D. H.,** 1958, Tritium as indicator in hydrocarbon recovery by underground combustion: U.S. Patent 2–843,207. C.A. 53: P1695 f. In.

C48 **Cline, J. F.,** 1953, Absorption and metabolism of tritium oxide and tritium gas by bean plants: Plant Physiology, v. 28, p. 717–723. C.A. 48: 2190 h. AbO, BiB, BiC.

Coffey, J. C. *See* Baggett, Billy.

Cohen, M. *See* Seligman, H.

C49 **Colman, Brian, and Vishniac, Wolf,** 1963, Characteristics of tritium incorporated into illuminated chloroplasts: [U.S.] Natl. Acad. Sci.—Natl. Research Council Misc. Pub. 1145, p. 213–218. C.A. 60: 14835 c. BiB, InBi, MeDf.

C50 **Colvin, D. W.,** 1957a, A simple leak detector for tritium: U.S. Atomic Energy Comm. Pub., DP–198, 8 p. N.S.A. 17: 6390. AnC, Ha.

C51 **Colvin, D. W.,** 1957b, A simple monitor for tritium contamination on surfaces: U.S. Atomic Energy Comm. Pub., DP–242, 12 p. C.A. 52: 6966 d. N.S.A. 12: 3796. AnC, Ha.

C52 **Comar, C. L.,** 1964, The importance of radioisotopes in biological research: Ithaca, N.Y., Cornell Univ., Symposium on Animal Nutrition and

Physiology, 1964, Proc., p. 3–35 [1965]. Ge of: An, Bi, InBi (with 34 references).

C53 **Conner, R. D.,** Concentration of natural and artificial airborne activities near ground level at Winnipeg: Canadian Jour. Physics, v. 41, no. 7, p. 1118–1134. C.A. 59:3509 d; N.S.A. 17:30686. Ab_{atm}, AnC, In_{atm}, InA_{atm}, $MeDf_{atm}$.

C54 **Conway, W. D., Grace, A. J., and Rogers, J. E.,** 1966, Simplification of oxygen-flask combustion procedure for preparation of samples for liquid scintillation counting: Anal. Biochemistry v. 14, p. 491–494. N.S.A. 20:20570. AnC.

Cooper, R. *See* Carson, A. S.

Cornog, R. *See* Libby, W. F.

C55 **Corti, F.,** 1965, Il dossaggio del tritio (rassegna), Parte 1 [Determination of tritium content in samples (review), Part 1]: Rome, Italy, Istituto Superiore di Sanitá, Lab. di Fisica, 68 p. N.S.A. 20:3876. An, Ge (with 110 references), Ha, InBi, Nu, Sy, Th.

Corval, M. *See* Viallard, Rodolphe.

Cory, R. *See* Biddulph, O.

Costa, N. L. *See* Marquez, L.

C56 **Cottier, H., Cronkite, E. P., Tonna, E. A., and Nielsen, N. O.,** 1962, Leukemogenic effect of whole body Co^{60} γ-irradiation [cobalt-60 gamma-irradiation] compared with tritium-thymidine and tritium-cytidine—Preliminary report on the development of thymic lymphomas in C^{57} BL/6J mice: U.S. Atomic Energy Comm. Pub.. BNL-6105, 13 p. N.S.A. 17:10354. BiC, BiZ, Ha, InBi.

C57 **Cotton, A. F., and Wilkinson, Geoffrey,** 1966, Advanced inorganic chemistry: 2d ed., New York, Interscience Publishers, 1136 p. AbG, In, Nu.

Cotton, K., *See* Pickworth, J. W.

C58 **Coulon, André, Stouls, Léon, and Simonet, Guy,** 1962, Industrial production of deuterium poor in tritium. Industries Atomiques, v. 6, p. 81–93 [in French]. N.S.A. 17:1798. AnC, SeAd, SeDf.

C59 **Cowper, G.,** circa 1961, Review of radiation dosimetry at Chalk River, Ontario: Atomic Energy Canada, Ltd., Pub., AECL-802, p. 25–32. N.S.A. 15:8982. An, Ha, Sa_{atm}, Sy.

Craig, Harmon. *See* White, D. E.

C60 **Craig, Harmon,** 1957a, The effects of atomic radiation on oceanography and fisheries: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 551, p. 103. Ab_{atm}, Ab_{ocean}, In_{atm}, In_{ocean}.

C61 **Craig, Harmon,** 1957b, Distribution, production rate, and possible solar origin of natural tritium: Phys. Rev., v. 105, p. 1125–1127. C.A. 51:11117 i; N.S.A. 11:5701. AbG_{atm}.

C62 **Craig, Harmon,** 1957c, Radiocarbon and tritium distribution and mixing rates: La Jolla, Calif., Scripps Inst. Oceanography Conf. on Recent Research in Climatology, 1957, Proc., p. 53–73. C.A. 53:12029 f. Ab, Ge, MeDf.

C63 **Craig, Harmon,** 1958, Distribution of radiocarbon and tritium—Cosmological and geological implication of isotope variation: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 572, p. 135–147. Ab_{ocean}, In_{ocean}, $MeDf_{ocean}$.

C64 **Craig, Harmon, Boato, G., and White, D. E.,** 1956, Nuclear processes in geologic settings: Second Conf., Sept. 8–10, 1955, [U.S.] Natl. Acad.

Sci.—Natl. Research Council Pub. 400; Nuclear Sci. Ser. Rept. 19. SeDf, SeDs.

C65 **Craig, Harmon, and Lal, Devendra,** 1961, The production rate of natural tritium: Tellus, v. 13, p. 85–105 [in English]. N.S.A. 15:31485. AbG$_{atm}$, In$_{atm}$, NuR.

C66 **Cramer, W. A., Houtman, J. P. W., Koch, R. O., and Piet, G. J.,** 1966, Measurement of radioactivity in effluents of a gas chromatograph. The flame ionization detector used as a combustion chamber in combination with specially designed absorbers: Internat. Jour. Appl. Radiation and Isotopes, v. 17, no. 2, p. 97–101. C.A. 64:13705 gh. AdC, AnC, KiR.

Crawhill, J. C. *See* Banks, T. E.

C67 **Crespi, M. B. A., and Perschke, H.,** 1964, Application of solid-gas chromatography to the enrichment of low-level tritium: Internat. Jour. Appl. Radiation and Isotopes, v. 15, p. 569–578. N.S.A. 19:7834. AdC, AnC, SeAd.

Cronkite, E. P. *See* Cottier, H.

Cronkite, E. P. *See* Rubini, J. R.

C68 **Cronkite, E. P., Bond, V. P., Fliedner, T. M., and Rubini, J. R.,** 1959, The use of tritiated thymidine in the study of DNA synthesis and cell turnover in hemopoietic tissues: Lab. Inv. v. 8, p. 263–277. N.S.A. 13:7412. BiC, Ha, InBi, KiR.

C69 **Cronkite, E. P., Fliedner, T. M., Killmann, S. A., and Rubini, J. R.,** 1961, Tritium-labelled thymidine [H^{3}TDR]—Its somatic toxicity and use in the study of growth rates and potentials in normal and malignant tissue of man and animals, *in* Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 189–209 [1962]. C.A. 57:15692 c. BiZ, Ha, InBi.

C70 **Cronkite, E. P., Greenhouse, S. W., Brecher, George, and Bond, V. P.,** 1961, Implication of chromosome structure and replication on hazard of tritiated thymidine and the interpretation of data on cell proliferation: Nature, v. 189, p. 153–154. N.S.A. 15:8461. BiZ, Ha, InBi.

Crooks, R. N. *See* Stewart, N. G.

C71 **Crosby, J. W., 3d, and Chatters, R. M.,** 1965, Water-dating techniques as applied to the Pullman-Moscow ground-water basin: Pullman, Wash., Washington State Univ., College Eng. Resources Div. Bull. 296, 21 p. C.A. 64:19186 c. Ab$_{gw}$, InA$_{gw}$, MeDf$_{gw}$.

Crouse, D. J. *See* Blake, C. A., Jr.

Crozaz, G. *See* Picciotto, Edgard.

Csanyi, P. F. *See* Köhegyi [Koehegi], Ferenc.

C72 **Csanyi, P. F., Lévay, Bela, and Köhegyi, Ferenc,** 1962, Coincidence counting of tritium with a liquid scintillator, Part II: Magyar Kémiai Folyóirat, v. 68, p. 482–485. C.A. 58:12139 c. AnC.

C73 **Csanyi, P. F. [Fodorné, C. P.], Lévay, Bela, and Salamon, Andras,** 1964, Measurements on soft β-ray-emitting isotopes with a single-channel liquid scintillograph: II, Measurements on tritium-substituted water and hydrocarbons: Magyar Kémiai Folyóirat, v. 70, no. 4, p. 184–189 [in Hungarian]. C.A. 62:6105 ef; N.S.A. 18:25301, N.S.A. 18:41340. AnC, SpFl.

Csanyi, Piroska (Mrs. Fodor). *See* Ormos, Gyorgy.

C74 **Cuddeback, R. B., Koeller, R. C., and Drickamer, H. G.,** 1953, The effect of pressure on diffusion in water and in sulfate solutions: Jour. Chem. Physics, v. 21, p. 589–597. C.A. 47:6223 h. MeDf.

C75 **Currie, L. A.,** 1959, Tritium production by 6 b. e. V. protons: Phys. Rev., v. 114, p. 878–880. Ab.

C76 **Currie, L. A., Libby, W. F., and Wolfgang, R. L.,** 1956, Tritium production by high-energy protons: Phys. Rev. v. 101, p. 1557–1563. Ab.

C77 **Curtis, M. L., Ness, S. L., and Bentz, L. L.,** 1966, Simple technique for rapid analysis of radioactive gases by liquid scintillation counting: Anal. Chemistry, v. 38, no. 4, p. 636–637. C.A. 64:18905 g. AnC.

C78 **Czapski, Gideon, and Katakis, D.,** 1966, Light emission from aqueous solutions of T_2O: Jour. Phys. Chemistry, v. 70, no. 3, p. 637–640 [in English]. C.A. 64:12058 c. An, ElCl, EqL, IsSp, SpFl.

D

Daniel, H. *See* Simon, Helmut.

D1 **Daniel, R. R., Lavakare, P. J., Menon, M. G. K., Naranan, S., Nerukar, N. W., Pal, Yash, and Sreekantan, B. V.,** eds., 1964, International conference on cosmic rays, Jaipur, December 1963, Proceedings; v. 1, Solar particles and sun-earth relations: Bombay, India, Internat. Union Pure and Appl. Physics and Dept. Atomic Energy, Indian Govt., The Commercial Printing Press, Ltd., 273 p. Available from Tata Institute of Fundamental Research, Bombay, India. N.S.A. 19:3005. Ge of: AbG_{atm}, AbG_{met}, AbG_{sat} (with 19 articles); KiR.

D2 **Dansgaard, W.,** 1961, The isotopic composition of natural waters, *with special reference to* The Greenland ice cap: Medd. om Grønland, v. 165, no. 2, p. 1–120 [in English]. C. A. 56:4535 d. Ge (with 103 references).

D3 **Daruschy, Paul,** 1965, A fast and simple method for the detection of tritium in biological material: Atompraxis, v. 11, no. 5, p. 273–274 [in German]. C.A. 63:10308 d: N.S.A. 19:36261. AnC, InBi.

D4 **Daruschy, Paul,** 1966, Analysis of tritium-containing H_2O vapor in air: Atompraxis, v. 12, no. 6, p. 301-302 [in German]. C.A. 65:12767 c; N.S.A. 20:37028. AnC, Ha, In_{atm}, SeAd, SeDs.

Davidson, J. D. *See* Oliverio, V. T.

Davies, P. L. *See* Caddock, B. D.

Davis, A. K. *See* Vaughan, B. E.

D5 **Davis, G. H., Gatlinger, T., Payne, B. R., Dincer, Turgut, and Florkowski, Tadeusz,** 1966, Seasonal variations in the tritium content of ground waters of the Vienna Basin, Austria: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., p. 1–28. Ab_{atm}, Ab_{gw}, Ab_{Hy}, In_{atm}, In_{gw}, In_{hy}, InA_{atm}, InA_{gw}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{Pc}$.

D6 **Davis, S. N., and De Wiest, R. J. M.,** 1966, Hydrogeology: New York, John Wiley & Sons, Inc., 463 p. (See especially p. 137–139). AbG_{atm}, AbG_{gw}, AbG_{sw}, In_{gw}, In_{atm}, In_{sw}, InA_{gw}, InA_{atm}, InA_{sw}, $MeDf_{gw}$, $MeDf_{atm}$, $MeDf_{sw}$, Nu, NuB.

D7 **Davydoff, Sylvie,** 1956, Relative biological effectiveness of tritium and of various γ [gamma] radiations: Comptes Rendus, Cong. Internat. Chimie Indus., v. 243, p. 1455–1457 [in French]. N.S.A. 11:1733. Bi, BiC, Ha.

De Brueck, W. *See* Picciotto, Edgard.

D8 **Dedek, W.**, 1964, The application of radioisotopes to the chemistry of pesticides and plant protection: Atompraxis, v. 10, no. 2, p. 65–70. C.A. 60: 13812 g. BiB, BiC, InBi.

DeFelice, Joseph. *See* Fireman, E. L.

D9 **DeFelice, Joseph, Fireman, E. L., and Tilles, David,** 1963, Tritium, argon 37, and manganese 54 radioactivities in a fragment of Sputnik 4: Jour. Geophys. Research, v. 68, no. 18, p. 5289–5296. C.A. 59: 8312 f: N.S.A. 17: 37922. AbG_{atm}, AbG_{met}, AbG_{sat}, In_{atm}, In_{met}, In_{sat}, $SeDf_{sat}$.

Degot, Bernadette. *See* Alvinerie, Jacques.

D10 **deGroot, R. J.**, 1964, Symposium on some uses of ionizing radiation in pregnancy: I, The therapeutic and diagnostic use of radioisotopes during pregnancy: Jour. College Radiologists Australasia [Title changed to Australasian Radiology], v. 8, p. 123–127. N.S.A. 19: 13124. Ha.

D11 **DeHaan, A.**, 1959, Use of short-lived isotopes in the petroleum industry: New York, 5th Petroleum Cong. Proc., v. 10, p. 75–84 [1960]. C.A. 56: 10455 c. Ha, In_{gw}, InA_{gw}, MeDf.

Delafield, H. J. *See* Bishop, K. F.

D12 **deLaguna, Wallace**, 1956, The use of tritium for determining the age of ground water: U.S. Geol. Survey Water-Resources Bull., Aug. 10, 1956, p. 29–31. In_{gw}, InA_{gw}.

Delibrias, Georgette. *See* Bibron, Roland.

Delibrias, Georgette. *See* Tamers, M. A.

D13 **Delisle, M. J., and Lansdown, A. R.**, 1960, A low-cost high-efficiency experimental β-ray counter: Symposium on Instrument Methods and Analysis Proc., v. 6, N7, 5 p. C.A. 60: 12858 f. AnC.

D14 **DeLong, C. W., Thompson, R. C., and Kornberg, H. A.**, 1954, Percutaneous adsorption of tritium oxide: Am. Jour. Roentgenology, Radium Therapy, and Nuclear Medicine, v. 71, p. 1038–1045. C.A. 48: 11608 f. AbO, Biz.

Denecke, B. *See* Spernol, A.

Denham, Charlene. *See* Oliverio, V. T.

Denman, R. F. *See* Diamond, P. S.

Devanathan, M. A. V. *See* Bockris, J. O'M.

Devell, L. *See* Westermark, Torbjorn.

De Wiest, R. J. M. *See* Davis, S. N.

D15 **Diamond, P. S., and Denman, R. F.**, 1966, Laboratory techniques in chemistry and biochemistry: New York, D. Van Nostrand, Inc., 491 p. Is, Nu.

Dibeler, V. H. *See* Mohler, F. L.

D16 **Dibeler, V. H., Mohler, F. L., Wells, E. J., Jr., and Reese, R. M.**, 1950, Mass spectra of some simple isotopic molecules: [U.S.] Natl. Bur. Standards Jour. Research, v. 45, p. 288–291. C.A. 45: 2765 i. Sr.

Diez, M. *See* Tamers, M. A.

Dincer, Turgut. *See* Davis, G. H.

Dincer, Turgut. *See* Payne, B. R.

D17 **Dincer, Turgut**, 1966, Application of radiotracer methods in streamflow measurements: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/8, 22 p. Ad, An, BiB, Ha, In_{gw}, In_{Hy}, In_{sw}, MeDf, NuB, NuIn.

Dirian, Grégoire. *See* Botter, Fernande.

Distenfeld, Carl. *See* Clark, D. O.

Dmitriev, M. T. *See* Pshezhetskiĭ, S. Ya.

Dmitrieva, G. V. *See* Karol, I. L.

D18 **Dobbs, H. E.**, 1961, The detection of tritium labelled compounds in vapour phase chromatography: Jour. Chromatography, v. 5, p. 32–37 [in English]. AdC, An, Ge of: AnC.

D19 **Dobbs, H. E.**, 1962, Quenching and adsorption in liquid scintillation counting: Wantage, Berks, England, United Kingdom Atomic Energy Authority, Research Group, Wantage Research Lab. Pub., AERE–M–1075, 17 p. N.S.A. 17: 353, AnC.

D20 **Dobbs, H. E.**, 1963, Oxygen flask method for the assay of tritium-, carbon–14-, and sulfur–35-labeled compounds: Anal. Chemistry, v. 35, p. 783–786. N.S.A. 17: 23263. AnC.

D21 **Dobbs, H. E.**, 1964, The use of a windowless gas-flow counter for detecting weak β-emitters on paper chromatograms: Jour. Chromatography, v. 15, p. 29–38. N.S.A. 18: 35862. AdC, AnC.

D22 **Dobbs, H. E.**, 1966, New oxygen flask apparatus for the assay of tritium and carbon–14: Internat. Jour. Appl. Radiation and Isotopes, v. 17, no. 6, p. 363–364. C.A. 65: 8299 cd. AnC.

Dolphin, G. W. *See* Jackson, S.

D23 **Dolphin, G. W., and Jackson, S.**, 1964, Interpretation of bioassay data, *in* Assessment of radioactivity in man, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium, held at Heidelberg, Federal Republic of Germany, May 11–16, 1964, Proc., p. 329–354. Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AHSB (RP) R–41. N.S.A. 19: 29879. BiC, Ha, InBi.

Done, J. *See* Payne, P. R.

D24 **Donth, H. H.**, 1966, Empirical radiotoxicity hazards and general licensing exemptions: Health Physics, v. 12, p. 106–108. N.S.A. 20: 9199. Ha.

Dorfman, L. M. *See* Wilzbach, K. E.

D25 **Dorfman, L. M.**, 1954, Adsorption of tritium β-particles in hydrogen and other gases: Phys. Rev., v. 95, p. 393–396. C.A. 48: 11206 h. NuIn.

D26 **Dorfman, L. M., and Mattraw, H. C.**, 1953, Exchange reaction of hydrogen and tritium: Jour. Phys. Chemistry, v. 57, p. 723–725. C.A. 48: 465 b. EqG, KiG.

Dorrer, H. D. *See* Simon, Helmut.

D27 **Dostrovsky, I., Avinur, P., and Nir, Aharon**, 1957, Liquid scintillation counting method of natural tritium and its applications to hydrology and meteorology: Chicago, Northwestern Univ. Conf. on Liquid Scintillation Counting, Proc., p. 283–287. C.A. 53: 5899 g. AnC.

D28 **Dougherty, E. C., and Lawrence, J. H.**, 1948, Isotopes in clinical and experimental medicine—A review: California Medicine, v. 69, p. 58–73. C.A. 43: 3483 f. Ge (with 153 references), InBi.

D29 **Douglas, D. L.**, 1955, Tritium-carbon monoxide reaction: Jour. Chem. Physics, v. 23, p. 1558–1559. C.A. 49: 15399 c. AnMs, Ki, Sy.

D30 **Doury, A.**, 1965, Risks related to the diffusion in the atmosphere of large amounts of tritium: Minerva Nucleare, v. 9, no. 1, p. 1–6 [in French]. C.A. 63: 5407 b; N.S.A. 19: 30462. Ab_{atm}, AbG_{atm}, Ha, $MeDf_{atm}$, SeAd.

D31 **Downes, A. M., and Till, A. R.**, 1961, On the assay of tritium as tritobutane: Internat. Jour. Appl. Radiation and Isotopes, v. 11, p. 154–157 [in English]. N.S.A. 15: 32115. AnC, SeAd.

D32 **Drawert, Friedrich**, 1963, Reaction gas chromatography and radio gas chromatography: Vortraege des Symposiums über Gas-chromatographie, Leuna, Germany, May 28–31, 1963, p. 339–350. C. A. 60: 4441 h. AnC. InBi.

D33 **Drever, R. W. P., and Moljk, A.,** 1956, Measurement of tritium as water vapor: Rev. Sci. Instruments, v. 27, p. 650–651. C.A. 51: 12682 c. AnC, SeAd.

Drevinsky, P. J. *See* Martell, E. A.

Drew, R. M. *See* Painter, R. B.

D34 **Drew, R. M., and Painter, R. B.,** 1959, Action of tritiated thymidine on the clonal growth of mammalian cells: Radiation Research, v. 11, p. 535–544. BiZ, Ha, InBi.

Dreyfus-Alain, B. *See* Viallard, Rodolphe.

Drickamer, H. G. *See* Cuddeback, R. B.

D35 **Driver, G. E.,** 1956, Tritium survey instruments: Rev Sci. Instruments, v. 27, p. 300–303. C.A. 51: 17488 i. An, Ge.

D36 **Drobinski, J. C., La Gatta, D. P., Goldin, A. S., and Terrill, J. G., Jr.,** 1965, Analyses of environmental samples for carbon–14 and tritium: Health Physics, v. 11, no. 5, p. 385–395 [in English]. C.A. 63: 10965 f; N.S.A. 19: 22616. AbG_{atm}, AbO, AnC, BiZ, Ha, In_{atm}, In_{Hy}, InBi.

Drury, T. *See* Burns, I.

D37 **Drury, T., and Roberts, J. P.,** 1963, Diffusion in silica glass following reaction with tritiated water vapor: Physics and Chemistry Glasses, v. 4, no. 3, p. 79–90. C.A. 59: 8449 a. AnC.

D38 **Dulcino, J., Bosco, R., Verly, W. G., and Maisin, J. R.,** 1963, Assay of tritium and carbon–14 in animal tissues by liquid scintillation: Clinica Chimica Acta, v. 8, p. 58–65 [in English]. N.S.A. 17: 13895. AnC, BiC, BiZ, InBi, SpFl.

D39 **Dumbost, Henry, and Lefort, Marc,** 1963, Diffusion of tritium out of iron samples in relation to tritium content in meteorites: Nature, v. 200, no. 4906 p. 566. C.A. 60: 5232 de; N.S.A. 18: 1897. AbG_{met}, $MeDf_{met}$.

D40 **Duncombe, W. G.,** 1958, Scintillation counting of tritium in solid samples: Jour. Biochemistry, v. 69, p. 6P [in 371st Proc. pages]. C.A. 53: 2844 c. AnC.

D41 **Dunken, Heinz,** 1965, Isotope analysis of water by emission spectroanalysis: Jena Review, v. 4, p. 204–209 [in English]. C.A. 64: 10696 b. An, IsSp, NuB, SeMs.

D42 **Dunn, F. J., Mosley, J. R., and Potter, R. M.,** 1955, Separations of mixtures of tritium and hydrogen with Hertz pumps: Anal. Chemistry, v. 27, p. 63–64. C.A. 49: 3729 e. An, Sy.

Dunn, W. *See* Ammar, R. G.

Duquesne, Maurice. *See* Apelgot, Sonia.

Dutton, H. J. *See* Chorney, W.

D43 **Dutton, H. J.,** 1961, Monitoring gas chromatography for H^3- and C^{14}-labelled compounds by liquid scintillation counting, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 147–152 [1963]. C.A. 58: 10945 d; N.S.A. 17: 18485. Ge of: AdC, AnC, Sy.

D44 **Dyne, P. J., Fletcher, J. W., Jenkinson, W. M., and Roy, L. P.,** 1961, Radiation-induced exchange reactions in solutions of hydrogen and water: Canadian Jour. Chemistry, v. 39, p. 933–939. C.A. 55: 15170 ab. SeAd.

E

E1 **Eaborn, C., Matsukawa, E., and Taylor, R.,** 1957, Measurement of tritium: Rev. Sci. Instruments, v. 28, p. 725–726. C.A. 52: 6966 e; N.S.A. 12: 3086 AnC, Ha.

E2 **Eastham, J. F., Westbrook, H. L., and Gonzales, D..,** 1961, Liquid scintillation detection of tritium and other radioisotopes in insoluble or quenching organic samples, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci. May 3–10, 1961, Proc., p. 203–209 [1962]. C.A. 57: 10738 gh; N.S.A. 16: 16091. AnC.

Eberhardt, P. *See* Begemann, Friedrich.

E3 **Eberhardt, P., and Geiss, Johannes,** 1964, Meteorite glasses and radiation ages: Isotopic Cosmic Chemistry, North-Holland Publishing Co., Amsterdam, Netherlands, 1964, p. 452–470 [in English]. C. A. 62: 7540 a. AbG_{met}, InA.

Ebert, P. S. *See* Prockop, D. J.

Eccleston, B. H. *See* Whisman, M. L.

Edelman, I. S. *See* Wang, J. H.

E4 **Eden, G. E., and Melbourne, K. V.,** 1960, Radioactive tracers for measuring the periods of retension in percolating filters: Internat. Jour. Appl. Radiation and Isotopes, v. 8, p. 172–178. C.A. 55: 22671 hi. Ad_{gw}, InA_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

Edwards, G. W. *See* Everett, R. J.

Efremov, A. A. *See* Zel'venskii, Ya. D.

Eggleton, A. E. J. *See* Bishop, K. F.

Eggleton, A. E. J. *See* Bainbridge, A. E.

Ehhalt, D. [Dieter]. *See* Brinkmann, Roland.

Ehhalt, D. *See* Gonsior, Bernhard.

Ehhalt, D. *See* Vogel, J. C.

Ehhalt, D. *See* Zimmermann, U.

E5 **Ehhalt, D., Israel, G., Roether, W., and Stich, W.,** 1963, Tritium and deuterium content of atmospheric hydrogen: Jour. Geophys. Research, v. 68, no. 13, p. 3747–3751. C.A. 59: 3509 c; N.S.A. 17: 30692. Ab_{atm}, Ab_{art}, In_{atm}, $MeDf_{atm}$.

E6 **Ehhalt, D., Knott, K., Nagel, J. F., and Vogel, J. C.,** 1963, Deuterium and oxygen–18 in rain water: Jour. Geophys. Research, v. 68, p. 3775–3780. Ab_{atm}, In_{atm}, Th.

E7 **Ehhalt, D., Münnich, K. O., and Roether, W.,** 1964, C–14 working paper: Vienna, Austria. Submitted to the Internat. Atomic Energy Agency Symposium Panel on World Wide Survey of Hydrogen and Oxygen Isotopes in Precipitation, Oct. 12–16, 1964. AbG_{atm}, In_{atm}.

E8 **Ahhalt, D., Münnich, K. O., Roether, W., Schölch, J., and Stich, W.,** 1963, Artificially produced radioactive noble gases in the atmosphere: Jour. Geophys. Research, v. 68, no. 13, p. 3817–3821. Ab_{atm}, In_{atm}.

E9 **Ehhalt, D. H., and Bainbridge, A. E.,** 1966, A peak in the tritium content of atmospheric hydrogen following the accident at Windscale: Nature, v. 209, no. 5026, p. 903–904. C.A. 64: 18917 e. Ab_{atm}, InA_{atm}, $MeDf_{atm}$.

Ehrenberg, L. *See* Ahmstroem, G.

E10 **Eichelberger J. F., Grove, G. R., and Jones, L. V.,** 1963a, Mound Laboratory progress report for June 1963: U.S. Atomic Energy Comm. Pub., MLM–1160, 30 p. N.S.A. 18: 19465. AnCl, NuB.

E11 **Eichelberger, J. F., Grove, G. R., and Jones, L. V.,** 1963b, Mound Laboratory progress report for September 1963: U.S. Atomic Energy Comm. Pub., MLM–1176, 15 p. N.S.A. 18: 19468. AnCl, NuB.

E12 **Eichelberger, J. F., Grove, G. R., and Jones, L. V.,** 1963c, Mound Laboratory progress report for October 1963: U.S. Atomic Energy Comm. Pub., MLM–1177, 27 p. N.S.A. 18: 21707. AnC.

Eichler, Roland. *See* Brinkmann, Roland.

E13 **Eichler, Roland,** 1964, Über den isotopengehalt des wasserstoffs in niederschlags—und grund-wässern [The concentration of hydrogen isotopes in precipitation and ground-water]: Thesis dissertation, given at **Bonn,** Federal Republic of Germany, 1964. In_{gw}, InA_{gw}.

Eidinoff, M. L. *See* Perri, G. C.

Eidinoff, M. L. *See* Verly, W. G.

E14 **Eidinoff, M. L.,** 1947a, The cathodic protium-tritium separation factor: Am. Chem. Soc. Jour., v. 69, p. 977. C.A. 41: 4362 e. AnC, SeAd, SeEl.

E15 **Eidinoff, M. L.,** 1947b, The quantitative measurement of tritium—Hydrogen-alcohol-argon mixtures: Am. Chem. Soc. Jour., v. 69, p. 2504–2507. C.A. 42: 2171 f. AnC.

E16 **Eidinoff, M. L.,** 1947c, Upper limit to the tritium content of ordinary water: Jour. Chem. Physics, v. 15, p. 416. C.A. 41: 5389 h. AbG, AnC, SeEl.

E17 **Eidinoff, M. L.,** 1948, The search for tritium; The hydrogen isotope of mass three—A review: Jour. Chem. Education, v. 25, p. 31–34, 40. C.A. 42: 2865 g. AbG, AnMs, Ge, NuR.

E18 **Eidinoff, M. L.,** 1961, Tritium in biochemical studies, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 222–226 [1963]. C.A. 59: 849: N.S.A. 17: 18497. BiZ: Ge of: In: Ha, SeAd.

E19 **Eidinoff, M. L., Fitzgerald, P. J., Simmel, E. B., and Knoll, J. E.,** 1951, Intercellular localization of compounds labeled with tritium, H^3, by radioautography: Soc. Experimental Biology Medicine Proc., v. 77, p. 225–229. C.A. 45: 8071 e. AnC, BiZ, InBi.

E20 **Eidinoff, M. L., Perri, G. C., Knoll, J. E., Marano, B. J., and Arnheim, J.,** 1953, The fractionation of hydrogen isotopes in biological systems: Am. Chem. Soc. Jour., v. 75, p. 248–249. C.A. 47: 4939 e. AbO, BiC, MeDf, SeAd.

E21 **Elbert, Michael, and Howard, Alma, eds.,** 1963, Radiation effects in physics, chemistry and biology: 2d Internat. Cong. on Radiation Research, held at Harrogate, Great Britain, August 5–11, 1962, Proc., Amsterdam, Netherlands, North-Holland Publishing Co., 521 p. N.S.A. 17: 25017. Ge of: BiC, InBi (with 25 review papers).

Eliseev, G. P. *See* Lyubimov, V. A.

E22 **Elkins, H. B.,** 1961, Maximum permissible urinary concentrations—Their relation to atmospheric maximum allowable concentrations: Pure and Appl. Chemistry, v. 3, p. 269–273. C.A. 56: 2682 a. AbO, Ha, InBi.

Elliot, N. *See* Cannon, C. V.

Elliott, M. J. W. *See* Goldsmith, P.

Elliott, N. *See* Jenks, G. H.

Ellis, J. G. *See* Sharp, R. A.

Ellis, S. C. *See* Lloyd, R. A.

E23 **El-Sayed, M. A., Estrup, P. J., and Wolfgang, Richard,** 1958, Mechanism of reaction of recoil hydrogen in the gas phase: Jour. Phys. Chemistry, v. 62, p. 1356–1363. N.S.A. 13: 2811. AnC, EqI, KiR, NuR, SeAd.

Ely, R. L., Jr. *See* Ballard, L. F.

E24 **Ely, R. L., Jr., and Ballard, L. F.,** 1961a, Geiger counting of tritium as water vapor: U.S. Atomic Energy Comm. Pub., ORO–484, 48 p. C.A. 57: 8144 g; N.S.A. 16: 18814. AnC.

E25 **Ely, R. L., Jr., and Ballard, L. F.,** 1961b, Counting tritium as water vapor in a Geiger flow-counter: Am. Nuclear Soc. 1961 winter mtg., held at Chicago, Ill., Nov. 7–9, 1961, Trans., v. 4, no. 2, p. 249. N.S.A. 16: 694. AnC.

Emerson, R. J. *See* Smith, G. N.

Emil 'yanov, V. A. *See* Belikov, M. P.

Emmanuel, H. *See* Le Pape, M.

E26 **Engelke, M. J.,** 1965, Model 200 AC/DC air sampler: U.S. Atomic Energy Comm. Pub., LA–3228, 20 p. N.S.A. 19: 24843. Ha, In_{atm}.

E27 **Engelke, M. J., and Bennis, E. A.,** 1962, The diffusion and mixing of tritium gas in air: U.S. Atomic Energy Comm. Pub., LA–2671, 36 p. C.A. 57: 11873 d; N.S.A. 16: 15023. Ha, MeDf, SeDf.

E28 **Erdtmann, Gerhard, and Herrmann, Guenter (Günter),** 1963, Aqueous emulsions for scintillator counting of β-emitters: Radiochimica Acta., v. 1, p. 98–103 [in German]. C.A. 59: 197 h; N.S.A. 17: 29217. AnC, Sy.

Erickson, G. P. *See* Kulp, J. L.

Ericksson, Erik. *See* Burdon, D. J.

Eriksson, Erik. *See* Seligman, H.

E29 **Eriksson, Erik,** 1958, The possible use of tritium for estimating groundwater storage: Tellus, v. 10, p. 472–478. C.A. 54: 25401 g. AbG_{gw}, AbG_{Hy}, In_{gw}, In_{Hy}, InA_{gw}.

E30 **Eriksson, Erik,** 1962, Radioactivity in hydrology, *in* Israel, H., and Krebs, A. T., eds., Nuclear radiation in geophysics: New York, Academic Press, p. 47–60. N.S.A. 17: 3189. Ab_{gw}, Ab_{sw}, In_{gw}, In_{sw}, In_{hy}, InA_{gw}, InA_{sw}, $MeDf_{gw}$, $MeDf_{sw}$.

E31 **Eriksson, Erik,** 1963, Atmospheric tritium as a tool for the study of certain hydrologic aspects of river basins: Tellus, v. 15, no. 3, p. 303–308. N.S.A. 18: 10293. AbG_{gw}, AbG_{sw}, AbG_{atm}, AbG_{Hy}, InA_{gw}, InA_{sw}, InA_{atm}, Sa_{sw}, Sa_{gw}, Sa_{atm}.

E32 **Eriksson, Erik,** 1965, An account of the major pulses of tritium and their effects in the atmosphere: Tellus, v. 17, p. 118–130. N.S.A. 19: 28552. Ab_{atm}, Ab_{ocean}, In_{atm}, In_{ocean}, $MeDf_{atm}$, $MeDf_{ocean}$, $MeDf_{Hy}$.

E33 **Eriksson, Erik, and Bolin, Bert,** 1964, Oxygen-18, deuterium, and tritium in natural waters and their relation to the global circulation of water: Paper presented at 2d Conf. on Radioactive Fallout from Nuclear Weapons Tests, held at Germantown, Md., Nov. 1964. U.S. Atomic Energy Comm. Pub., CONF–765–10, 14 p. Ab_{Hy}, AbG, In_{atm}, In_{Hy}, MeD, $MeDf_{atm}$, $MeDf_{ocean}$, $SeAd_{atm}$, $SeAd_{ocean}$, SeDf.

E34 **Esno, Sugiura,** 1963, Chemical composition of upper atmosphere: Kagaku (Kyoto), v. 18, no. 1, p. 20–25 [in Japanese]. N.S.A. 19: 14120. AbG_{atm}, In_{atm}, $MeDf_{atm}$, NuR.

Estrup, P. J., *See* El-Sayed, M. A.

Etienne, A. D. *See* Pro, M. J.

E35 (Reference deleted.)

E36 **Eulitz, G. W.,** 1963, Sensitive tritium counting with a propane proportional counting system: Rev. Sci. Instruments, v. 34, no. 9, p. 1010–1014. C.A. 60: 1304 d; N.S.A. 17: 37440. AnC, SeAd.

Eutsler, B. C. *See* McClelland, Jean.

Eutsler, B. C. *See* Milligan, M. F.

Eutsler, B. C. *See* Robbins, M. C.

E37 **Eutsler, B. C., Evans, G. L., Hiebert, R. D., Mitchell, R. N., Robbins, M. C., and Watts, R. J.,** 1956, Instruments for monitoring tritium in the atmosphere: Nucleonics, v. 14, no. 9, p. 114–117. AnC.

E38 **Evans, E. A.,** 1966, Tritium and its compounds: Princeton, N.J., D. Van Nostrand Co., 376 p. An, BiC, Ge, Ha, In_{hy}, In_{Pe}, InA, InBi, KiR, No, Nu, Se, SeAd.

Evans, G. L. *See* Eutsler, B. C.

E39 **Everett, R. J., Brewer, L. W., Edwards, G. W., Jack, A. J., Linn, T. A., Jr., and Mills, R. O.,** 1964, Chemical and radiochemical analytical procedures: U.S. Atomic Energy Comm. Pub., SC–4783 (RR), 79 p. C.A. 61: 13799 e; N.S.A. 18: 13642. Ge of: AnC, BiB, In, InBi, Sa.

Evers, J. *See* Siri, W.

Ewing, B. B. *See* Kaufman, W. J.

F

F1 **Facy, L.,** 1962, Radioactive precipitations and fallout, *in* Israel, H., and Krebs, A., eds., Nuclear radiation in geophysics: Berlin, Federal Republic of Germany, Springer Verlag. Ab_{atm}.

Fairman, W. *See* Sedlet, J.

Fallot, P. *See* Pellerin, P.

F2 **Fallot, P., Aeberhardt, A., and Masson, J.,** 1957, Determination of tritium in water and its clinical applications: Internat. Jour. Appl. Radiation and Isotopes, v. 1, p. 237–245. C.A. 52: 5523 c; N.S.A. 11: 4806, N.S.A. 11: 3677. AnC, Ha.

Farkas, J. *See* Aman, J.

Farkas, L. *See* Aman, J.

Farzine, K. *See* Von Buttlar, Haro.

F3 **Faul, Henry, ed.,** 1954, Nuclear geology: New York, John Wiley & Sons, Inc., 414 p. (See especially p. 133–134.) AbG_{atm}, AbG_{terr}, NuR.

F4 **Fechtig, H., and Gentner, W.,** 1965, Tritium diffusion measurements on four stone meteorites: Zeitschr. Naturforschung, v. 20a, no. 12, p. 1682–1691, C.A. 64: 12415 d. AbG_{met}, $MeDf_{atm}$.

Feely, H. W. See Friend, J. P.

F5 **Feely, H. W., and Spar, Jerome,** 1960, Mixing and transfer within the stratosphere, Progress report on HASP [High-Altitude Sampling Program]: U.S. Atomic Energy Comm. Pub., DASA–1222, 67 p. N.S.A. 15: 29513. Ab_{atm}, An.

F6 **Feely, H. W., Walton, Alan, Barnett, C. R., and Bazan, Fernando, 1961,** The potential applications of radioisotope techniques to water resources investigations and utilization: Office of Isotopes Development, U.S. Atomic Energy Comm. Final Rept., 340 p. Ge of: Ab_{gw}, Ab_{ocean}, Ab_{sw}, Ab_{atm}, In_{gw}, InA_{gw}.

F7 **Feine, U.,** 1963, Determination of tritium in tissue and other biological samples: Atompraxis, v. 9, p. 357–358 [in German]. N.S.A. 17: 40738. An, BiZ, Ha, InBi.

Feinendegen, L. E. *See* Bond, V. P.

F8 **Feitknecht, W., Wyttenbach, A., and Buser, W.,** 1961, Tritium exchange between water and the hydroxides $Ni(OH)_2$ and α–FeOOH, *in* Reactivity of solids: Amsterdam, Netherlands, Elsevier Publishing Co., p. 234–239. N.S.A. 16: 31367. MeDf, SeAd, SeDf, StD, ThSo.

F9 **Feldman, M. S.,** 1962, Techniques for the determination of tritium: A

literature search: U.S. Atomic Energy Comm. Pub., DP–511, 56 p. C.A. 58: 5016 a; N.S.A. 17: 6035. Ge of; AnC (with 196 references).

Fenimore, D. C. *See* Shoemake, G. R.

Fergusson, G. J. *See* Wilson, A. T.

F10 **Fergusson, G. J.,** 1965, Radiocarbon and tritium in the upper troposphere, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 525–540. AbG_{atm}, In_{atm}.

Fernandez, C. *See* Jacobson, H. I.

F11 **Ferrier, M. D., ed.,** 1962, Transactions of the American Nuclear Society, 1962 winter meeting, Washington, D.C., November 26–28, 1962: Am. Nuclear Soc. Trans., v. 5, no. 2. In_{gw}, InA_{gw}.

Fieldman, Ch. F. *See* Hodnett, E. M.

Filippov, O. A. *See* Bernotas, V. I.

F12 **Filippov, O. A.,** 1964, Activity of tritiated water vapor: Gosudarst. Inst. Priklad. Khimii Trudy (State Institute of Applied Chemistry Trans.), no. 52, p. 81–85 [in Russian]. C. A. 63: 14072 f. AdL., AnC, KiR.

Filonov, V. A. *See* Alekseev, F. A.

Filonov, V. A. *See* Finkel'shteĭn, Ya. B.

F13 **Finkel, E. E.,** 1957a, Measurement of permeability to water vapor in films of synthetic materials by use of water tagged with tritium: Zhur. Fiz. Khimii, v. 31, p. 1650–1653. C.A. 52: 5931 g. An, MeDf.

F14 **Finkel, E. E.,** 1957b, Studying the diffusion of aqueous vapors in synthetic materials by means of tritium: Paris, France, Internat. Conf. on Radioisotopes Sci. Research Proc., v. 2, p. 463–477 [1958]. C.A. 54: 27 g. In.

F15 **Finkel, E. E., and Chmutov, K. V.,** 1959, The use of a gas flow counter for measuring the moisture penetrability of synthetic films by using water-tagged tritium: Zhur. Fiz. Khimii, v. 33, p. 943–947. C.A. 54: 8166 a. AnC, MeDf.

Finkel'shteĭn, Ya. B. *See* Alekseev, F. A.

F16 **Finkel'shteĭn, Ya. B., Filonov, V. A., Soĭfer, V. N., and Obukhova, M. P.,** 1957a, Study of the dynamics of underground waters by means of radioactive isotopes: [Translated from Trudy Vsesoyuz. Nauch.-Tekh. Konf. Primenen. Radioaktiv. i Stabil. Izotopoz i Izluchenii v Narod. Khoz. i Nauk, Moscow, 1957.] Raxved. i Razrabotka Poleznykh Iskopaemkh., p. 191–194 [1958]. U.S. Atomic Energy Comm. Pub., AEC–tr–4475, p. 220–224. In_{gw}, InA_{gw}.

F17 **Finkel'shteĭn, Ya. B., Filonov, V. A., Soĭfer, V. N., and Obukhova, M. P.,** 1957b, Investigation of the ground water migration by means of tritium as indicator: Raxved. i Okhrana Nedr. 24, no. 1, p. 28–35. C.A. 52: 10463 g. N.S.A. 12: 13130. AnC, In, Sy.

F18 **Finkel'shteĭn, Ya. B., and others,** 1957, An attempt to use tritium as an indicator in studying the dynamics of underground waters: Akad. Nauk SSSR Doklady, v. 116, no. 4, p. 671–672. AbG_{gw}, In_{gw}.

F19 **Finkelstein, A., and Lesimple, M.,** 1955, The determination of hydrogen-3 in tritiated water [Le dosage du tritium dans l'eau tritiée]: Jour. Nuclear Energy, v. 2, p. 101–109 [in French]. C.A. 50: 4714 e. AnC.

Fireman, E. L. *See* DeFelice, Joseph.

F20 **Fireman, E. L.,** 1953, Measurement of the (N, H^3) cross section in nitrogen and its relationship to tritium production in the atmosphere: Phys. Rev., v. 91, p. 922–926. C.A. 47: 12017 i. AbG_{atm}.

F21 **Fireman, E. L.,** 1955, Tritium production by 2.2 bev. [Bev.] protons on

iron and its relation to cosmic radiation: Phys. Rev. v. 97, p. 1303–1304. AbG.

F22 **Fireman, E. L.,** 1958, Distribution of helium-3 in the Carbo meteorite: Nature, v. 181, p. 1725. N.S.A. 12: 11478. AbG_{met}.

F23 **Fireman, E. L.,** 1960a, Argon-37, argon-39, and tritium in recent meteorite falls: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 845, p. 28–30. C.A. 55: 14208 ab, AbG_{met}.

F24 **Fireman, E. L.,** 1960b, Problems related to interplanetary matter: Comm. on Nuclear Sci., Conf., Highland Park, Ill., [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 845, Nuclear Sci. ser. rept. 33. AbG.

F25 **Fireman, E. L.,** 1961, Tritium in meteorites and in recovered satellite material, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 69–74 [1962]. N.S.A. 16: 16080. AbG_{atm}, AbG_{met}, AbG_{sat}, InA_{met}, InA_{sat}.

F26 **Fireman, E. L.,** 1962, The Ehole meteorite, its acquisition and its radioactivity: Jour. Geophys. Research, v. 67, p. 2592–2594. N.S.A. 16: 20842. AbG_{atm}, AbG_{met}.

F27 **Fireman, E. L.,** 1963, Solar surface nuclear reactions, *in* Hess, W. N., ed., The physics of solar flares: Washington, D. C., Am. Astron. Soc.—Natl. Aeronautics and Space Adm. Symposium, held at Goddard Space Flight Center, Greenbelt, Md., Oct. 28–30, 1963, Proc., Natl. Aeronautics and Space Adm. Pub., NASA–SP–50, p. 279–284 [1964]. N.S.A. 18: 44400; C.A. 64: 1530 f. AbG_{atm}, AbG_{met}, AbG_{sat}.

F28 **Fireman, E. L., and DeFelice, Joseph,** 1960a, Argon–39 and tritium in meteorites: Geochim. et Cosmochim. Acta, v. 18, nos. 3–4, p. 183–192. N.S.A. 14: 19670. AbG_{atm}, InA_{atm}.

F29 **Fireman, E. L., and DeFelice, Joseph,** 1960b, Argon–37, argon–39, and tritium in meteorites and the spatial constancy of cosmic rays: Jour. Geophys. Research, v. 65, no. 10, p. 3035–3041. C.A. 57: 1816 cd; N.S.A. 15: 2031. AbG_{atm}, AbG_{met}, InA, Nu.

F30 **Fireman, E. L., and DeFelice, Joseph,** 1961, Tritium, argon–37, and argon–39 in the Bruderheim meteorite: Jour. Geophys. Research, v. 66, no. 10, p. 3547–3551. C.A. 59: 7262 fg; N.S.A. 16: 916. AbG_{atm}, AbG_{met}, In_{atm}.

F31 **Fireman, E. L., and DeFelice, Joseph,** 1964, Multiple fall of Pribram meteorites photographed; VII, The tritium and argon–39 in the Pribram meteorite: Astron. Inst. Czech. Bull. 15, no. 3, p. 113 [in English]. C.A. 64: 7921 b. AbG_{met}, In_{atm}.

F32 **Fireman, E. L., DeFelice, Joseph, and Tilles, David,** 1961, Solar-flare tritium in a recovered satellite: Phys. Rev., v. 123, p. 1935–1936. C.A. 56: 2124 b; N.S.A. 15: 31481. AbG_{met}, AbG_{sat}.

F33 **Fireman, E. L., DeFelice, Joseph, and Tilles, David,** 1962a, Radioactivity in meteorites and in satellites: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioactive Dating, held at Athens, Greece, Nov. 19–23, 1962. Proc., preprint, Symposium SM–33/11, 15 p. [in English]. N.S.A. 17: 4708. AbG_{atm}, AbG_{met}, AbG_{sat}, $SeDf_{met}$, $SeDf_{sat}$.

F34 **Fireman, E. L., DeFelice, Joseph, and Tilles, David,** 1962b, Tritium and radioactive argon and xenon in meteorites and satellites, *in* Radioactive dating: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioactive Dating, held at Athens, Greece, Nov. 19–23, 1962, Proc., p. 323–334 [in English, 1963]. AbG_{atm}, AbG_{met}, AbG_{sat}, $SeDf_{met}$, $SeDf_{sat}$.

F35 **Fireman, E. L., and Rowland, F. S.,** 1955, Tritium and neutron production by 2.2-Bev. protons on nitrogen and oxygen: Phys. Rev., v. 97, p. 780–782. AbG_{atm}, NuR, Sy.

F36 **Fireman, E. L., and Rowland, F. S.,** 1961, An additional measurement of the tritium content of atmospheric hydrogen of 1949: Jour. Geophys. Research, v. 66, p. 4321. N.S.A. 16: 5562. Ab_{atm}.

F37 **Fireman, E. L., and Schwarzer, D.,** 1954, Measurement of the tritium concentration in natural waters by a diffusion cloud chamber: Phys. Rev., v. 94, p. 385–388. Ab_{gw}, Ab_{atm}, Ab_{snow}, Ab_{sw}, AnC, In_{atm}, In_{gw}, In_{snow}, In_{sw}.

F38 **Fireman, E. L., and Schwarzer, D.,** 1957, Measurement of lithium-6, helium-3, and hydrogen-3 in meteorites and its relationship to cosmic radiation: Geochim. et Cosmochim. Acta, v. 11, no. 4, p. 252–262. C.A. 51: 13676 f; N.S.A. 11: 8000. AbG_{atm}, AbG_{met}, AbG_{terr}.

F39 **Fireman, E. L., and Zaehringer, J.,** 1957, Depth variation of tritium and argon-37 produced by high energy protons in iron: Phys. Rev., v. 107, p. 1695–1698. AbG.

F40 **Firestone, R. F.,** 1957, Radiation chemistry of water vapor: Am. Chem. Soc. Jour., v. 79, p. 5593–5598. C.A. 52:3440 a. NuIn, NuR.

Fisher, E. H. R. *See* Stewart, N. G.

Fisher, E. L. *See* Walton, Alan.

Fitzgerald, P. J. *See* Eidinoff, M. L.

F41 **Flamm, E., Lingenfelter, R. E., MacDonald, G. J. F., and Libby, W. F.,** 1962, Tritium and helium-3 in solar flares and loss of helium from the earth's atmosphere: Science, v. 138, p. 48–50. C.A. 58: 2293 e; N.S.A. 16:33300. AbG_{atm}, AbG_{met}, AbG_{sat}.

F42 **Flerov, G. N.,** 1960, Use of nuclear physical methods in prospecting and working oil and gas deposits, *in* Radioisotopes in the physical sciences and industry, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., p. 117–122 [in Russian, 1962]. N.S.A. 16: 16043. Ge of: In_{terr}.

F43 **Flerov, G. N., and Alekseev, F. A.,** 1955, The use of radioactivity in prospecting for oil and oil-field development: Zasedaniya Otdel. Tekh. Nauk, p. 302–317, with English summary, p. 318–319. Acad. Sci. U.S.S.R., Conf. on Peaceful Uses of Atomic Energy, Sess. Div. Tech. Sci., p. 183–193 [in English, 1956]. C.A. 50: 559 f, C.A. 50: 11649 e. Ge, In_{gw}.

Fletcher, J. W. *See* Dyne, P. J.

Flew, E. M., *See* James, B. T.

Fliedner, T. M. *See* Cronkite, E. P.

Fliedner, T. M. *See* Rubini, J. R.

Florini, J. *See* Buyske, D. A.

Florini, J. R. *See* Peets, E. A.

Florkowski, Tadeusz, *See* Davis, G. H.

F44 **Florkowski, Tadeusz,** 1964, The possibility of tritium detection in application to hydrogeology: Kwart. Geol., v. 5, p. 887–896 [in Polish]. N.S.A. 19: 18183. AbG, AnC, Ha, Is, Me, Nu, Se, SeDs, SeEl. Ge of: In_{Hy}.

Flynn, J. J., Jr. *See* Hodnett, E. M.

F45 **Fodor, P. C.,** 1958, Tritium: Atomtech, v. 11, p. 286–293 [in Hungarian]. N.S.A. 13:9741. AbG, Ge of: Nu: In, Sy.

Fodorné, C. P. *See* Köhegyi [Koehegi], Ferenc.

F46 **Fodorné, C. P., Lévay, Bela, and Köhegyi, Ferenc,** 1962, Measurement of tritium by means of a liquid scintillator in coincidence circuit, Part II: Magyar Kémiai Folyóirat, v. 68, p. 482–485 [in Hungarian]. N.S.A. 18:19891. AnC, SpFl.

Folley, S. J. *See* Balmain, J. H.

F47 **Fontes, J. C., Letolle, R., Olive, Philippe, and Blavoux, Bernard,** 1966, Oxygene–18 et tritium dans le bassin d'Evian [Oxygen–18 and tritium in the Evian basin]: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/28, 15 p. [in French]. Ab_{atm}, Ab_{gw}, Ab_{sw}, AnC, In_{atm}, In_{gw}, In_{sw}, In_{hy}, InA_{gw}, InA_{Hy}, MeDf, SeEl.

Foreman, W. W. See McClelland, Jean.

Forsberg, H. G. *See* Knutsson, Gert.

F48 **Forsberg, H. G.,** 1962, Liquid scintillation measurements: Svensk. Kem. Tidskr., v. 74, p. 144–163 [in Swedish]. N.S.A. 16: 24337. AnC, BiS, In_{terr}, In_{atm}, In_{sw}, In_{gw}, In_{hy}, In_{art}.

F49 **Forte, M., and Anzani, A.,** 1959a, A method for scintillation counting of very low energy particles: Symposium on Health Physics in Nuclear Installations, Risø, Denmark, May 25–28, 1959, Proc., p. 193–200 [in English]. N.S.A. 14: 16876. AnC, Ec, Ha.

F50 **Forte, M., and Anzani, A.,** 1959b, Method for scintillation counting of very low energy particles: Vienna, Austria, Symposium on Meteorol. Radionuclides, Proc., p. 269–277 [1960]. C.A. 57: 9425 gh. AnC, Ec, KiP, KiR.

F51 **Foskett, A. C.,** 1961, Tritium detection and measurement—Bibliography: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–Bib–132, 33 p. C.A. 55: 14083 a; N.S.A. 15: 16897. Ge of; An, Sy (with 164 references).

Foster, K. W. *See* Grove, G. R.

F52 **Foster, R. R., Purcell, D. H., and Wheat, J. A.,** 1961, Electrolytic separation factors for hydrogen isotopes: U.S. Atomic Energy Comm. Pub., DP–558, 16 p. N.S.A. 15: 22610. Nu, NuR, SeAd, SeEl.

F53 **Fox, S., and Frank, R. B.,** 1958, A dynamic condenser electrometer system for β-particle detection: Inst. Radio Engineers Trans. Nuclear Sci. [N.S.], v. 5, no. 2, p. 27–30. C.A. 52: 19542 f. AnC, Sy.

F54 **Foy, J. M.,** 1964, The biological half-life of tritiated water in the mouse, rat, guinea pig, and rabbit under tropical conditions, and the effect of climate and saline drinking on the biological half-life of tritiated water in the rat: Jour. Cellular and Comp. Physiology, v. 64, p. 279–282. N.S.A. 18: 2017. AbO, BiC, BiZ, Ha, InBi.

F55 **Foy, J. M., and Schnieden, H.,** 1960, Estimation of total body water (virtual tritium space) in the rat, cat, rabbit, guinea pig, and man, and of the biological half-life of tritium in man: Jour. Physiology, v. 154, p. 169–176. C.A. 55: 8525 b. AbO, BiZ, Ha, InA, InBi.

Franc, Z. *See* Vavrejn, B.

F56 **Franc, Z., Svobodova, J., Francova, V., Lipovska, M., and Horesovsky, C.,** 1965, Measurement of soft β-radiation in biological material with the aid of liquid scintillators: II, Determination of ^{14}C and ^{3}H by oxidation in oxygen atmosphere: Colln. Czech. Chem. Commun., v. 30, no. 8, p. 2875–2878 [in English]. C.A. 63: 15214 g; N.S.A. 20: 253. AnC.

F57 **France, Centre d'Études Nucléaires,** 1964, Isotopes, rayonnements, agriculture [Isotopes, radiation, agriculture]: Cadarache, France, Centre

d'Études Nucléaires Bull. Bibliog. Mensuel, v. 2, 47 p. N.S.A. 18: 20423. Ge of: BiB, Ha, In_{Pe}, InBi, $SeAd_{bl}$ (with 110 references), $SeAd_{Pe}$.

Francis, G. E. *See* Banks, T. E.

F58 **Francis, G. E., Mulligan, W., and Wormall, A.,** 1959, Isotopic tracers—A theoretical and practical manual for biological students and research workers: 2d ed., London, England, London Univ., 544 p. N.S.A. 15: 27308. Ge of: An, BiC, InBi, Nu, Sy.

Francova, V. *See* Franc, Z.

Francova, V. *See* Vavrejn, B.

Frank, R. B. *See* Fox, S.

F59 **Franzinetti, C.,** 1950, The mass of charged particles of the cosmic radiation: Philos. Mag. v. 41, p. 86–106. C.A. 44: 6301 c. Ab_{atm}, NuM.

Freeman, N. L. *See* Kabara, J. J.

Freese, Ernst. *See* Gottschling, Hubert.

F60 **Frenkel, E. P., Whalley, B. E., Knorpp, C. T., and Korst, D. R.,** 1962, On the counting of tritiated thymidine in tissues: Jour. Lab. and Clinical Medicine, v. 59, p. 174–178. N.S.A. 16: 7352. AnC, Bi, BiC, InBi, Sy.

F61 **Frey, A. J.,** 1965, Air conditioned living in plastic: Internat. Conf. and Exhibition of the Canadian Nuclear Assoc., held at Quebec, Canada, May 9–12, 1965, preprint 65–CNA–207, 17 p.; U.S. Atomic Energy Comm. Pub., CONF–650515–9, 17 p. Ha.

F62 **Friedlander, Gerhart, and Kennedy, J. W.,** 1955, Nuclear and radiochemistry: 2d ed., New York, John Wiley & Sons, Inc., 468 p. C.A. 49: 12152 f; N.S.A. 18: 33455. Ab, AbG, An, Nu.

F63 **Friedlander, M. W.,** 1957, Lifetime of hydrogen-3 hyperfragments: Nuovo Cimento [10], v. 5, p. 283–284 [in English]. C.A. 52: 16072 b. InA, Nu.

Friedman, A. S. *See* Brown, L. M.

Friedman, A. S. *See* Johnson, V. R.

Friedman, A. S. *See* Oppenheim, Irwin.

Friedman, I. *See* Gonsior, Bernhard.

F64 **Friedman, I., Machta, Lester, and Soller, R.,** 1962, Water-vapour exchange between a water droplet and its environment: Jour. Geophys. Research, v. 67, p. 2761–2766. Ab_{atm}, In_{atm}, ThP.

Friedman, Irving. *See* Bainbridge, A. E.

Friedman, Irving. *See* Begemann, Friedrich.

F65 **Friend, J. P., and others,** 1960, Study of the general feasibility of radioisotope methods in the natural gas industry: U.S. Atomic Energy Comm. Pub., NYO–2753, p. 59–80. Ab_{gw}, In_{gw}.

F66 **Friend, J. P., ed., Feely, H. W., Krey P. W., Spar, Jerome, and Walton, Alan,** 1961, The high altitude sampling program; HASP [High-Altitude Sampling Program] Studies, v. 5 supp.: U.S. Atomic Energy Comm. Pub., DASA–1300, 325 p. N.S.A. 16: 6644. Ge of: Ab_{atm}, In_{atm}, In_{Pe}: Ha, KiR, $MeDf_{atm}$, Sa_{atm}.

F67 **Fries, B. A.,** 1964, Steam-flow measurement by the total-sample method: Am. Chem. Soc., Div. Petroleum Chem. preprints, v. 9, no. 2, p. A30–A42. AnC, Ha, In_{sw}.

F68 **Frissel, M. J., and Kisieleski, W. E.,** 1961, The simultaneous determination of C^{14} and H^3 in biological material, using the Schöniger combustion technique: U.S. Atomic Energy Comm. Pub., ANL–6535, p. 62–65. N.S.A. 16: 31392. AnC, EqI, InBi, KiR.

Frush, H. L. *See* Isbell, H. S.

F69 **Fry, R. M.,** 1958, A note on the maximum permissible levels of tritium: Harwell, Berks, England, United Kingdom Atomic Energy Research Authority, Atomic Energy Research Establishment Pub., AERE–HP/M–137, 11 p. N.S.A. 13: 16118. BiC, Ha, Nu.

F70 **Fry, R. M.,** 1959a, Calibration of flow-ionization chambers for tritium monitoring in air: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., M–429, 8 p. C.A. 54: 5272 h. AdL, AnC, Ec.

F71 **Fry, R. M.,** 1959b, Tritium in urine monitoring by the acetylene-flow ion chamber method: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–HP/R–2858, 13 p. N.S.A. 14: 163. AnC, BiC, Ha, InBi.

F72 **Fry, R. M.,** 1959c, The calibration of flow ionization chambers for tritium monitoring in air: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–M–429, 15 p. AnC.

F73 **Fry, R. M.,** 1959d, Determination of tritium as water vapor in a Geiger-Müller counter: Harwell, Berks, England, Great Britain Atomic Energy Research Establishment Pub., R–2867, 13 p. C.A. 54: 5273 h: N.S.A. 14: 165. AnC, SeAd.

Fry, R. M. J. *See* Lamerton, L. F.

Fujimoto, Hiroshi. *See* Ojima, Tsutomu.

F74 **Fujita, Minoru, and Iwamoto, Junko,** 1961, Estimation of body burden of excretion analysis: Radioisotopes, v. 10, p. 310–321 [in Japanese]. N.S.A. 16: 8516. AbO, BiC, BiZ, Ha.

Furchner, J. E. *See* Richmond, C. R.

F75 **Furry, W. H., and Jones, R. C.,** 1946, Isotope separation by thermal diffusion—The cylindrical case: Phys. Rev., v. 69, p. 459–471. C.A. 40: 4946 b. An, Ge, KiR, MeDf$_{frt}$, SeDf.

F76 **Furth, Jacob, and Tullis, J. L.,** 1956, Carcinogenesis by radioactive substances: Cancer Research, v. 16, p. 5–21. C.A. 50: 14090 f. Ab, AbO, BiZ, Ge, Ha, MeDf (with 90 references).

G

G1 **Gage, R. S., and Aronoff, S.,** 1960, Translocation; III, Experiments with carbon–14, chlorine–36, and hydrogen–3: Plant Physiology, v. 35, p. 53–54. C.A. 54: 15559 c. InBi, MeDf.

Galbraith, T. W. *See* Smith, G. N.

G2 **Galli, M., and Singer, S. F.,** 1956, Cosmic-ray production of helium–3 and tritium in meteorites: Am. Phys. Soc. Bull. [2], v. 1, p. 231. C.A. 52: 12579 b. AbG$_{met}$.

G3 **Gant, P. L., and Yang, Kang,** 1959a, Tritium-ethane reaction: Jour. Chem. Physics, v. 30, p. 1108–1109. N.S.A. 13: 13289. AdC, AnC, Ki.

G4 **Gant, P. L., and Yang, Kang,** 1959b, Separation of hydrogen isotopes by gas—solid chromatography: Science, v. 129, p. 1548–1549. C.A. 53: 18727. AdC, AdG, An, Ki.

G5 **Gant, P. L., and Yang, Kang,** 1964, Chromatographic separation of isotopic methanes: Am. Chem. Soc. Jour., v. 86, p. 5063–5064. N.S.A. 19: 5863. AnC, SeAd.

G6 **Gant, P. L., and Yang, Kang,** 1965, Low-temperature adsorption process for purifying low-molecular-weight gases: U.S. Patent 3,208,200 (Cl. 55–68): Appl. May 18, 1961, 5 p. C.A. 64: P4644 a. AnC.

G7 **Gurder, K. H.,** 1963, Studies on the incorporation of tritiated thymidine

in deoxyribonucleic acid in mouse tissues and on its radiation effects: Internat. Jour. Radiation Biology, v. 6, p. 157–172 [in English]. N.S.A. 17: 19847. AnC, BiC, BiZ, InBi, KiR.

Gargarinskii, Yu. V. *See* Popov, M. M.

Garner, J. D. *See* McFadden, E. B.

G8 **Garnett, J. L., Hannan, W. K., and Law, S. W.,** 1961, A modified tritium gas counting procedure: Anal. Chim. Acta, v. 25, p. 170–175 [in English]. N.S.A. 15: 27558. AnC, Sa, Sy, ThP.

Garnier, A. *See* Vacca, G.

Gat, J. R. *See* Borowitz, J. L.

Gat, J. R. *See* Harpaz, Y.

G9 **Gat (Gutmann), J. R.,** 1961, Tritium concentration in natural water sources in the eastern Mediterranean area: Rehovoth, Israel, Weizmann Inst. Sci., Ann. Prog. Rept. 3, Jan. 1960–Jan. 1961, 17 p.; U.S. Atomic Energy Comm. Pub., TID–11879, 17 p. N.SA. 15: 13165. Ab_{atm}, Ab_{gw}, Ab_{sw}, Ab_{ocean}, AnC, SeEl.

G10 **Gat, J. R.,** 1965, The determination of characteristics of water bodies with the aid of bomb-produced tritium pulses, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and Tritium Dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 630–642. Ab_{atm}, Ab_{sw}, Ab_{gw}, In_{gw} In_{sw}, InA_{gw}, InA_{sw}, InA_{Hy}, InA_{atm}, Is, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, Sa, $SeAd_{atm}$, $SeAd_{gw}$, $SeAd_{sw}$, SeDs, ThSo.

G11 **Gat, J. R., Karfunkel, Uriel, and Nir, Aharon,** 1961a, Tritium content of rainwater from the eastern Mediterranean area: U.S. Atomic Energy Comm. Pub., TID–12612, 28 p. N.S.A. 15: 17129. Ab_{atm}, In_{atm}, InA_{atm}, $MeDf_{atm}$.

G12 **Gat, J. R., Karfunkel, Uriel, and Nir, Aharon,** 1961b, Tritium content of rainwater from the eastern Mediterranean area, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., v. 1, p. 41–54. C.A. 57: 9588 i: N.S.A. 15: 17129. Ab_{atm}, In_{atm}, InA_{atm}, $MeDf_{atm}$.

G13 **Gat, J. R., and Nir, Aharon,** 1964, Tritium concentrations in natural water sources in the eastern Mediterranean area—Final contract report, June 15, 1958–June 14, 1962: U.S. Atomic Energy Comm. Pub., TID–21350, 22 p. N.S.A. 19: 7703. AnC, Ge of: An: Sa, SeEl.

Gatlinger, T. *See* Davis, G. H.

G14 **Gavosto, F., Pileri, A., and Maraini,** G., 1959, Usefulness of the tritium-tagged compounds in the autoradiographic investigation of cells: Prog. Medicine, v. 15, p. 14–16. C. A. 53: 11482 h. AnC, BiC, InBi.

G15 **Gavrilov, V. M., and Tishkin, P. A.,** 1960, Apparatus for measuring the hydrogen isotope H^3 with a liquid scintillator: Gosudarst. Inst. Priklad. Khimii Trudy (State Institute of Applied Chemistry, Trans.), v. 1960, no. 45, p. 85–96. C.A. 56: 11150 b. AnC, Sy.

G16 **Gazzola, Adriano,** 1964, Further examples of the use of long-lived nuclear products in the study of large-scale atmospheric movements: Riv. Meteorologica Aeronautica, v. 24, no. 2, p. 35–49 [in Italian]. N.S.A. 18: 34255. In_{atm}, $MeDf_{atm}$.

Geiss, Johannes. *See* Bageman, Friedrich.

Geiss, Johannes, *See* Eberhardt, P.

G17 **Geiss, Johannes,** 1957, Age of meteorites by isotopic measurement: Chimia, v. 11, p. 349–363. N.S.A. 11: 11477. AbG_{atm}, AbG_{met}, InA_{met}, Nu.

G18 **Geiss, Johannes, and Goldberg, E. D., eds.,** 1963, Earth science and meteoritics: Amsterdam, Netherlands, North-Holland Publishing Co., 311 p. Ge of: AbG_{atm}, AbG_{met}, In: MeDf (with 15 articles).

G19 **Geiss, Johannes, Hirt, B., and Oeschger, Hans,** 1960, Tritium- und helium-gehalti in meteoriten [Tritium and helium contents [concentrations] in meteorites]: Helvetica Physica Acta, v. 33, p. 590–593. [in German]. C.A. 55: 11215 g; N.S.A. 15: 11337. AbG_{met}, AnC, In_{atm}, In_{met}, Sy.

G20 **Geiss, Johannes, Oeschger, Hans, and Singer, Peter,** 1958, Helium-3—hydrogen-3 measurements on a stone meteorite: Helvetica Physica Acta, v. 31, p. 322–333. C.A. 53: 4045 h. AbG_{met}, InA_{met}.

G21 **Geiss, Johannes, Oeschger, Hans, and Singer, Peter,** 1960, Radiation ages of chondrites: Zeitschr. Naturforschung, v. 15a, p. 1016–1017. C.A. 56: 6956 d. AbG_{met}, InA_{met}.

Gentner, W. *See* Fechtig, H.

Genunche, Ana. *See* Mantescu, Constanta.

G22 **Gersh, M. E.,** 1965, Improved separation of isotopic hydrogens by gas chromatography: Anal. Chemistry, v. 37, p. 1786. N.S.A. 20: 5824. AdC, AnC.

Gevantman, L. H. *See* Casaletto, G. J.

Gevantman, L. H. *See* Smith, C. H.

Gevantman, L. H. *See* Yang, J. Y.

Gewehr, H. *See* Scharpenseel, H. W.

G23 **Gey, A.,** 1963, Tritium and tritiated water—Time limits of accidental exposure in stable or regenerated atmospheres: Saclay, France, Internat. Conf. on Radioactive Pollution of Gaseous Media, Nov. 1963, U.S. Atomic Energy Comm. Pub., CONF–337–46, 57 p. N.S.A. 18: 43876. Ha, In_{atm}.

G24 **Geyh, M. A., and Wendt, Immo,** 1965, Results of water sample dating by means of the model of Münnich and Vogel, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 597–603. InA_{gw}.

Ghanem, N. A. *See* Westermark, Torbjorn.

Ghormley, J. A. *See* Jenks, G. H.

Gibson, J. A. B. *See* Burt, A. K.

G25 **Gibson, J. A. B.,** 1961a, Detection of tritium with a film dosemeter [dosimeter]: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–M–770. N.S.A. 16: 20687. Ha, KiP.

G26 **Gibson, J. A. B.,** 1961b, Detection of tritium with a film dosemeter [dosimeter]: Physics in Medicine and Biology, v. 6, p. 283–286. N.S.A. 16: 20687. Ha, KiP.

G27 **Gibson, J. A. B.,** 1961c, Liquid scintillation counting of tritium in urine: Physics in Medicine and Biology, v. 6, p. 55–64. C.A. 56: 3752 d; N.S.A. 15: 24834. AnC, Ha, InBi, NuR, Sy, ThP.

G28 **Gibson, J. A. B., and Burt, A. K.,** 1966, Method for continuous measurement of tritiated water in air: Jour. Nuclear Energy, pts. A–B, v. 20, no. 3, p. 185–190. C.A. 64: 17005 g. AnC, Ha.

Giletti, B. J. *See* Kulp, J. L.

G29 **Giletti, B. J.,** 1957, The geochemistry of tritium: New York, N.Y., Columbia Univ., unpub. Ph. D. thesis, 124 p. AbG, AnC.

G30 **Giletti, B. J., and Bazan, Fernando,** 1956, Rates of movement and mixing of water masses in the Atlantic Ocean [abs.]: Geol. Soc. America Bull., v. 67, p. 1698. AbG_{atm}, AbG_{ocean}, In_{hy}, InA_{ocean}, $MeDf_{ocean}$.

G31 **Giletti, B. J., Bazan, Fernando, and Kulp, J. L.,** 1958, The geochemistry of tritium: Am. Geophys. Union Trans., v. 39, no. 5, p. 807–818. N.S.A. 13: 2023. AbG_{atm}, AbG_{ocean}, AbG_{gw}, AbG_{Hy}, InA_{atm}, InA_{ocean}, InA_{gw}, MeDf, Nu.

G32 **Giletti, B. J., and Kulp, J. L.,** 1956, Application of tritium measurements to oceanography and meteorology [abs.]: Am. Geophys. Union Trans., v. 37, p. 345. AbG_{atm}, AbG_{ocean}, InA_{atm}, InA_{ocean}, $MeDf_{atm}$, $MeDf_{ocean}$.

G33 **Gill, D. M.,** 1964, Use of glass fibre paper in liquid scintillation counting: Nature, v. 202, p. 626. N.S.A. 18: 25839. AnC, Sy.

G34 **Giovannozzi-Sermanni, G., Masironi, R., and Cacciari, I.,** 1962, Physiological effects of tritiated water on *Rhodotorula gracilis* as influenced by cystamini: Internat. Jour. Radiation Biology, v. 5, p. 485–491. C.A. 58: 2633 c; N.S.A. 17: 5719. BiB, InBi, MeDf, SeAd.

Glangeaud, Louis, *See* Blavoux, Bernard.

Glascock, R. F. *See* Balmain, J. H.

G35 **Glascock, R. F.,** 1951a, Estimation of radioactive hydrogen as tritiobutane in the Geiger counter: Nature, v. 168, p. 121–122. C.A. 46: 10917 i. AnC.

G36 **Glascock, R. F.,** 1951b, Estimation of tritium and some preliminary experiments on its use as a label for water: Nucleonics, v. 9, no. 5, p. 28–34. C.A. 46: 2424b. AnC, BiC.

G37 **Glascock, R. F.,** 1952, Combustion technique for the assay of tritium, carbon^{13}, and carbon^{14} in a single 10-mg. sample of biological material: Jour. Biochemistry, v. 52, p. 699–704. C.A. 47: 2243d. AnC.

G38 **Glascock, R. F.,** 1954, Isotopic gas analysis for biochemists: New York, Academic Press, Inc., 253 p. C.A. 49: 2556 d. Ge of: AnC, InBi.

G39 **Glascock, R. F., and Buncombe, W. G.,** 1954, Differential fractionation of hydrogen isotopes in liver and mammary gland: Jour. Biochemistry, v. 58, p. 440–447. C.A. 46: 10290 a. AbO, BiC, InBi, MeDf.

G40 **Glascock, R. F., and Smith, R. W.,** 1961, Assay of T as tritiobutane: Internat. Jour. Appl. Radiation Isotopes, v. 11, nos. 2, 3, p. 158. C.A. 60: 13880 a. AnC.

Glass, H. I. *See* Burns, H. G.

G41 **Glasstone, Samuel,** 1946, The elements of physical chemistry: Princeton, N.J., D. Van Nostrand Co., 695 p. (See especially p. 46–48, 50.) Ge, No.

G42 **Glazov, N. V.,** 1962, Primenenie radioaktivnykh izsotopov v inzhenernykh izyskaniyakh [Use of radioactive isotopes in engineering studies]: Moscow, U.S.S.R., Gosatomizdat, 68 p. N.S.A. 17: 27583. In_{Hy}, In_{Pe}.

Goebel, K. *See* Charalambus, St.

G43 **Goebel, K., and Schmidlin, P.,** 1960a, Tritium, *in* pt. 4, Radiochemical investigations, sec. B, The Breitscheid meteorite: Geochim. et Cosmochim. Acta, v. 17, p. 342–349. C.A. 54: 6433 g. AbG_{met}.

G44 **Goebel, K., and Schmidlin, P.,** 1960b, Tritium measurements on rock meteorites: Zeitschr. Naturforschung, v. 15a, p. 79–82. C.A. 54: 12922 fg. AbG_{met}.

G45 **Goebel, K., and Schmidlin, P.,** 1960c, Tritium measurements on iron meteorites: Zeitschr. Naturforschung, v. 15a, p. 79–82. N.S.A. 14: 11810. AbG_{met}, NuB.

G46 **Goebel, K., and Schmidlin, P.,** 1960d, The radiation age of meteorites, *in* Radioisotopes in the physical sciences and industry, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., p. 13–17 [1962]. N.S.A. 16: 16039. AbG_{met}, In_{atm}, SeDf.

G47 **Gold, V., Lambert, R. W., and Satchell, D. P. N.,** 1959, Aromatic tritium exchange in water and deuterium oxide: Chemistry and Industry, no. 42, p. 1312–1313. N.S.A. 14: 7328. SeAd.

Goldberg, E. D. *See* Geiss, Johannes.

Goldin, A. S. *See* Drobinski, J. C.

Goldsmith, P. *See* Barclay, F. R.

Goldsmith, P. *See* Brown, F.

G48 **Goldsmith, P., and Brown, F.,** 1961, Worldwide circulation of air within the stratosphere: Nature, v. 191, no. 4793, p. 1033–1037. C.A. 60: 7655 c. AbG_{atm}, In_{atm}, $MeDf_{atm}$.

G49 **Goldsmith, P., Jelley, J. V., Barclay, F. R., Elliott, M. J., and Osborne, A. R.,** 1960, Some preliminary measurements of the tritium and carbon-14 content of the stratosphere over England: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–R–3271, 11 p. C.A. 54: 22044 g; N.S.A. 14: 19523. AbG_{atm}, InA_{atm}, Sa.

Gole, H. *See* Ostlund [Oestlund].

G50 **Gonsior, Bernhard,** 1959, Tritium-anstieg im atmosphärischen wasserstoff [Tritium increase in atmospheric hydrogen]: Naturwissenschaften, v. 46, p. 201–202. C.A. 53: 16619 h; N.S.A. 13: 13138. Ab_{atm}, AnC, $MeDf_{atm}$.

G51 **Gonsior, Bernhard,** 1960, Die konzentration des tritium in der atmosphäre: Heidelberg, Federal Republic of Germany, Heidelberg Univ. unpub. thesis. AbG_{atm}.

G52 **Gonsior, Bernhard,** 1961, Thermal-diffusion apparatus [installation] for separation of tritium from low-concentration solutions: Zeitschr. Angew. Physik, v. 13, p. 545–548 [in German]. C.A. 56: 11134 h: N.S.A. 16: 12009. AnC, SeAd, $SeDf_{art}$, SeEl, ThD.

G53 **Gonsior, Bernhard, and Friedman, I.,** 1962, Tritium and deuterium in atmospheric hydrogen: Zeitschr. Naturforschung, v. 17a, p. 1088–1091. C.A. 58: 6610 c; N.S.A. 17: 14517. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

G54 **Gonsior, Bernhard, Friedman, I., and Ehhalt, D.,** 1963, Measurements of the tritium and deuterium concentrations in atmospheric hydrogen: Jour. Geophys. Research, v. 68, no. 13, p. 3753–3756. C.A. 58: 6610 c, C.A. 64: 18917 e: N.S.A. 17: 30693. Ab_{atm}, Ab_{art}, In_{atm}, In_{art}, $MeDf_{atm}$, $MeDf_{art}$.

G55 **Gonsior, Bernhard, Friedman, I., and Lindenmayr, G.,** 1965, New tritium and deuterium measurements in atmospheric hydrogen, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 549–559. Ab_{atm}, In_{atm}.

Gonzales, D. *See* Eastham, J. F.

G56 **González-Vidal, José,** 1958, Survey of tritium-producing nuclear reactions: Berkeley, Calif., California Univ. thesis. U.S. Atomic Energy Comm. Pub., UCRL–8330, 64 p. N.S.A. 12: 15909. Ge: of Nu.

G57 **Goodheart, Clyde,** 1961, Radiation dose calculation in cells containing intracellular tritium: Radiation Research, v. 15, p. 707–773. N.S.A. 16: 5123. Ha.

G58 **Goodier, I. W., Hughes, F. H., and Williams, A.,** 1965, Precise measurement of the activity of low-energy β-emitter with calibrated ionization chambers: Vienna, Austria, Symposium on Radioisotope Sample Measurement and Techniques in Medicine and Biology, May 24–28, 1965, Proc., p. 613–622. C.A. 65: 6679 f. AnC, Ha, In.

Gordon, B. E. *See* Hodgson, T. S.

Gordon, K. F. *See* Mitsis, G. J.

Gordon, S. *See* Buyske, D. A.

Gordon, S. *See* Kelly, R. G.

G59 **Gorlovoi, G. D., and Stepanenko, V. A.,** 1965, Tritievye Izluchateli [Tritium emitters]: Moscow, U.S.S.R., Atomizdat., 115 p. C.A. 65: 8303 g. Ge.

G60 **Gottschling, Hubert, and Freese, Ernst,** 1962, A tritium isotope effect on ion exchange chromatography: Nature, v. 196, p. 829–831. N.S.A. 17: 7948. AnC, EcC, IsKi, SeAd.

Goutier, R. *See* Baugnet-Mahieu, L.

Grace, A. J. *See* Conway, W. D.

Grace, J. T. *See* Johnson, B. S., Jr.

G61 **Gracheva, E. G., and Khusainova, Sh. G.,** 1957, Determination of tritium content in liquids: Soviet Jour. Atomic Energy, v. 2, p. 74 [English translation]: Atomnaya Energiya, v. 2, p. 70. C.A. 52: 10804 i. AnC.

G62 **Grandclément, G.,** 1963, The use of radioactive tracers in hydrology and hydraulics: Eau Potable Assainissement, v. 50, p. 293–300 [in French]. N.S.A. 18: 12370, N.S.A. 18: 27822. AnC, In_{gw}, In_{sw}, In_{hy}, In_{Hy}, InA_{gw}, InA_{sw}, $MeDf_{gw}$, $MeDf_{sw}$, $SeAd_{gw}$, SeAd.

G63 **Grant, P. J.,** 1965, The ground waters of the Heretaunga Plains; I, The Ngaruroro River as a major recharge source: Marton, New Zealand, Jour. Hydrology, v. 4, p. 65. Ab_{sw}, Ab_{gw}, In_{sw}, In_{gw}.

G64 **Grant-Taylor, T. L., and Taylor, C. B.,** 1966, Tritium hydrology in New Zealand: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/27, 37 p. [in English]. Ab_{gw}, Ab_{atm}, Ab_{snow}, Ab_{sw}, Ab_{ocean}, AbG, AnC, In_{gw}, In_{atm}, In_{sw}, In_{hy}, In_{ju}, InA_{gw}, InA_{sw}, $MeDf_{atm}$, $MeDf_{ocean}$, No, NuB, SeEl.

G65 **Grant-Taylor, T. L., and Taylor, C. B.,** 1970, Tritium hydrology in New Zealand: New Zealand Jour. Geology and Geophysics. (In press) Ab_{atm}, Ab_{gw}, InA_{atm}, InA_{gw}.

Grapengiesser, Björn. *See* Westermark, Torbjorn.

G66 **Graul, E. H., and Hundeshagen, Heinz,** 1959a, Measuring techniques and autoradiographic detection of tritium-labeled organic substances, using as example arginine: Strahlentherapie, v. 108, p. 524–530 [in German]. N.S.A. 13: 12400. An, BiC, KiP, KiR, Nu, Sy.

G67 **Graul, E. H., and Hundeshagen, Heinz,** 1959b, The technique of preparation and analysis of tritium-labeled compounds: Atompraxis, v. 5, p. 154–160. C.A. 53: 21594 g. AnC, Ge, In, Sy (with 82 references).

G68 **Graupner, K., and Winter, E. R. S.,** 1952, Self-diffusion coefficients of liquids: Jour. Chem. Soc., 1952, p. 1145–1150. C.A. 46: 7386 g. MeDf, ThD.

Gray, J., Jr. *See* Hagemann, F. T.

Green, H. F. *See* Brown, F.

Greene, R. C. *See* Patterson, M. S.

Greenhouse, S. W. *See* Cronkite, E. P.

G69 **Greenkorn, R. A.,** 1962, Experimental study of water-flood tracers: Jour. Petroleum Technology, v. 14, p. 87–89. C.A. 56: 10450 f. Ad, In_{gw}, MeDf.

G70 **Gregory, D. P., and Landsman, D. A.,** 1958, Average decay energy of tritium: Phys. Rev., v. 109, p. 2091. C.A. 52: 14364 i. Ki, NuB, Th.

Grenon, Michel. *See* Viallard, Rodolphe.

G71 **Grenon, Michel,** 1953, A study of the functioning of counters with an external cathode—The influence of heat treatment and the role of water bound to the glass: Paris, Comptes Rendus, Cong. Internat. Chimie Indus., 26th, 1953, v. 236, p. 1772–1773. CA. 47: 10991 g. AnC, $In_{art.}$

G72 **Grenon, Michel, and Viallard, Rodolphe,** 1952, Determination of tritium — A review: Jour. Chimie Phys. et Physicochimie Biol., v. 19, p. 623–628. C.A. 47: 3754 e. Ge: of AnC.

G73 **Greulich, R. C.,** 1961, Deleterious influence of orally administered tritiated thymidine on reproductive capacity of mice: Radiation Research, v. 14, p. 83–95. N.S.A. 15: 10664. BiZ, Ha.

G74 **Grillo, R. S., and O'Brien, K. M.,** 1965, The use of the diffusion chamber to study cell proliferation in the newt: Am. Zoologist, v. 5, p. 247. An, BiZ, SeDf.

G75 **Grillo, R. S., Urso, Paul, and O'Brian, D. M.,** 1965, The effect of dose on the incorporation of ^3H-thymidine in the nuclei of the liver capsule cells in the newt, *Triturus viridescens*: Experimental Cell Research, v. 37, p. 683–685. BiZ, InBi.

G76 **Grillo, R. S., Urso, Paul, and O'Brian, D. M.,** 1966, An *in vivo* culture technique to study cell proliferation in the newt, *Triturus viridescens*: New Jersey Acad. Sci. Bull., Fall 1966, p. 10–14. An, BiZ, InBi, KiB, SeDf.

G77 **Grilly, E. R.,** 1951, The vapor pressures of hydrogen, deuterium, and tritium up to three atmospheres: Am. Chem. Soc. Jour., v. 73, p. 843–846. C.A. 45: 4505 g. Sd, ThP.

G78 **Groot-Wesseldijk, A. Th.,** 1964, Experience with the use of radioactive hydrogen in industry: Tijdschr. Soc. Geneeskunde, v. 42, p. 854–857. N.S.A. 19: 33781, N.S.A. 19: 38355. BiC, Ha.

Gross, J. *See* Zajicek, G.

G79 **Grosse, A. V., Kirshenbaum, A. D., Kulp, J. L., and Broecker, W. S.,** 1954, The natural tritium content of atmospheric hydrogen: Phys. Rev., v. 93, p. 250–251. C.A. 48: 6174 g. $AbG_{atm.}$

G80 **Grossweiner, L. I., and Matheson, M. S.,** 1952, Luminescence of ice and tritiated ice: Jour. Chem. Physics, v. 20, p. 1645–1655. C.A. 46: 10909 c. NuB, SpEl.

Grove, G. R. *See* Eichelberger, J. F.

Grove, G. R. *See* Wylie, K. F.

G81 **Grove, G. R., Foster, K. W., and Valee, R. E.,** 1957, Separation of hydrogen and tritium by thermal diffusion, *in* Kistemaker, J., Bigeleisen, Jacob, and Nier, A. O. C., eds., International Symposium on Isotope Separation, Proceedings: Amsterdam, Netherlands, p. 462–482 [1958]. C.A. 52: 11597 g. AnC, KiR, SeEl, ThF.

G82 **Gruber, G. H.,** circa 1961, Detection of D_2O leakage in heat exchangers: U.S. Atomic Energy Comm. Pub., AECL–801, p. 73–76. N.S.A. 15: 2764. AnC, NuIn.

Gruenberger, D. *See* Tykva, R.

Grummitt, W. E. *See* Brown, R. M.

Guarino, Angelo. *See* Aliprandi, Bianca.
Guarino, Angelo. *See* Cacace, Fulvio.
Gugler, H. D. *See* Kaplan, W. D.
Guibileo, M. *See* Camera, V.

G83 **Guibileo, M., and Camera, V.,** 1965, Determinations of urinary tritium by means of a liquid scintillator carried out on the personnel of a nuclear center: Medicina del Lavoro, v. 56, no. 3, p. 216–221 [in Italian]. C.A. 63: 7314 c. AbO, AnC, Ha, InBi.

G84 **Guillaume, M., and Warin, R.,** 1963, A radioactivity measurement device of high sensitivity for chromatographic gaseous eluates: Soc. Belge Chim. Bull., v. 72, no. 11–12, p. 686–698. C.A. 60: 6447 e; N.S.A. 19: 320. AnC, ThD.

G85 **Guinn, V. P.,** 1961, Special features of tritium as a tracer in industrial research, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 227–233 [1963]. C.A. 58: 9843 h; N.S.A. 17: 18498. Ge of: AnC; Ha, In, Is, Nu, Sy.

G86 **Guinn, V. P., and Wagner, C. D.,** 1961, Comparison of ionization-chamber and liquid-scintillation methods for measurement of beta emitters, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 160–166 [1963]. C.A. 59: 4755 ab; N.S.A. 17: 18487. Ge of: AnC.

G87 **Guizerix, J., Margrita, R., Launay, M., and Ruby, P.,** 1966, Tritium et hydrogéologie. Études et mesures effectuées au Centre d'Études Nucléaires de Grenoble: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Symposium preprint, SM–83/31, 29 p. [in French]. Ab_{atm}, Ab_{gw}, Ab_{sw}, AbG, AnC, In_{atm}, In_{Pe}, In_{gw}, In_{sw}, $MeDf_{atm}$, $MeDf_{gw}$, Sa, SeAd, SeEl.

Gupta, G. N. *See* Jacobson, H. I.

G88 **Gupta, G. N.,** 1966, A simple in-vial combustion method for assay of tritium, carbon–14, and sulfur–35 in biological, biochemical, and organic materials: Anal. Chemistry, v. 38, p. 1356–1359. N.S.A. 20: 36721. AnC.

H

H1 **Haberer, K.,** 1963, Correction for self-absorption in the measurement of β-activity in water samples: Atomwirtschaft, v. 8, no. 10, p. 541–544. C.A. 61: 6605 g. An.

Hagee, G. R. *See* Setter, L. R.

H2 **Hagemann, F. T., Gray, J., Jr., Machta, Lester, and Turkevich, Anthony,** 1959, Stratospheric carbon–14, carbon dioxide, and tritium: Science, v. 130, p. 542–552. C.A. 54: 1949 e: N.S.A. 13: 20417. AbG_{atm}, InA_{atm}, $MeDf_{atm}$.

H3 **Haigh, C. P.,** 1957, Scintillation counter for measuring hydrogen–3 and carbon–14: Paris, France, Internat. Conf. on Radioisotopes Sci. Research Proc., v. 1, p. 663–674 [1958]. C.A. 53: 16732 e. AnC.

H4 (Reference deleted.)

Halevy, E. *See* Mercado, A.

H5 **Halevy, E., and Nir, Aharon,** 1960a. Use of radioisotopes in studies of groundwater flow: U.S. Atomic Energy Comm. Pub., NP–8745, 41 p. N.S.A. 14: 18029. An, Ha, In_{gw}, $MeDf_{gw}$, Sa, $SeAd_{gw}$.

H6 **Halevy, E., and Nir, Aharon,** 1960b, Use of radioisotopes in studies of ground-water flow: Tel Aviv, Israel, Tahal Water Planning for Israel, Ltd. AbG_{gw}, In_{gw}, InA_{gw}.

H7 **Halevy, E., and Nir, Aharon,** 1962, The determination of aquifer parameters with the aid of radioactive tracers: Jour. Geophys. Research, v. 67, no. 6, p. 2403–2409. Ha, In_{gw}, $MeDf_{gw}$.

H8 (Reference deleted.)

Hall, L. G. *See* Washburn, H. W.

Hallowes, K. H. *See* Lloyd, R. A.

H9 **Halvorsen, K.,** 1961, Direct measurement of tritium in biological materials with the liquid scintillator counter, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 313–323 [1962]. N.S.A. 16: 16098. AnC, BiC, BiZ, InBi, SpFl.

Mamada, Tatsuji. See Kang, Yung-ho.

Hamada, Tatsuji. *See* Takahashi, Tan.

Hamada, Tatsuji. *See* Yamazaki, [Yamasaki] Fumio.

H10 **Hammel, E. F.,** 1950, Some calculated properties of tritium: Jour. Chem. Physics, v. 18, p. 228–229. C.A. 44: 6215 b. MeD, SdTr, ThP.

H11 **Hammond, P. R.,** 1962, Glass electrode in solutions containing H isotopes: Chemistry and Industry, v. 1962, p. 311–312. C.A. 56: 15288 ab. AnC.

Han, H. H. *See* Kim, T. S.

H12 **Handler, J. A.,** 1963, A liquid-scintillation method for determining tritium in the tissues of animals dosed with tritium-labeled vitamin A: Analyst, v. 88, p. 47–55. C.A. 59: 10462 cd. AnC, InBi, Sy.

H13 **Handloser, J. H., Jr.,** 1957, Tritium health physics: New York, N.Y., Symposium on Tritium Tracer Application, p. 21–22 [1958]. C.A. 53: 71 d. Ge (with 18 references), Ha, In.

H14 **Handloser, J. H., Jr.,** 1961, Tritium health physics considerations, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 201–202 [1963]. N.S.A. 17: 18492. Ha, In, KiR, Nu.

H15 **Haney, W. A.,** 1964, Fission-product tritium in fuel-processing waste: Nuclear Safety, v. 5, p. 399–403. N.S.A. 18: 43858. AnC, Ha, In_{atm}, In_{Pe}, In_{gw}, MeDf, NuB.

H16 **Haney, W. A., Brown, D. J., and Riesenauer, A. E.,** 1962, Fission-product tritium in separations wastes and in the ground water: U.S. Atomic Energy Comm. Pub., HW–74536, 14 p. C.A. 59: 13683 h; N.S.A. 16: 30156. Ab_{gw}, Ab_{sw}, Ab_{atm}, Ha, In_{gw}, In_{sw}, In_{Pe}, In_{atm}, InA_{gw}, $MeDf_{gw}$.

Hannan, W. K. *See* Garnett, J. L.

Hanshaw, B. B. *See* Back, William.

Hardaway, J. E. *See* Ault, W. U.

Harfenist, M. *See* Pace, N.

H17 **Harkins, W. D.,** 1950, The intermediate compound nucleus in nuclear reactions: Colloid Chemistry, v. 7, p. 3–32. C.A. 44: 10528 a. Ab, Ge, Nu.

H18 **Harley, J. H.,** 1962, Indirect methods of estimating radionuclide body burden or exposure: Munich, Federal Republic of Germany, Internat. Symposium on Radioactive Contamination of Workers, Proc., p. 201–217 [in English, 1964]. C.A. 63: 12630 b: N.S.A. 19: 24473. Ge of: Ha (with 123 references).

Harman, D. *See* Stewart, T. D.

H19 **Harpaz, Y., Mandel, S., Gat, J. R., and Nir, Aharon,** 1963, The place of isotope methods in groundwater research, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology held at

Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 175–191. N.S.A. 18: 1920. Ab; Ge of: In_{gw}; In_{Hy}, InA_{gw}, $MeDf_{gw}$, No, Sa, SeAd.

H20 **Harris, G. M.,** 1950, Limitations of the tracer method in scientific research; I, Physical aspects: Melbourne, Australia, Melbourne Univ., Conf. on Applications Isotopes Sci. Research Proc., p. 65–76. C.A. 45: 9377 i. In, IsEq, IsKi.

Harteck, Paul. *See* von Faltings, Volkert.

H21 **Harteck, Paul,** 1954, The relative abundance of HT and HTO in the atmosphere: Jour. Chem. Physics, v. 22, p. 1746–1751. C.A. 49: 2133 c. Ab_{atm}, EqI, KiP, KiR.

H22 **Harteck, Paul, and von Faultings, Volkert,** 1950, The helium-3 problem of the atmosphere: Nature, v. 166, p. 1109. C.A. 45: 5533 b. AbG_{atm}, AnC.

H23 **Hasan, J.,** 1961, A zinc fusion method for the determination of tritium in biological material by gas counting, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci. May 3–10, 1961, Proc., p. 361–369 [1962]. C.A. 57: 10140 i; N.S.A. 16: 16102. AnC, InBi, Sy.

H24 **Hash, J. H.,** 1962, Determination of tritium in whole cells and cellular fractions of *Bacillus megaterium*, using liquid scintillation techniques: Anal. Biochemistry, v. 4, p. 257–267. C.A. 58: 6004 h; N.S.A. 16: 31553. AnC, BiB, InBi, SeAd, Sy.

H25 **Haskell, E. E., Jr., Leventhal, J. S., and Bianchi, W. C.,** 1966, The use of tritium to measure the movement of ground water toward irrigation wells in western Fresno County, California: Jour. Geophys. Research, v. 71, no. 16, p. 3849–3859. Ab_{atm}, Ab_{gw}, AbG_{atm}, In_{atm}, In_{gw}, In_{Hy}, In_{hy}, $MeDf_{gw}$, $MeDf_{atm}$.

Hastings, J. M. *See* Schaeffer, O. A.

Hathaway, L. *See* Rowland, F. S.

Hattori, Toshie. *See* Takahashi, Hajime.

H26 **Hattori, Toshie, Takahashi, Hajime, and Maruo, Bunji,** 1963, Liquid scintillation counting of tritium in aqueous solution: Tokyo, Japan, 5th Japan Conf. on Radioisotopes, Proc. no. 3, p. 87–89 [in Japanese]. N.S.A. 17: 30087. AnC.

H27 **Hawkings, R. C., and Merritt, W. F.,** 1954, Some preliminary results on the absolute beta counting of tritium: Chalk River, Ontario, Canada, Atomic Energy Canada, Ltd., Pub., CRP–560, AECL–94. AnC.

H28 **Hawkins, D. B., and Schmalz, B. L.,** 1965, Environmental tritium studies at the National Reactor Testing Station: U.S. Atomic Energy Comm. Pub., IDO–12043, 39 p. C.A. 64: 2983 h; N.S.A. 19: 46642. Ab_{gw}, Ab_{atm}, Ab_{sw}, AbG_{atm}, AbG_{gw}, AbG_{sw}, Ha, In_{gw}, In_{atm}, In_{sw}, In_{hy}.

H29 **Hawkins, R. H.,** 1962, Improved burial of solid radioactive wastes: U.S. Atomic Energy Comm. Pub., TID–7628, p. 462–465. C.A. 58: 1235 b. Ha, MeDf.

Hayes, F. N. *See* Anderson, E. C.

H30 **Hazelton-Nuclear Science Corporation,** 1965, Post-shot hydrologic safety; Project Shoal, Final Report: Palo Alto, Calif., Contract AT (29–2)–1229, VUF–1014, 54 p. N.S.A. 20: 16742. In_{gw}, $MeDf_{gw}$, NuB.

Head, B. M. *See* McClelland, Jean.

H31 **Healy, J. W.,** 1949, Urine analysis for tritium oxide: U.S. Atomic Energy Comm. Pub., HW–13949, 6 p. [declassified, 1960]. C.A. 57: 15447 b; N.S.A. 14: 11427. AnC.

H32 **Healy, J. W., and Schwendiman, L. W.**, 1956, Hydrogen counter for analysis of dilute tritium oxide: Radiation Research, v. 4, p. 278–285. C.A. 50: 12676 c. AnC.

H33 **Hecht, C. E.**, 1959, The possible superfluid behavior of hydrogen atom gases and liquids: Physica, v. 25, p. 1159–1161 [in English]. N.S.A. 14: 5741. Th.

H34 **Heemstra, R. J., Watkins, J. W., and Armstrong, F. E.**, 1961, Laboratory evaluations of nine water tracers: Nucleonics, v. 19, no. 1, p. 92–96. Ad, AnMs, In_{gw}, InA_{gw}, $MeDf_{gw}$, Nu, SeAd, SeDf, Sy.

Heller, A. See Anbar, M.

H35 **Hempel, K.**, 1964, Simultaneous measurement of tritium and ^{14}C in biological material with a liquid scintillation counter: Atompraxis, v. 10, p. 148–152 [in German]. N.S.A. 18: 17743. AnC.

Henderson, D. *See* Chen, Ru-yong.

Henderson, Douglas. *See* Reed, R. D.

H36 **Hendler, R. W.**, 1964, Procedure for simultaneous assay of two β-emitting isotopes with the liquid scintillation counting technique: Anal. Biochemistry, v. 7, p. 110–120. N.S.A. 18: 9979. AnC, KiR.

Hennix, Sharon. *See* Jacobson, H. I.

H37 **Henriques, F. C., Jr., and Margnetti, C.** 1946, Analytical procedure for measurement of radioactive hydrogen (tritium): Indus. and Eng. Chemistry, no. 18, p. 420–422. C.A. 40: 53323. An.

H38 **Herberg, R. J.**, 1960, Determination of carbon-14 and tritium in blood and other whole tissue—Liquid scintillation counting of tissues: Anal. Chemistry, v. 32, p. 42–46. N.S.A. 14: 5013. AnC, BiZ, InBi.

H39 **Herberg, R. J.**, 1964, Statistical aspects of double-isotope liquid scintillation counting by internal standard technique: Anal. Chemistry, v. 36, no. 6, p. 1079–1082. C.A. 61: 1478 e; N.S.A. 18: 19872. AnC, KiR, NuR.

Herbert, M. *See* Pichat, L.

H40 **Herczynska, Elwira**, 1959a, Estimation of tritium in the gas phase: Nukleonika, v. 4, p. 381–389 [in Polish]. N.S.A. 14: 4455, N.S.A. 15: 22829. Ge of: AnC.

H41 **Herczynska, Elwira**, 1959b, Mesure de l'activité du tritium gaseux [Measure of activity of gaseous tritium]: Translated into French from Nukleonika, v. 4, p. 381–389. France, Comm. à l'Énergie Atomique Rap., CEA–tr–X–365, 24 p. N.S.A. 15: 22829, N.S.A. 14: 4455. Ge of: AnC.

Hermann, J. *See* Viallard, Rodolphe.

Herrmann. *See* Erdtmann, Gerhard.

Hess, D. C. *See* Begemann, Friedrich.

H42 **Hess, W. N., ed.**, 1964, The physics of solar flares: Washington, D. C., Am. Astronomical Soc.—Natl. Aeronautics and Space Adm. Symposium, held at Goddard Space Flight Center, Greenbelt, Md., Oct. 28–30, 1963, Proc., Natl. Aeronautics and Space Adm. Pub., NASA–SP–50, 473 p. N.S.A. 18: 44371. AbG_{atm}, AbG_{met}, AbG_{sat}.

H43 **Heusinger, H., and Rau, H.**, 1961, Excitation of luminescence with tritium β-radiation: Kerntechnik, v. 3, p. 67–70 [in German]. C. A. 62: 5983. NuIn.

H44 **Hevesy, Georg**, 1952, Use of radioactive tracers—A lecture: Chimia v. 6, p. 201–211. C.A. 47: 2045 i. ElGd, SpEl.

H45 **Hevesy, Georg**, 1961, Some uses of isotopic indicators in physiology: Archiv Gesamte Physiologie, v. 272, p. 195–214. C.A. 55: 8536 e. BiZ, Ha, InBi.

Hiebert, R. D., *See* Eutsler, B. C.

Hiebert, R. D. *See* McClelland, Jean.

H46 **Higashimura, Takenobu, Iwakura, Tetsuo, and Sidei, Tunahiko, 1960,** Determination of H^3 and C^{14} with a liquid scintillation counter: Oyo Butsuri, v. 29, p. 20–27. C.A. 54: 19201 e. AnC.

H47 **Hilde, Levi,** 1964, The interpretation of autoradiograms, especially when using tritium as a tracer: Scandinavian Jour. Haemotology, v. 1, p. 138–149. N.S.A. 19: 35928. Ge of: AnC.

H48 **Hill, D. K.,** 1962, Resolving power with tritium autoradiographs: Nature, v. 194, p. 831–832. N.S.A. 16: 20508. An, KiR, Sy.

H49 **Hill, R. D.,** 1941, Production of helium–3: Phys. Rev., v. 59, p. 309. AbG_{terr}, NuR.

Hirsh, F. G. *See* Kingsley, W. H.

Hirt, B. *See* Geiss, Johannes.

Hitchcock, C. *See* James, A. T.

H50 **Hodgson, T. S., Gordon, B. E., and Ackerman, M. E.,** 1958, Single-channel counter for carbon-14 and tritium: Nucleonics, v. 16, no. 7, p. 89–94. C.A. 52: 19543 b. AnC.

H51 **Hodnett, E. M., Fieldman, Ch. F., and Flynn, J. J. Jr.,** 1957, Preparation of radioactive water: Experientia, v. 13, p. 96 [in English]. C.A. 51: 12682 d. An, Sy.

H52 **Hoff, W. J., Jr., and Rowland, F. S.,** 1958, The reactions of tritium trapped in inorganic crystals: Jour. Inorganic and Nuclear Chemistry, v. 5, p. 164–169. NuR.

Hoffman, C. C. *See* Thatcher, L. L.

Hoffman, C. M. *See* Stewart, G. L.

H53 **Hoffman, C. M., and Stewart, G. L.,** 1966, Quantitative determination of tritium in natural waters: U.S. Geol. Survey Water-Supply Paper 1696–D, 18 p. AbG_{atm}, AnC, AnMs, In_{Hy}, KiR. No, SeDf, SeEl, Sy.

Hoffman, I. *See* Parups, E.

Hoffman, Joseph. *See* Post, Joseph

Hoffmann, W. *See* Linowitzki, V.

Hofstra, A. *See* Kuper, E.

Hogrebe, K. *See* Moghissi, A.

H54 **Holland, J. Z.,** 1959, Stratospheric radioactivity data obtained by balloon sampling: U.S. Atomic Energy Comm. Pub., TID–5555, 129 p. C.A. 54: 4174 a. Ab, An, Ge, In.

Holland, M. *See* Ammar, R. G.

H55 **Holmes, C. R.,** 1963, Tritium studies, Socorro Spring: New Mexico Geol. Soc. Ann. Field Conf. Guidebook 14, p. 152–154. C.A. 61: 4103 e. Ab, In_{gw}, In_{sw}.

H56 **Holmquist, C. E.,** 1965, Hazards of tritium oxides induced in large heavy water-reactor stations: U.S. Atomic Energy Comm. Pub., Accession 927, CONF–650540–6, 14 p. C.A. 65: 8302 a. Ab_{atm}, Ab_{Hy}, Ha, In.

Holt, A. *See* Brown, F.

Honda, Masatake. *See* Merrill, J. R.

Hondlik, J. *See* Vavrejn, B.

Horesovsky, C. *See* Franc, Z.

H57 **Horrocks, D. L., and Studier, M. H.,** 1961, Determination of absolute disintegration rates of low-energy β-emitters in a liquid scintillation spectrometer: Anal. Chemistry, v. 33, p. 615–620. C.A. 55: 14095 ef: N.S.A. 15: 15051 AnC, NuB, NuSt.

H58 **Horton, J. H., and Ross, D. I.,** 1960, Use of tritium from spent uranium fuel elements as a ground-water tracer: Soil Sci., v. 90, p. 267–271. C.A. 55: 6737 a; N.S.A. 15: 3734. Ab, In_{gw}, In_{Pe}.

Hours, R. M. *See* Kaufman, W. J.

H59 **Hours, R. M., and Kaufman, W. J.,** 1960, Low-level tritium measurements in the liquid scintillation spectrometer: New York, N.Y., 6th Conf. on Nuclear Eng. Sci., Preprint 1960, no. 51, 17 p.; California Univ. (Berkeley), Sanitary Eng. Research Prog. Rept. 1 [1959]; U.S. Atomic Energy Comm. Pub., TID–13910, 54 p. N.S.A. 16: 12959. AnC, AnMs, Ha, In, InBi, KiP, No, SpFl, Th.

H60 **Houtermans, F. G., and Oeschger, Hans,** 1955, Proportional counter for measurement of weak activities from soft β-radiation: Helvetica Physica Acta, v. 28, p. 464–466. AnC.

H61 **Houtermans, Jan,** 1965, Tritium in the surface water of the North Pacific Ocean, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 565–576. AbG_{ocean}, In_{ocean}, $MeDf_{ocean}$.

H62 **Houtman, A. C.,** 1964, Determination of tritium and carbon–14 in blood, *in* Sirchis, J., ed., Preparation and biomedical application of labeled molecules: Vienna, Austria, European Atomic Energy Community Symposium Aug. 23–29, 1964, Proc., Pub. EUR–2200.e, 514 p.; U.S. Atomic Energy Comm. Pub., CONF–774, 514 p. An, Ha.

H63 **Houtman, A. C.,** 1965, Liquid scintillation counting of blood: Internat. Jour. Appl. Radiation and Isotopes, v. 16, p. 65–70. N.S.A. 19: 13240. AnC, Ha.

Houtman, J. P. W. *See* Cramer, W. A.

Howard, Alma. *See* Elbert, Michael.

H64 **Hoy, J. E.,** 1961, Operational experience with Kanne ionization chambers: Health Physics, v. 6, p. 203–210. C.A. 56: 8264 c; N.S.A. 16: 10218. AnC, Ha, In, Th.

Huebner, Leonid. *See* Barrett, E. W.

Hughes, Alun. *See* Chamberlain, J.

Hughes, B. *See* Renaud, Andre.

Hughes, F. H. *See* Goodier, I. W.

Hughes, W. L. *See* Painter, R. B.

H65 **Hughes, W. L.,** 1958, Autoradiography with tritium: U.S. Atomic Energy Comm. Pub., BNL–3757, 7 p. N.S.A. 12: 15312. An, BiC, InBi, KiR.

H66 **Hughes, W. L.,** 1961, Autoradiography with tritium, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 291–294 [1963]. C.A. 58: 9848 g; N.S.A. 17: 18504. Ge of: An, BiB, KiR; SeAd.

H67 **Huiswaard, P. J., and Bell, C. B., Jr.,** 1957, Model study of the fate of pollution in a tidal estuary: U.S. Atomic Energy Comm. Pub., AECU–3966, 78 p. C.A. 55: 860 e. AnC, In_{sw}, In_{ocean}.

Humbelle, G. *See* Verly, W. G.

H68 **Hummon, M. R.,** 1962, Effects of tritiated thymidine incorporation on secondary root production by *Pisum sativum*: Am. Jour. Botany, v. 49, p. 1038–1046. C.A. 58: 7137 c; N.S.A. 17: 15653. BiB, InBi.

Hundeshagen, Heinz. *See* Graul, E. H.

H69 **Hursh, J. B., ed.,** 1958, Chemical methods for routine bioassay: U.S.

Atomic Energy Comm. Pub., AECU–4024, 104 p. N.S.A. 13:11530. Ge of: An; InBi.

H70 **Husain, L., and Kuroda, P. K.,** 1966, Magnesium–28 in rain—Produced by cosmic rays: Science, v. 154, no. 3754, p. 1180–1181. AbG_{atm}.

H71 **Hutchin, M. E., and Vaughan, B. E.,** 1964, Skin contact transfer of tritium from brass: San Francisco, Calif., [U.S.] Naval Radiological Defense Lab. Rept., AD–603309 [available from office of Technical Services, Dept. Commerce, in English]. C.A. 62:3032 h. BiZ, Ha, InBi.

H72 **Hutchinson, W. P.,** 1960a, Liquid scintillation counting of tritium at 22°C: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–R–3238, 1 p. C.A. 54:13881 f; N.S.A. 14:11593. AnC.

H73 **Hutchinson, W. P.,** 1960b, The determination of tritiated water in urine by liquid scintillation counting: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–R–3425, 6 p. C.A. 55:4633 c; N.S.A. 15:3977. AnC, Ha, InBi.

H74 **Hutchinson, W. P.,** 1960c, Identification of β-emitting isotopes by liquid scintillation counting: Harwell, Berks, England, Great Britain Atomic Energy Research Establishment Pub., AERE–R–3605, 9 p. C.A. 55:16200 f; N.S.A. 15:15544. AnC, InBi.

Hyde, G. M. *See* Prentice, T. C.

I

I1 **Ide, R. H.,** 1964, The production of tritium and helium–3 by proton bombardment of metals—Solar origin of terrestrial tritium: Los Angeles, Calif., California Univ. (Los Angeles) thesis, 109 p. N.S.A. 19:21438. Ab_{atm}, Ab_{terr}, AbG_{atm}, AbG_{sat}, AnC, InSp. NuH, NuR.

Imada, M. R. *See* Werbin, Harold.

Inoue, Yoriteru. *See* Iwai, S.

Inoue, Yoriteru. *See* Kaufman, W. J.

I2 **Inoue Yoriteru, and Kaufman, W. J.,** 1962, Studies of injection disposal: U.S. Atomic Energy Comm. Pub., TID–7628, p. 303–321. C.A. 58:1236 c. AbG, In, MeDf.

I3 **International Atomic Energy Agency,** 1960a, Radioisotopes in the physical sciences and industry, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., 549 p. [1962]. N.S.A. 16:16037. AnC, Ge (with 47 papers), In_{gw}.

I4 **International Atomic Energy Agency,** 1960b, Radioisotopes in the physical sciences and industry, v. 3, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Conf. on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., 648 p. [1962]. N.S.A. 16:23547. Ge of: An, In (with 51 papers).

I5 **International Atomic Energy Agency,** 1961a, Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc. 377 p. [in English, 1962]. N.S.A. 16:16076. Ge of: Ab_{atm}, Ab_{sw}, Ab_{gw}, Ab_{ocean}, Ab_{Hy}, AbG_{atm}, AbG_{met}, AdC, An, AnC, BiC, In_{atm}, In_{sw}, In_{gw}, In_{ocean}, In_{hy}, In_{met}, InA_{gw}, InBi, IsEq, MeDf.

I6 **International Atomic Energy Agency,** 1961b, Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat.

Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., 451 p. [1962]. N.S.A. 16: 17375. Ge of: AbO, AnC, BiC, Ha, InBi, Sy (with 38 papers); Is.

I7 **International Atomic Energy Agency,** 1962a, Isotope techniques for hydrology: Vienna, Austria, Internat. Atomic Energy Agency Panel Rept. on Use of Isotopes in Hydrology, Dec. 17–21, 1962, Tech. Rept. Ser. 23, 38 p. [1964]. N.S.A. 18: 18052. Ge of: Ab_{sw}, Ab_{gw}, Ha, In_{gw}, In_{sw}, InA_{gw}.

I8 **International Atomic Energy Agency,** 1962b, International directory of radioisotopes; pt. 2, Compounds of carbon–14, hydrogen–3, iodine–131, phosphorus–32, and sulfur–35: Vienna, Austria, Internat. Atomic Energy Agency, 2d ed., 697 p. Ge, No, Sy.

I9 **International Atomic Energy Agency,** 1962c, Safe handling of radioisotopes: Vienna, Austria, Internat. Atomic Energy Agency Symposium Proc., Symposium paper STI/PUB/1/Rev./1 (E), 85 p. Ha.

I10 **International Atomic Energy Agency,** 1962d, Application of isotope techniques in hydrology: Vienna, Austria, Internat. Atomic Energy Agency Panel, Nov. 6–9, 1961, Proc., Tech. Rept. Ser. 11, 34 p. N.S.A. 17: 8512. Ge of: AbG_{atm}, In_{gw}, In_{Hy}, In_{hy}, InA_{gw}.

I11 **International Atomic Energy Agency,** 1962e, Tritium concentration in rain, rivers, oceans, and other water: Vienna, Austria, Internat. Atomic Energy Agency List 1, Jan. 1962. AbG_{Hy}, In.

I12 **International Atomic Energy Agency,** 1962f, Tritium concentration in rain, rivers, oceans, and other water: Vienna, Austria, Internat. Atomic Energy Agency List 2, Oct. 1962. AbG_{Hy}, In.

I13 **International Atomic Energy Agency,** 1963a, Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., 459 p. N.S.A. 18: 1911. Ab, Ge of: In_{Hy} (with 27 articles); InA.

I14 **International Atomic Energy Agency,** 1963b, Tritium concentration in rain, rivers, oceans, and other water: Vienna, Austria, Internat. Atomic Energy Agency List 3, Nov. 1963. AbG_{Hy}, In.

I15 **International Atomic Energy Agency,** 1963c, Dating the past with radioactivity: Vienna, Austria, Internat. Atomic Energy Agency Bull. 5, p. 18–21. N.S.A. 17: 10832. Ge of: AbG_{met}, InA_{atm}, InA_{gw}, InA_{sw}.

I16 **International Atomic Energy Agency,** 1964a, Assessment of radioactivity in man, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Assessment of Radioactive Body Burdens in Man, held at Heidelberg, Federal Republic of Germany, May 11–16, 1964, Proc., 401 p. N.S.A. 19: 29842. Ge of: AbO, BiC, BiZ, Ha, InBi (with 22 articles).

I17 **International Atomic Energy Agency,** 1964b, Tritium concentration in rain, rivers, oceans, and other water: Vienna, Austria, Internat. Atomic Energy Agency List 4, Aug. 1964. AbG_{Hy}, In.

I18 **International Atomic Energy Agency,** 1964c, Tritium and other environmental isotopes in the hydrological cycle: Vienna, Austria, Internat. Atomic Energy Agency Panel Conf., Oct. 12–16, 1964, Tech. Rept. Ser. 73, approx. 80 p. [circa 1967]. Ge of: Ab_{atm}, Ab_{ocean}, Ab_{Hy}, AbG_{atm}, AbG_{ocean}, AbG_{Hy}, An, In_{atm}, In_{gw}, In_{sw}, In_{Hy}, In_{hy}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, Sa.

I19 **International Atomic Energy Agency,** 1965a, Tritium concentration in rain, rivers, oceans, and other water: Vienna, Austria, Internat. Atomic Energy Agency List 5, 1965. AbG_{Hy}, In.

I20 **International Atomic Energy Agency,** 1965b, IAEA [International Atomic Energy Agency] laboratory activities, 2d report: Vienna, Austria, Internat. Atomic Energy Agency, Tech. Rept. Ser. 41, 113, p.; Pub. STI/DOC/10/41, 113 p. An, SeEl.

I21 **International Atomic Energy Agency,** 1966, Isotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency–Internat. Union of Geodesy and Geophysics Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., 700 p. [circa 1967]. Ge of: AbG, In_{atm}, In_{sw}, In_{terr}, In_{hy}, In_{Hy}, In_{Pe}, In_{gw}, In_{snow}, InA, $MeDf_{atm}$, $MeDf_{Pe}$, $MeDf_{Hy}$.

I22 **Iordanov, B. Iv., and Bozhinov, S.,** 1962, Effect of ionizing radiation on the blood-brain barrier: Neurologiia Psikhiatriia, v. 1, no. 4, p. 26–37. N.S.A. 17: 28746. BiC, BiZ, InBi.

I23 **Isbell, H. S., Frush, H. L., and Peterson, R. A.,** 1959, Tritium-labeled compounds; I, Radioassay of tritium-labeled compounds in infinite thickness films with a windowless proportional counter. [U.S.] Natl. Bur. Standards Jour. Research Pub. 63A, p. 171–175. C.A. 54: 9525 h. AnC.

I24 **Isbell, H. S., Frush, H. L., and Sniegoski, L. T.,** 1961, Utilization of tritium and carbon–14 in studies of isotope effects, *in* Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 93–101 [1962]. N.S.A. 16: 17383. AnC, BiC, InBi, Is, SeAd.

Ishihama, H. *See* Yamazaki, Mikio.

I25 **Isotopes, Inc.,** 1960a, The study of the potential applications of radioisotope technology to water resources investigations and utilization: Westwood, N.J., Isotopes, Inc., Quart. Rept. 2, Sept. 15, 1960, 59 p.; U.S. Atomic Energy Comm. Pub., NYO–9038, 59 p. N.S.A. 15: 1674. Ge of: In_{gw}, In_{sw}, In_{Pe}, In_{hy}.

I26 **Isotopes, Inc.,** 1960b, Studies of nuclear debris in precipitation: Westwood, N.J., Isotopes, Inc., Quart. Prog. Rept. 3, U.S. Atomic Energy Comm. Pub., TID–5710, 64 p. N.S.A. 14: 12801 Ab_{atm}, An, $MeDf_{atm}$, Sa.

Israel, G. See Ehhalt, D.

I27 **Israel, G. W.,** 1962, Measurements of the annual course of tritium in the 1960–61 rain by isotope concentration in the separation column: Zeitschr. Naturforschung, v. 17a, p. 925–929. C.A. 58: 3234 e; N.S.A. 17: 10840. Ab_{atm}, AnC, In_{atm}, $MeDf_{atm}$, SeAd, SeEl.

I28 **Israel, G. W., Roether, W., and Schumann, G.,** 1962, Seasonal variation of bomb tritium in rain: Paper presented at Symposium on Trace Gases and Natural and Artificial Radioactivity, Utrecht, Netherlands, Aug. 1962. U.S. Atomic Energy Comm. Pub., CONF–55–1, 7 p. N.S.A. 17: 32281. Ab_{atm}, In_{atm}.

I29 **Israel, G. W., Roether, W. and Schumann, G.,** 1963, Seasonal variations of bomb-produced tritium in rain: Jour. Geophys. Research, v. 68, no. 3, p. 3771–3773. N.S.A. 17: 32281. Ab_{atm}, BiB, In_{atm}, InBi, $MeDf_{atm}$, SeDs.

Istomina, A. G. *See* Zav'yalov, A. P.

I30 **Itō, Ryōiche, Nozaki, Tadashi, Nakamura, Asao, Morikawa, Naotake, and Simamura, Osamu,** 1961, Radioassay of labeled organic compounds, using gaseous samples; III, Conversion of tritiated water into butane-1-^{3}H and its gas counting: Tokyo, Japan, Radioisotopes, v. 10, p. 302–309. C.A. 56: 9667 i. AnC.

I31 **Iwai, S., and Inoue, Yoriteru,** 1963, A method for the estimation of ground-water stratification, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 297–307. N.S.A. 18: 1924. In_{gw}, In_{hy}, InA_{gw}, $MeDf_{gw}$, Sa.

Iwakura, Tetsuo. *See* Higashimura, Takenobu

Iwakura, Tetsuo. *See* Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)].

Iwakura, Tetsuo. *See* Kasida, Yoshiko [Yosihiko (or Kashida, Yoshihiko)].

Iwakura, Tetsuo. See Kasida, Yosihiko [Yoshiko (or Kashida, Yoshihiko)].

I32 **Iwakura, Tetsuo,** 1964, Simultaneous radiocarbon and tritium measurement by pulse height discrimination in liquid scintillation counting: Kagaku No Ryoiki (Jour. Japanese Chemistry), v. 18, no. 5, p. 407–417 [in Japanese]. C.A. 63:12626 f. AnC.

I33 **Iwakura, Tetsuo, and Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)],** 1965, ^{14}C and ^{3}H measurement by means of a liquid scintillation spectrometer-color quenching: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioisotope Sample Measurement Techniques in Medicine and Biology, May 24–28, 1965, Proc., p. 447–455. C.A. 65: 1721 d. Ad, AnC, AnCl, AnMs, InBi, Sy.

I34 **Iwakura, Tetsuo, Kasida, Yoshiko [Yosihiko (or Kashida, Yoshihiko)], and Morisaki, Naoko,** 1965, Carbon-14 and tritium measurement by the use of a liquid scintillation spectrometer: IV, Determination of the counting efficiency by the discriminator ratio method: Tokyo, Radioisotopes, v. 14, no. 2, p. 132–136 [in Japanese]. N.S.A. 19: 24464. AnC, AnMs, Sy.

Iwamoto, Junko, *See* Fujita, Minoru.

Iyengar, A. R. *See* Kamath, P. R.

Iyengar, T. S. *See* Soman, S. D.

I35 **Iyengar, T. S., Sadarangani, S. H., Somasundaram, S., and Vaze, P. K.,** 1965, A cold strip apparatus for sampling tritium in air: Health Physics, v. 11, no. 4, p. 313–314 [in English]. N.S.A. 19: 22125. AnC, In_{atm}.

I36 **Iyengar, T. S., Sadarangani, S. H., Soman, S. D., Somasundaram, S., and Vaze, P. K.,** 1966, A portable monitor for the estimation of tritium in aqueous samples: Am. Indus. Hygiene Assoc. Jour., v. 27, no. 3, p. 288–292 [in English]. C.A. 65:10077 h. AnC, Ec, Ha.

I37 **Izrael, Yu. A., Kolesnikova, V. N., Romanov, V. V., and Soĭfer, V. N.,** 1964, Tritium content in glaciers: Akad. Nauk SSSR Doklady, v. 156, no. 1, p. 72–73 [in Russian]. C.A. 61: 5403 a; N.S.A. 18: 37375. Ab_{snow}, Ab_{art}, AbG_{snow}, AbG_{atm}, In_{snow}, In_{atm}, InA_{snow}, $MeDf_{snow}$, $MeDf_{atm}$.

J

Jack, A. J. *See* Everett, R. J.

Jackson, H. R. *See* Parups, E.

Jackson, R. D. *See* Nakayama, F. S.

Jackson, S. *See* Dolphin, G. W.

J1 **Jackson, S., and Dolphin, G. W.,** circa 1965, The interpretation of analytical results for radionuclides in urine: Harwell, Berks, England, Conf. on Authority, Health and Safety Branch, United Kingdom Atomic Energy Authority, CONF–727, p. 85–101. N.S.A. 20: 8542. An, BiC, Ha.

J2 **Jackson, S., and Taylor, N. A.,** 1964, A survey of the methods used in the United Kingdom Atomic Energy Authority for the determination of radionuclides in urine, v. 2: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Assessment of Radioactive Body Burdens in Man, held at Heidelberg, Federal Republic of Germany, May 11–16, 1964, Preprint, SM–52/16; U.S. Atomic Energy Agency Pub., CONF–448–13, 24 p. N.S.A. 18: 33518. BiC, BiZ, Ge of: An; InBi, KiB.

J3 **Jacobs, D. G., and Shaikh, M. U.,** 1964, Liquid injection into deep permeable formations: U.S. Atomic Energy Comm. Pub., ORNL–3697, p. 3–10. N.S.A. 19: 8673. In_{gw}, In_{hy}, IsEq, $MeDf_{gw}$, $SeAd_{terr}$.

J4 **Jacobson, H. I., Gupta, G. N., Fernandez, C., Hennix, Sharon, and Jensen, E. V., 1960,** Determination of tritium in biological material: Archives Biochemistry and Biophysics, v. 86, p. 89–93. C.A. 54: 14349 h. AnC, InBi, Sy.

J5 **Jacobson, L. O., ed.,** 1957, Semiannual report to the [U.S.] Atomic Energy Commission: U.S. Atomic Energy Comm. Pub., ACRH–7, 88 p. N.S.A. 11: 13229. AnC, BiC, InBi, Sy.

J6 (Reference deleted.)

J7 **James, A. T., and Hitchcock, C.,** 1965, Improved gas-liquid radiochemical chromatogram for ^{14}C and tritium: Kerntechnik, v. 7, no. 1, p. 5–8. C.A. 62: 12711 h, C.A. 59: 1060 a. AnC.

J8 **James, A. T., and Piper, E. A.,** 1963, A compact radiochemical gas chromatograph: Anal. Chemistry, v. 35, p. 515–520. C.A. 59: 1060 ab. AnC.

J9 **James, B. T., and Flew, E. M.,** 1964, Health physics control of A. E. R. E. research reactors; Part III, The control of tritium in heavy water in Dido class reactors: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Research Group, Atomic Energy Research Establishment Pub., AERE–R–4528, p. 35–47. N.S.A. 18: 23812. Ge of: Ha, InBi.

J10 **James, J. A., and Robertson, J. S.,** 1957, Estimation of exchangeable water and potassium by radioisotope dilution in children: Am. Jour. Diseases of Children, v. 93, p. 217–222. C.A. 51: 8866 f. BiZ, InBi.

Jammet, H. *See* Vacca, G.

J11 **Japan Atomic Industrial Forum, Inc.,** 1961, Proceedings of the 4th Conference on radioisotopes, October 1961, Tokyo, Japan: 1161 p. N.S.A. 17: 29885. Ge of: AnC, In, InBi (with 233 papers).

J12 **Jeffay, Henry,** 1961, Measuring turnover rates in the nonsteady state, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 217–221 [1963]. N.S.A. 17: 18496. Ge of: BiC, InBi.

Jelley, J. V. *See* Barclay, F. R.

Jelley, J. V. *See* Goldsmith, P.

J13 **Jenkins, W. A.,** 1953, Estimating the tritium content of tritiated water: Anal. Chemistry, v. 25, p. 1477–1480. C.A. 48: 914 d. AbG, AnC.

J14 **Jenkins, W. A., and Yost, D. M.,** 1952, Kinetics of the exchange of tritium between hypophosphorous acid and water: Jour. Chem. Physics, v. 20, p. 538–539. C.A. 46: 8941 b. EqL, KiL.

Jenkinson, W. M. *See* Dyne, P. J.

Jenks, G. *See* Cannon, C. V.

J15 **Jenks, G. H., Ghormley, J. A., and Sweeton, F. H.,** 1949, Measurement of the half-life and average energy of tritium decay: Phys. Rev., v. 75, p. 701–702. C.A. 43: 4112 e. NuB.

J16 **Jenks, G. H., Shapiro, E. M., Elliott, N., and Cannon, C. V., 1963,** Production of tritium; U.S. Patent 3,079,317 (issued to U.S. Atomic Energy Comm.). Ab_{art}, NuR.

Jensen, E. V. *See* Jacobson, H. I.

J17 **Joftes, D. L.,** 1959, Liquid emulsion autoradiography with tritium: Lab. Inv., v. 8, p. 131–138. N.S.A. 13: 7411. An, KiP.

J18 **Johnson, B. S., Jr., Grace, J. T., Karraker, D. G., Meyer, L. H., and Nicholson, C. K.,** 1958, Isotopic purification of tritium by electrolysis: U.S. Atomic Energy Comm. Pub., DP–261, 81 p. N.S.A. 17: 16489. An, SeAd, SeEl.

J19 **Johnson, V. R.,** 1957, A review of the properties of deuterium and tritium compounds—Annual bibliography, 1955: U.S. Atomic Energy Comm. Pub., NBS–5446, 89 p. N.S.A. 12: 8329. Ge (with 455 references).

J20 **Johnson, V. R., Brown, L. M., and Friedman, A. S.,** 1957, Bibliography of research on deuterium and tritium compounds, 1953 and 1954: [U.S.] Natl. Bur. Standards Circ. 562, Supp. 1, 31 p.; U.S. Atomic Energy Comm. Pub., NBS–C–562 (Supp. 1), 34 p. C.A. 53: 12768 i; N.S.A. 11: 11998. Ge of: Ab, Ad, An, Bi, In, Ki, Nu (with 720 references).

J21 **Johnson, V. R., and Oppenheim, Irwin,** 1958, A review of the properties of deuterium and tritium compounds—Annual bibliography, 1956: U.S. Atomic Energy Comm. Pub., NBS–5892, 81 p. C.A. 53: 13803 f: N.S.A. 13: 552. Ge (with 434 references).

Johnston, W. H. *See* Wing, James.

Johnston, W. M. *See* Von Grosse, A. V.

Joiner, E. E. *See* Prentice, T. C.

J22 **Jones, J. R.,** 1965, Tritium labeling of compounds—An assessment: Lab. Practice, v. 14, no. 4, p. 433–436. C.A. 62: 15703 a. Ge of: Sy (with 46 references).

J23 **Jones, J. R., and Monk, C. B.,** 1962, Some aspects of liquid scintillation counting of tritiated compounds: Lab. Practice, v. 11, p. 675–677. C.A. 58: 206 c. AnC, Ge.

J24 **Jones, J. R., Rowlands, D. L. G., and Monk, C. B.,** 1965, Diffusion coefficient of water in water and in some alkaline earth chloride solutions at 25°: Faraday Soc. Trans., v. 61, no. 511, p. 1384–1388. C.A. 63: 14067 g. In, Is, MeV, Th.

Jones, L. V., *See* Eichelberger, J. F.

J25 **Jones, P. H.,** 1964, The velocity of ground-water flow in basalt aquifers of the Snake River Plain, Idaho: Berkeley, Calif., Internat. Assoc. Sci. Hydrology, Gen. Assembly, Pub. 64, p. 225–234. In_{gw}, In_{hy}, $MeDf_{gw}$, Nu.

Jones, R. C. *See* Furry, W. H.

J26 **Jones, W. M.,** 1948, Thermodynamic functions for tritium and tritium hydride; The equilibrium of tritium and hydrogen with tritium hydride; The dissociation of tritium and tritium hydride: Jour. Chem. Physics, v. 16. p. 1077–1081. C.A. 43: 476 b. EqG, NuS, ThF.

J27 **Jones, W. M.,** 1951a, Half life of tritium by absolute counting: Phys. Rev., v. 83, p. 537–539. C.A. 45: 8906 c. AnC, NuB.

J28 **Jones, W. M.,** 1951b, The relative rates of reaction of hydrogen and tritium hydride with chlorine: Jour. Chem. Physics., v. 19, p. 78–85. C.A. 45: 6468 e. IsKi, KiP, KiR.

J29 **Jones, W. M.,** 1952a, The triple-point temperature of tritium oxide: Am. Chem. Soc. Jour., v. 74, p. 6065–6066. C.A. 47: 3675 e. ThP.

J30 **Jones, W. M.,** 1952, Luminescence behavior in tritium oxide: Jour. Chem. Physics, v. 20, p. 1974. C.A. 47: 3675 e. NuB, SdSp, SpFl.

J31 **Jones, W. M.,** 1955, Half life of tritium: Phys. Rev., v. 100, p. 124–125. NuB.

J32 **Jones, W. M.,** 1963, Vapor pressures of tritium oxide and deuterium oxide—Interpretation of the isotope effect: U.S. Atomic Energy Comm. Pub., LADC–5905, 30 p. N.S.A. 18:31425. IsTh, ThP.

J33 **Jordan, Pierre,** 1965, Simultaneous gas-proportional counting of ^{3}H and ^{14}C: Nucleonics, v. 23, no. 11, p. 46–49 [in English]. C.A. 64: 258 d. AnC. Sy.

J34 **Jordan, Pierre, and Kaczmar, U.,** 1966, Automatic compensation of fluorescence extinguishing and other disturbing factors, which appear in the scintillation counting of radioactive substances in solution: Experientia, v. 22, p. 482 [in German]. N.S.A. 20: 36743. AnC, AnMs, SpFl.

J35 **Jordan, Pierre, and Lykourezos, A. P.,** 1965a, Precision method for the routine measurement of ^{14}C and ^{3}H in proportional counters: Internat. Jour. Appl. Radiation and Isotopes, v. 16, p. 631–644 [in German]. N.S.A. 20: 5517. AnC.

J36 **Jordan, Pierre, and Lykourezos, A. P.** 1965b, Total transformation of organic compounds into gaseous products for simultaneous determination of ^{3}H and ^{14}C in tube counters: Helvetica Chimica Acta, v. 48, no. 3, p. 581–590 [in German]. AnC, InBi.

J37 **Jordan, Pierre, and Lykourezos, A. P.,** 1966, Simultaneous determination of tritium and carbon–14 in proportional counters: Radiochimica Acta, v. 5, p. 137–140 [in German]. N.S.A. 20: 38823. AnC.

Joris, G. G. *See* Black, C.

J38 **Jortner, Joshua, and Stein, Gabriel,** 1960, Hydrogen-isotope effects in the photo and radiation chemistry of aqueous solutions: Internat. Jour. Appl. Radiation and Isotopes, v. 7, p. 198–206. C.A. 54: 13825 h. Ge of: IsKi, KiP, KiR.

Junge, C. E. *See* Bleeker, W.

J39 **Junge, C. E.,** 1962, Note on the exchange rate between the northern and southern atmosphere: Tellus, v. 14, no. 2, p. 242–246. Ab_{atm}, InA_{atm}, $MeDf_{atm}$.

J40 (Reference deleted.)

J41 **Junge, C. E.,** 1963, Air chemistry and radioactivity, v. 4, *in* Van Mieghem, ed., International Geophysical Series: New York, Academic Press, 382 p. C.A. 59: 3498 f. Ge of: AbG_{atm}, $MeDf_{atm}$.

J42 **Junge, C. E.,** 1963c, Global exchange processes in the atmosphere by natural and artificial tracers: Jour. Geophys. Research, v. 68, no. 13, p. 3849–3856. C.A. 59: 3677 c. AbG_{atm}, $MeDf_{atm}$.

K

Kabara, J. J. *See* Okita, G. T.

K1 **Kabara, J. J., Spafford, N. R., McKendry, M. A., and Freeman, N. L.,** 1963, Recent developments in simultaneous C^{14} and T counting, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 76–85 [1963]. C.A. 58: 9845 h: N.S.A. 17: 18478. AnMs; Ge of: AnC, Sy.

Kaczmar, U. *See* Jordan, Pierre.

K2 **Kainz, Gerald, and Wachberger, Eugen,** 1966a, Determination of carbon–14, tritium, and sulfur–35 after combustion of an organic sample at a

system of nozzles: Microchem. Jour., v. 10, nos. 1–4, p. 114–130. C.A. 64: 13706 e; N.S.A. 20: 36771. AnC, InBi.

K3 **Kainz, Gerald and Wachberger, Eugen,** 1966b, Instrument compensation of the quenching effects in determination of carbon–14 and sulfur–35: Zhur. Anal. Khimii, v. 220, p. 15–20 [in German]. N.S.A. 20: 36771. AnC.

K4 **Kalberer, F., and Rutschmann, J.,** 1961, A rapid method to determine the presence of tritium and radioactive carbon and [radio] sulfur in any biological sample by means of a liquid scintillation counter: Helvetica Chimica Acta, v. 44, p. 1956–1966 [in German]. C.A. 56: 9044 c; N.S.A. 16: 10055. Ad, AnC, Ha, InBi, Sy.

K5 **Kamath, P. R., Bhat, I. S., Rudran, Kamala, Iyengar, A. R., Koshy, Elizabeth, Waingankar, U. S., and Khanolkar, V. S.,** 1964, Recent radiochemical procedures for bio-assay studies at Trombay [India], *in* Assessment of radioactivity in man, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Assessment of Radioactive Body Burdens in Man, held in Heidelberg, Federal Republic of Germany, May 11–16, 1964, Proc., p. 195–215. N.S.A. 19: 30140. An, BiC, BiZ, InBi.

Kambara, T. *See* Rowland, F. S.

K6 **Kambara, T., White, R. M., and Rowland, F. S.,** 1961, The reaction of recoil tritium atoms in aqueous solution: U.S. Atomic Energy Comm. Pub., AD–251657, 20 p. N.S.A. 15: 22316. AbG$_{terr}$, NuR.

K7 **Kamen, M. D.,** 1947, Tracer studies from a general biological viewpoint—A review: Conf. on Metabolic Aspects of Convalescence, Trans., v. 15, p. 23–30. C.A. 44: 4345 f. Ge of: InBi.

K8 **Kamen, M. D.,** 1961, Design and analysis of tracer experimentation-biochemical aspects, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1; New York, Plenum Press, p. 205–209 [1963]. N.S.A. 17: 18494. Ge of: BiC, InBi.

K9 **Kandel, R. J.,** 1963, Methane-tritium system; I, Mass spectra of tritium-substituted methanes: Jour. Chem. Physics, v. 39, no. 10, p. 2581–2587. C.A. 59: 13438 b. IsMs, SeAd.

K10 **Kang, Man Sik, and Chung, Hack Pil,** 1964, Determination of tritium in human urine: Kisul Yon'guso Pogo, v. 3, p. 66–68 [in Korean]. C.A. 65: 10928 e. AnC, BiZ, Ha, InBi, Sy.

K11 **Kang, Yung-ho, Takahashi, Tan, and Hamada, Tatsuji,** 1962, Externally quenched hydrogen counter for tritium measurement and its application to absolute assay of tritiated water: Tokyo, Japan, Inst. Phys. Chem. Research Sci. Papers, v. 56, p. 51–58 [in English]. N.S.A. 16: 25592. AnC.

K12 **Kannuna, M. M., and Cameron, J. F.,** 1957, The use of tritium bremsstrahlung for the determination of sulfur in hydrocarbons: Internat. Jour. Appl. Radiation and Isotopes, v. 2, p. 76–79. C.A. 51: 11170 b. AnC.

Kaplan, L. *See* Braun, V. G.

Kaplan, L. *See* Brown, W. G.

Kaplan, Louis. *See* Wilzbach, K. E.

K13 **Kaplan, W. D., Gugler, H. D., Kidd, K. K., and Tinderholt, V. E.,** 1964, Nonrandom distribution of lethals induced by tritiated thymidine in *Drosophila melanogaster*: Genetics, v. 49, p. 701–714. N.S.A. 18: 17521. AnC, BiZ, InBi.

Karfunkel, Uriel. See Gat, J. R.

K14 **Karfunkel, Uriel,** 1961, Measurement of tritium: Rehovoth, Israel, Weiz-

mann Inst. Sci. thesis; U.S. Atomic Energy Comm. Pub., TID–19994, 120 p. [in Hebrew]. N.S.A. 18:8284. AbG_{atm}, AnC, In_{atm}, In_{sw}, In_{gw}, In_{ocean}, In_{Hy}, In_{snow}, $MeDf_{atm}$, SeAd, SeEl.

Karlson, Peter. *See* Maurer, Rainer.

Karmen, Arthur. *See* Winkelman, J. W.

K15 **Karmen, Arthur, McCaffery, Irmgarde, Winkelman, J. W., and Bowman, R. L.,** Measurement of tritium in the effluent of a gas chromatography column: Anal. Chemistry, v. 35, p. 536–542. C.A. 59:1092 bc; N.S.A. 17:11027, N.S.A. 17:17982. AdC, AnC.

K16 **Karol, I. L., and Malakhov, S. G., eds.,** 1962a, Problems of nuclear meteorology: Moscow, U.S.S.R., Gosatomizdat Voprosy Yadernoi Meteorologii, 340 p; U.S. Atomic Energy Comm. Pub., AEC–tr–6128 [1962]. N.S.A. 18:10603. Ge of: AbG, In_{atm}, $MeDf_{atm}$, Nu.

K17 **Karol, I. L., and Malakhov, S. G.,** 1962b, Use of natural radioactive isotopes in the atmosphere for meteorological investigations: Moscow, U.S.S.R., Gosatomizdat Voprosy Yadernoi Meteorologii, v. 1962, p. 5–42; U.S. Atomic Energy Comm. Pub., AEC–tr–6128, p. 1–51 [1962]. N.S.A. 18:10604. Ge of: AbG, In, KiG; MeDf, Nu.

K18 **Karol, I. L., Malakhov, S. G., Vilenskii, V. D., Dmitrieva, G. V., Krasnopievtzev, Y. V., Kirichenko, L. V., and Ssissiguina, T. I.,** 1964, Quantitative investigations of atmospheric motions by means of radioactive tracers: Compilation of many Russian scientific investigations. U.S. Atomic Energy Comm. Pub., A/CONF.28/P/383, 18 p. N.S.A. 18:37789. Ge of: In_{atm}, In_{ocean}; $MeDf_{atm}$, $MeDf_{ocean}$.

Karraker, D. G. *See* Johnson, B. S., Jr.

K19 **Karraker, D. G.,** 1953, A monitor for surface adsorbed tritium: U.S. Atomic Energy Comm. Pub., DP–34 [declassified, 1956], 15 p. N.S.A. 11:2598. AnC, Ha.

Karush, Fred. *See* Lobunez, Walter.

Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)]. *See* Yamazaki, Mikio.

K20 **Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)], Yamazaki, Mikio, and Iwakura, Tetsuo,** 1961, C^{14} and H^3 measurement with use of liquid scintillation counters: Tokyo, Japan, Radioisotopes, v. 10, p. 27–36 [in Japanese]. C.A. 55:20685 bc; N.S.A. 15:27824. AnC, Sy, ThSo.

K21 **Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)], and Yamazaki, Mikio,** 1965, Determination of ^{14}C and ^3H by liquid scintillation spectrometer; IV, Application of oxygen flask combustion technique to determination of ^{14}C in plant tissue: Tokyo, Japan, Radioisotopes, v. 14, p. 331–334 [in Japanese]. N.S.A. 20:36764. AnC, InBi.

Kashida, Yoshihiko [Kasida, Yoshiko (or Yosihiko)]. *See* Iwakura, Tetsuo.

K22 **Kasida, Yoshiko [Yosihiko (or Kashida, Yoshihiko)], and Iwakura Tetsuo,** 1962a, ^{14}C and ^3H measurement by the use of a liquid scintillation spectrometer; II, Simultaneous counting methods of ^{14}C and ^3H in the same sample: Tokyo, Japan, Radioisotopes, v. 11, p. 247–256 [in Japanese]. N.S.A. 17:16457. AnMs.

K23 **Kasida, Yoshiko [Yosihiko (or Kashida, Yoshihiko)], and Iwakura, Tetsuo,** 1962b, ^{14}C and ^3H measurement by the use of a liquid scintillation spectrometer; III, Counting vials: Tokyo, Japan, Radioisotopes, v. 11, p. 257–264. N.S.A. 17:16458. AnMs.

K24 **Kasida, Yosihiko [Yoshiko (or Kashida, Yoshihiko)], Iwakura, Tetsuo, and Morisaki, Naoko,** 1963, ^{14}C and ^{3}H measurement by the use of a liquid scintillation spectrometer; IV, Determination of counting efficiency by the discriminator ratio method: Tokyo, Japan, 5th Japan Conf. on Radioisotopes Proc., no. 3, p. 84–86 [in Japanese]. AnMs, AnC.

Katakis, D. *See* Czapski, Gideon.

K25 **Kaufman, Sheldon, and Libby, W. F.,** 1954, The natural distribution of tritium: Phys. Rev., v. 93, no. 6, p. 1337–1344. AbG_{atm}, AbG_{ocean}, AbG_{sw}, AbG_{gw}, AbG_{Hy}, AnC, BiB, Ha, In_{gw}, InBi, $MeDf_{atm}$, $MeDf_{gw}$, SeEl.

Kaufman, W. J. *See* Hours, R. M.

Kaufman, W. J. *See* Inoue, Yoriteru.

K26 **Kaufman, W. J.** 1959, Tritium as a ground-water tracer: Santa Monica, Calif., 8th Ann. Mtg. California Assoc. Sanitarians, Proc. In_{gw}, $MeDf_{gw}$.

K27 **Kaufman, W. J.,** 1960a, The use of radioactive tracers in hydrologic studies: California Univ., Conf. on Water Research, Proc., Water Resources Center Rept. 2, p. 6–14. In_{gw}, InA_{gw}, $MeDf_{gw}$.

K28 **Kaufman, W. J.,** 1960b, Tritium as a ground-water tracer: Am. Soc. Civil Engineers [Sanitary Eng. Div.] Proc., v. 86, no. SA–6, p. 47–57. C.A. 55: 12709 g. Ha, InA_{gw}, $MeDf_{gw}$.

K29 **Kaufman, W. J.,** 1961, Tritium as a ground-water tracer: Am. Soc. Civil Engineers Trans., v. 3, no. 3203, p. 436–446. AbG, BiB, Ha, In_{gw}, $MeDf_{gw}$.

K30 **Kaufman, W. J., Ewing, B. B., Kerrigan, J. V., and Inoue, Yoriteru,** 1961, Disposal of radioactive wastes into deep geologic formations: Jour. Water Pollution Control Federation, v. 33, p. 73–84. Ge of: In, InA, $MeDf_{gw}$.

K31 **Kaufman, W. J., and Hours, R. M.,** 1959, Progress report 1, contract AT (11–1)–34: Saclay, France, U.S. Atomic Energy Comm. and Comm. à l'Énergie Atomique. In_{gw}.

K32 **Kaufman, W. J., Nir, Aharon, Parks, G., and Hours, R. M., 1960,** Studies of low-level liquid scintillation counting of tritium: U.S. Atomic Energy Comm. Pub., TID–7612, p. 239–250. C.A. 57: 5539 i; N.S.A. 15: 29126. AnC, Sy.

K33 **Kaufman, W. J., Nir, Aharon, Parks, G., and Hours, R. M.,** 1961, Recent advances in low-level scintillation counting of tritium, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 249–261 [1962]. N.S.A. 16: 16094. AnC, Se.

K34 **Kaufman, W. J., and Orlob, G. T.,** 1956a, An evaluation of ground-water tracers: Am. Geophys. Union Trans., v. 37, no. 3, p. 297–306. C.A. 51: 5331 b. Ge of: In_{gw}; $MeDf_{gw}$, $SeAd_{gw}$.

K35 **Kaufman, W. J., and Orlob, G. T.,** 1956b, Measuring ground-water movement with radioactive and chemical tracers: Am. Water Works Assoc. Jour., v. 48, no. 5, p. 559–572. Ge of: In_{hy}, InA_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

K36 **Kaufman, W. J., and Todd, D. K.,** 1961, Application of tritium to canal seepage measurements, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 83–94 [1962]. N.S.A. 16: 16082. Ab_{gw}, In_{gw}, In_{Hy}, In_{hy}, $MeDf_{gw}$, Sa.

Kawai, Hiroshi, *See* Nishiwaki, Yasushi.

Keller, S. *See* Rubini, J. R.

Kelly, R. G. *See* Buyske, D. A.

K37 **Kelly, R. G., Peets, E. A., Gordon, S., and Buyske, D. A.,** 1961, Determination of C^{14} and H^3 in biological samples by Schöniger combustion and liquid scintillation techniques: Anal. Biochemistry, v. 2, p. 267–278. N.S.A. 15: 20668. AnC, InBi.

K38 **Kempel, K.,** 1964, Simultaneous measurement of tritium and ^{14}C in biological material with a liquid scintillation counter: Atompraxis, v. 10, no. 3, p. 148–152. C.A. 61: 2176 fg. AnC.

Kennedy, J. W. *See* Friedlander, Gerhart.

K30 **Kennedy, M. R.,** 1957, Health physics manual of radiochemical and chemical analyses and procedures: U.S. Atomic Energy Comm. Pub., KAPL–A–HP–3, 70 p. N.S.A. 12: 89. AnC, Ha.

K40 **Kernreaktor Bau-und Betriebs G. m. b. H.,** 1961, The continuous detection of low-tritium traces in air and in other reactor gases: Kerntechnik, v. 3, p. 552, German Patent DAS 1,074,880. An, IsTh, SeAd, SeDf.

Kerr, E. C. *See* Bigeleisen, Jacob.

Kerrigan, J. V. *See* Kaufman, W. J.

Keys, W. S. *See* Schmalz, B. L.

Khaidarov, A. A. *See* Abdullaev, A. A.

Khaitov, B. K. *See* Abdullaev, A. A.

K41 **Khan, A. A., and Wilson, J. E.,** 1965, Turnover [of tritium] in mammalian subcellular particles; brain nuclei, mitochondria, and microsomes [from albino female rats]: Jour. Neurochemistry, v. 12, no. 2, p. 81–86. C.A. 62: 10697 b. AbO, BiZ, Ha.

Khanolkar, V. S. *See* Kamath, P. R.

Khusainova, Sh. G. *See* Gracheva, E. G.

Kidd, K. K. *See* Kaplan, W. D.

K42 **Kigoshi, Kunihiko,** 1961, Natural concentration of krypton-85, carbon-14, and tritium in recent years: U.S. Atomic Energy Comm. Pub. A/AC.82/G/L.693, 4 p. N.S.A. 16: 4389. Ab_{atm}, BiB, In_{atm}, InBi.

K43 **Kigoshi, Kunihiko, and Tomikura, Yoshi,** 1961, Tritium and carbon-14 in tree rings: Chem. Soc. Japan Bull. 34, p. 1738–1739. C.A. 57: 2590 f; N.S.A. 16: 12849. Ab_{atm}, AbO, In_{atm}, InA, InBi, $MeDf_{atm}$.

Killmann, S. A. *See* Cronkite, E. P.

Kim, S. M. *See* Noakes, J. E.

K44 **Kim, T. S., Han, H. H., and Chung, H. P.,** 1962, Survey of radioactive fallout: Summary report (1961–62): [U.S.] Army Research Testing Lab. Rept. 1, p. 79–84 [in Korean]. N.S.A. 18: 1904. Ab, In_{atm}.

K45 **Kimmel, Hermann** [to Gesellschaft für Kernforschung mbH], 1961, Flow counter for the measurement of tritium: German Patent No. 1,180,856 [Nov. 5, 1964]. N.S.A. 19: 11044. AnC, ThP.

Kimura, Miwako. *See* Yura, Osuma.

K46 **Kinard, F. E.,** 1956, Liquid scintillator for the analysis of tritium in water: U.S. Atomic Energy Comm. Pub., DP–190, 12 p. C.A. 51: 10133 i; N.S.A. 11: 6841. AnC, In.

K47 **Kinard, F. E.,** 1957, Liquid scintillator for the analysis of tritium in water: Rev. Sci. Instruments, v. 28, p. 293–294. C.A. 51: 10133 i; N.S.A. 11: 6841. AnC, In.

K48 **King, James, Jr.,** 1963, Chromatographic separation of the hydrogen isotopes, including tritium: Jour. Phys. Chemistry, v. 67, no. 6, p. 1937. AdC, An, Ec, Is.

King, Peter. *See* Lockhart, L. B., Jr.

K49 **Kingsley, W. H., and Hirsh, F. G.,** 1956, Some health considerations in the handling of tritium: U.S. Atomic Energy Comm. Pub., AECU–3394, 5 p. N.S.A. 11:3668. Ha.

Kirby, L. J. *See* Thomas, C. W.

Kirichenko, L. V. *See* Karol, I. L.

Kirkham, Don. *See* Kunze, R. J.

Kirschenbaum, A. D. *See* Von Grosse, A. V.

Kirshenbaum, A. D. *See* Grosse, A. V.

Kisieleski, W. E. *See* Baserga, Renato.

Kisieleski, W. E. *See* Frissel, M. J.

Kisieleski, W. E. *See* Samuels, L. D.

K50 **Kisieleski, W. E., and Smetana, F.,** 1958, Tritium in biological studies: Atompraxis, v. 4, 261–265. N.S.A. 12:16169. AdC, AnC, BiC, Ha, InBi.

K51 **Kitahara, Kazuta, and Tanaka, Yoshimasa,** 1963, Studies on micro amount of water in oil using tritiated water: Yakugaku Zasshi, v. 83, p. 559–560. N.S.A. 18:22383. AnC, In, SeAd.

Klebe, J. F. *See* Simon, Helmut.

Klement, A. W., Jr. *See* Schultz, Vincent.

K52 **Klement, A. W., Jr., ed.,** 1961, Radioactive fallout from nuclear weapons tests: U.S. Atomic Energy Comm., Div. Biology and Medicine, Fallout Studies Branch Conf., held at Germantown, Md., Nov. 15–17, 1961, Proc., Pub., TID–7632, 546 p. [1962]. N.S.A. 16:22433. Ab_{gw}, Ab_{sw}, Ha, In_{gw}, In_{sw}, $SeAd_{Pe}$, $SeAd_{terr}$.

Klemm, A. *See* Reichenbacher, W.

Kline, L. *See* Pace, N.

Knauss, H. J. *See* Porter, J. W.

K53 **Knoche, H. W., and Bell, R. M.,** Tritium assay by combustion with novel oxygen train and liquid scintillation techniques: Anal. Biochemistry, v. 12, no. 1, p. 49–59. C.A. 63:4651 e; N.S.A. 19:36247. AnC, Bi, Sy.

Knoll, J. *See* Perri, G. C.

Knoll, J. E. *See* Eidinoff, M. L.

Knoll, J. E. *See* Verly, W. G.

Knorpp, C. T. *See* Frenkel, E. P.

Knott, K. *See* Ehhalt, D.

K54 **Knutsson, Gert, and Forsberg, H. G.,** 1966, Laboratory evaluation of Cr^{51} EDTA as a tracer for ground-water flow: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Symposium preprint 42, 24 p. Ad, AnC, Ha, In_{gw}, In_{Pe}, IsTh, MeDf, NuIn, SeAd, Sy.

K55 **Knutsson, Gert, Ljunggren, Knut, and Forsberg, H. G., 1963, Field and** laboratory tests of chromium-51–EDTA and tritium water as a double tracer for groundwater flow, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 347–363. N.S.A. 18:1927. AnC, In_{gw}, In_{Hy}, InA_{gw}, Is, $MeDf_{gw}$, $SeAd_{gw}$.

K56 **Knutsson, Gert, and Ljunggren, Knut,** 1959, Studies of ground-water flow by using radioactive isotopes—Preliminary report: Geol. Fören. Stockholm Förh., v. 81, p. 405–409 [in English]. C.A. 53:22626 b. In_{gw}, In_{hy}, InA (with 14 references).

K57 **Koch, A. L.,** 1964, A distributional basis for the variation in killing efficiencies of different tritiated compounds incorporated into *E. coli*: Paper presented at the 12th Ann. Mtg. of the Radiation Research Soc., held at Miami, Fla., May 1964. U.S. Atomic Energy Comm. Pub., CONF-556-11, 17 p. N.S.A. 19:10781. AbO, BiB, InBi.

Koch, H. *See* Modes, D.

Kocharov, G. E. *See* Viktorov, S. V.

Koeller, R. C. *See* Cuddeback, R. B.

Köhegyi, Ferenc. *See* Csanyi, P. F.

Köhegyi, Ferenc. *See* Fodorné, C. P.

K58 **Köhegyi [Koehegi], Ferenc, Csanyi, P. F., and Lévay, Bela,** 1961, Liquid scintillation counting of tritium with a coincidence circuit: Magyar Kémiai Folyóirat (Hungarian Jour. Chemistry), v. 67, p. 413–414 [in Hungarian]. C.A. 56:9666 h; N.S.A. 19:22138. AnC.

K59 **Köhegyi [Koehegi], Ferenc, Csanyi, P. F., and Lévay, Bela,** 1962, Measurement of tritium radiation with a liquid scintillator: Magyar Kémiai Folyóirat (Hungarian Jour. Chemistry), v. 68, p. 429–432 [in Hungarian]. C.A. 58:8601 f. AnC.

K60 **Köhegyi [Koehegi], Ferenc, Fodorné, C. P., and Lévay, Bela,** 1962, Measurement of tritium by means of a liquid scintillator: Magyar Kémiai Folyóirat (Hungarian Jour. Chemistry), v. 68, p. 429–432 [in Hungarian]. N.S.A. 18:19890. AnC.

Kolesnikova, V. N. *See* Izrael, Yu. A.

Kondo, O. *See* Arizumi, A.

K61 **Koranda, J. J.,** 1965, The persistence of tritium and ^{14}C in the Pacific proving ground: Health Physics, v. 11, no. 12, p. 1445–1457. C.A. 64:13708 g. AbG, AbO, BiB, BiC, BiZ, InA_{Pe}, InBi.

Korff, S. A. *See* Shen, S. P.

K62 **Korff, S. A.,** 1954, Effects of cosmic radiation on terrestrial isotope distribution: Bol. Soc. Quím. Peru, v. 20, p. 77–82 [in English]. C.A. 49:2879 a. AbG.

K63 **Korff, S. A.,** 1956, Effects of cosmic rays on the terrestrial isotope distribution: New York Acad. Sci. Annals, v. 67, no. 3, p. 35–54. C.A. 54:14975 f–i. AbG.

K64 **Korff, S. A.,** 1957, The origin and implications of the cosmic radiation: Am. Scientist, v. 45, no. 4, p. 281–300. AbG, InA, NuM.

Kornberg, H. A. *See* DeLong, C. W.

Kornberg, H. A. *See* Thompson, R. C.

Korst, D. R. *See* Frenkel, E. P.

Koshy, Elizabeth. *See* Kamath, P. R.

Kosmachevskiĭ, V. S. *See* Lyubimov, V. A.

Kossakowska, Maria. *See* Chwalinski, Stanislaw.

K65 **Kowalski, Emil,** 1962, Measurement of the radioactivity in air: Atomwirtschaft, v. 7, no. 10, p. 481–486. C.A. 60:12861 a; N.S.A. 17:4814. Ha, In.

K66 **Kowalski, Emil, (to Landis and Gyr AG),** 1961, Method and arrangement for the continuous detection of small tritium concentrations in the air: German Patent 1,153,550 [Aug. 29, 1963]. N.S.A. 18:8318. AnC, $In_{atm.}$

Koyama, Masaki. *See* Nishiwaki, Yasushi.

Krasnopievtzev, Y. V. *See* Karol, I. L.

K67 **Krebs, G. N., Jr.,** 1963, Radiation hazard resulting from tritium diffusion in glove box operations: U.S. Atomic Energy Comm. Pub., LAMS–2962, 13 p. C.A. 60: 10164 a. Ha, In.

Kreiter, V. P. *See* Swain, G. C.

Kresge, A. J. *See* Swain, G. C.

Krey, P. W. *See* Friend, J. P.

Krey, P. W. *See* Walton, Alan.

Kritchevsky, D. *See* Biggs, M. W.

Kritchevsky, D. *See* Shapiro, I. L.

K68 **Kroh, J., and Plonka, A. M.,** 1966, Radiation-induced H-T exchange in aromatic hydrocarbons saturated with tritiated water: Acad. Polonaise Sci. Bull., Sér. Sci. Chim., v. 14, no. 5. p. 331–334 [in English]. C.A. 65: 8229 e. AnC, SeAd, Sy.

Kronberger, H. *See* Boorman, C

K69 **Krupa, R.,** 1962, Determination of tritium activity in tritium-labeled water by the use of an internal gas counter: Biul. Wojskowej Akad. Tech. imeni Jaroslawa Dabrowskiego, v. 11, no. 6 (118), p. 23–33 [in Polish]. C.A. 60: 2522 bc. AnC.

Kubose, D. A. *See* Balkwell, W. R.

Kulp, J. L. *See* Giletti, B. J.

Kulp, J. L. *See* Grosse, A. V.

Kulp, J. L. *See* Von Grosse, A. V.

K70 **Kulp, J. L.,** 1961, Radionuclides in man from nuclear tests: Jour. Agr. and Food Chemistry, v. 9, p. 122–126. C.A. 55: 20241 f. Ge of: Ha.

K71 **Kulp, J. L., and Carr, D. R.,** 1957, New developments in the use of radioisotopes as fluid tracers in reservoir engineering: Soc. Petroleum Engineers, Am. Inst. Mining Engineers 2d Ann. Mtg., Caracas, Venezuela, Nov. 6–9, 1957. InA_{gw}, $MeDf_{gw}$.

K72 **Kulp, J. L., Giletti, B. J., and Erickson, G. P.,** 1957, Isotopic studies on the Greenland Continental Glacier: Suffield, Alberta, Canada, Canada Experimental Sta., Final Rept., Contract AF–19 (604)–1891. AbG_{snow}.

K73 **Kunze, R. J., and Kirkham, Don,** 1965, Models and equations for determining DOH exchange and enrichment in plants: Agronomy Jour., v. 57, no. 3, p. 279–282. C.A. 63: 3319 e. Ab, AbO, BiB, InBi, SeAd.

K74 **Kuper, E., Hofstra, A., and Nauţa, H.,** 1960, Application of tritiated water as a tracer for quantitative determination of waterflow distribution in an oil field, *in* Radioisotopes in the physical sciences and industry, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., p. 511–517 [1962]. N.S.A. 16: 16074. AnC, In_{gw}, In_{hr}, KiH, $MeDf_{gw}$, $SeAd_{gw}$, SeEl.

Kuroda, P. K. *See* Husain, L.

K75 **Kusama, Keiichi,** 1965, An improved method for liquid scintillation counting of biological compounds in aqueous solutions: Tokyo, Japan, Radioisotopes, v. 14, no. 2, p. 142–145 [in Japanese]. N.S.A. 19: 24466. AnC, InBi.

Kusch, P. *See* Taub, H.

K76 **Kutyrin, V. M.,** 1956, The rate of deuterium penetration into plant tissue: Biokhimiya, v. 21, p. 50–52. C.A. 50: 10200 i. AbO, BiB, Eq.

L

Labeyrie, Jacques. *See* Bibron, Roland.

L1 **Labeyrie, Jacques,** 1960a, Technique for measuring air contamination, *in*

Symposium on Health Physics in Nuclear Installations Proceedings: Denmark, Atomenergikom., Forsøgsinst., Risø, Denmark, May 25–28, 1959, p. 53–66 [in French]. N.S.A. 14: 16912. Ab_{atm}, AnC, Ha, In_{atm}, $MeDf_{atm}$.

L2 **Labeyrie, Jacques,** 1960b, Techniques for measurement of [radioactive] air contamination: Saclay, France, Comm. à l'Énergie Atomique Rap. 1499, 14 p. C.A. 56: 8266 g. Ab_{atm}, AnC, Ha, In_{atm}, $MeDf_{atm}$.

La Gatta, D. P. *See* Drobinski, J. C.

Laine-Boszormenyi. *See* Pellerin, P.

Lajtha, L. G. *See* Oliver, R.

Lal, Devendra. *See* Anand, J. S.

Lal, Devendra. *See* Athavale, R. N.

Lal, Devendra. *See* Craig, Harmon.

L3 **Lal, Devendra,** 1962, Cosmic-ray-produced radionuclides in the sea: Oceanog. Soc. Japan Jour., v. 20, p. 600–614. N.S.A. 17: 41009. AbG_{atm}, AbG_{ocean}, In_{atm}, In_{ocean}.

L4 **Lal, Devendra, 1963,** On the investigations of geophysical processes using cosmic-ray-produced radioactivity, *in* Geiss, Johannes, and Goldberg, E. D., eds., Earth science and meteoritics: Amsterdam, Netherlands, North-Holland Publishing Co., p. 115–142. N.S.A. 18: 12362. AbG, In_{hy}.

L5 **Lal, Devendra,** 1965, Single-stage high-yield hydrogenation of CO_2 to methane, using the hydrogen of water, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 487–490. EqG, EqL.

L6 **Lal, Devendra,** 1966, Measurement of tritium activity in natural waters: Indian Acad. Sci. Proc., sec. A, v. 63, no. 3, p. 166–183 [in English]. C.A. 65: 5216 h. AbG_{atm}, AbG_{sw}, AbG_{gw}, AnC, InA_{atm}, InA_{sw}, InA_{gw}, $MeDf_{atm}$, $MeDf_{sw}$, $MeDf_{gw}$.

L7 **Lal, Devendra, Malhorta, P. K., and Peters, B.,** 1958, On the production of radioisotopes in the atmosphere by cosmic radiation and their application to meteorology: Jour. Atmos. and Terrest. Physics, v. 12, p. 306–328. N.S.A. 15: 17141. AbG_{atm}, InA_{atm}, $MeDf_{atm}$.

L8 **Lal, Devendra, and Peters, B.,** 1962, Cosmic-ray-produced isotopes and their application to problems in geophysics: Prog. Elementary Particle and Cosmic Ray Physics, v. 6, p. 1–74. AbG_{atm}, In_{atm}, InA_{atm}, $MeDf_{atm}$.

L9 **Lal, Devendra, Rajagopalan, G., and Venkatavaradan, V. S.,** 1963, Radioactivity induced by solar particles, *in* Daniel, R. R., Lavakare, P. J., Menon, M. G. K., Naranan, S., Nerurkar, N. W., Pal, Yash, and Sreekantan, B. V., eds., International conference on cosmic rays, Jaipur, December 1963, Proceedings, v. 1, Solar particles and sun-earth relations: Bombay, India, Internat. Union Pure and Appl. Physics and Dept. Atomic Energy, Indian Govt., The Commercial Printing Press, Ltd., 273 p. [1964]. Available from Tata Institute of Fundamental Research, Bombay, India. N.S.A. 19: 3008. AbG_{atm}, AbG_{met}, AbG_{sat}, KiR.

L10 **Lal, Devendra, and Rama,** 1965, Atmospheric pathways of manmade C^{14}, H^3, and Sr^{90}, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 541–548. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

L11 **Lal, Devendra, and Rama,** 1966, Characteristics of global tropospheric mixing based on manmade ^{14}C, ^{3}H, and ^{90}Sr: Jour. Geophys. Research, v. 71, no. 12, p. 2865–2874. C.A. 65: 3603 d. In_{atm}, $MeDf_{atm}$.

Lambert, R. W. *See* Gold, V.

L12 **Lamerton, L. F., and Fry, R. M. J., eds.,** 1963, Cell proliferation: Philadelphia, Pa., F. A. Davis Pubs. Ge of: BiC, BiZ, InBi, KiB.

Landsman, D. A. *See* Gregory, D. P.

Lang, A. R. G. *See* Sepall, O.

L13 **Lang, R. J., and Mason, S. G.,** 1960, Counter for solid samples containing labile tritium: Internat. Jour. Appl. Radiation and Isotopes, v. 7, p. 251–257. C.A. 54: 12808 c. AnC, SeAd.

L14 **Langbein, W. B.,** 1957, The use of tritium for determining the age of ground water—Discussion: Washington, U.S. Geol. Survey, Water Resources Bull., Feb. 10, 1957, p. 7. InA_{gw}.

Langer, H. *See* Paerisch, M.

L15 **Langer, H., and Bothe, H. K.,** 1964, A simple technique for the detection of incorporated tritium in the human-body water: Kernenergie, v. 7, nos. 6–7, p. 546–550. C.A. 62: 1963 c; N.S.A. 18: 39104. AnC, Ha, InBi.

Langham, W. H. *See* Pinson, E. A.

Langham, W. H. *See* Richmond, C. R.

Langham, W. H. *See* Trujillo, T. T.

Lansdown, A. R. *See* Delisle, M. J.

L16 **Lansdown, A. R.,** 1961, Application of tracers in the Steelman pilot waterflood: Canadian Mining and Metall. Bull. 64, p. 413–416. C.A. 56: 1682 e. In, MeDf, Nu.

L17 **Lapointe, C. M.,** 1962. Use of tritium to trace underground water: Canadian Nuclear Assoc. preprint, 25 p. N.S.A. 17: 303. Ad, AnC, Ge of: In; In_{gw}, NuB, SeAd, SeDf, SeEl.

Larin, G. M. *See* Zel'venskii, Ya. D.

Launay, M. *See* Guizerix, J.

Lavakare, P. J. *See* Daniel, R. R.

L18 **Lavrenchik, V. N.,** 1965a, Global fallout of nuclear explosion products: U.S. Atomic Energy Comm. Pub., Accession no. 2086, BNL–tr–42, 44 p. [in English]. C.A. 65: 11723 c. Ge of: Ab_{atm}, Ab_{terr}, In_{atm}, In_{terr}, $MeDf_{atm}$, $MeDf_{terr}$, Sa (with about 100 references).

L19 **Lavrenchik, V. N.,** 1965b, Global fallout of nuclear explosion products, *in* Global'noye vypadeniye produktov yadernykh vzrynov: Moscow, U.S.S.R., Atomizdat, chap. 3, 44 p. N.S.A. 20: 2086. Ge of: Ab_{atm}, Ab_{sw}, Ab_{terr}, An, In_{atm}, In_{terr}, $MeDf_{atm}$, $MeDf_{sw}$, $MeDf_{terr}$, Sa (with 100 references).

Law, S. W. *See* Garnett, J. L.

Lawrence, J. H. *See* Dougherty, E. C.

Lawrence, J. H. *See* Prentice, T. C.

L20 **Lawrence, J. N. P.,** 1958, Estimation of whole-body dose (REM) from tritium in body water: U.S. Atomic Energy Comm. Pub., LA–2163, 22 p. N.S.A. 12: 5200. BiZ, Ha, InBi, SeAd.

L21 **Leclipteur, J.,** 1962, Preparation of a scintillating mixture for the determination of T activity of tritiated C_6H_6 synthesized in the preparation of tritiated water: Soc. Royale Sci. Liège Bull., v. 31, p. 672–678. C. A. 58: 205 g. AnC, Sy.

Lee, E. K. C. *See* Lee, J. K.

L22 **Lee, J. K., Lee, E. K. C., Musgrave, Burdon, Tang, Yi-noo, Root, J. W., and Rowland, F. S.,** 1962, Proportional counter assay of tritium in gas chromatographic streams: Anal. Chemistry, v. 34, p. 741–747. N.S.A. 16: 17594. AdC, AnC.

Lefort, Marc. *See* Dumbost, Henry.
Léger, Concele. *See* Bibron, Roland.
Lehman, R. L. *See* Wittemore, I. M.
Lehr, C. G. *See* Bitter, F.

L23 **Leipunsky, O. I.,** 1957, The radiation hazards of explosions of pure hydrogen and ordinary atomic bombs: Atomnaya Energiya, v. 3, p. 530. Translated by the United Nations. Ab, Ha.

Lenskii, L. A. *See* Rachinskii, V. V.

L24 **Lenskii, L. A.,** 1963, Measurement of activity of tritium water by means of a flowmeter: Moscow, U.S.S.R., Akad. Mosk. Sel'skokhoz. Doklady, v. 89, p. 362–369. C.A. 61: 3882 g. ThD, ThP.

L25 **Lenskii, L. A.,** 1964, Isotope exchange sorption of tritium from aqueous solutions with soils in static conditions: Moscow, U.S.S.R., Akad. Rossiisk. Sel'skokhoz. Doklady, no. 99, p. 527–532 [in Russian]. C.A. 64: 7908 b. SeAd.

L26 **Le Pape, M., [and Emmanuel, H.],** 1963a, Méthodes de détection et de mesure du tritium et de ses composés [Techniques for the detection and measurement of tritium and its compounds]: Saclay, France, Comm. à l'Énergie Atomique, Centre d'Études Nucléaires Rap.; U.S. Atomic Energy Comm. Pub.; CEA–Bib–38, 68 p., C.A. 61: 2447 c; N.S.A. 18: 17862. Ge of: AnC (with 128 references).

L27 **Le Pape, M., and Emmanuel, H.,** 1963b, Techniques for the detection and measurement of tritium and its compounds: Saclay, France, Comm. à l'Énergie Atomique, Centre d'Études Nucléaires Rap., Bibliographie 38, 68 p., C.A. 61: 2447 c. Ge of: AnC (with 128 references).

LeRoy, G. V. *See* Okita, G. T.
LeRoy, J. H. *See* Butler, H. L.
Lesimple, M. *See* Finkelstein, A.
Letolle, R. *See* Fontes, J. C.
Lévay, Bela. *See* Csanyi, P. F.
Lévay, Bela. *See* Fodorné, C. P.
Lévay, Bela. *See* Köhegyi [Koehegi], Ferenc.
Leventhal. *See* Haskell, E. E., Jr.
Leventhal, J. S. *See* Miller, M. M.
Lévéque, Paul. *See* Alvinerie, Jacques.
Lévéque, Paul. *See* Blavoux, Bernard.

L28 **Lévéque, Paul, Vigneaux, Michel, and Alvinerie, Jacques,** 1966. Évolution de l'activité en tritium dans le Sud-Ouest de la France: Vienna, Austria, Internat. Atomic Energy Agency—Internat. Union of Geodesy and Geophysics Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Symposium preprint, SM 83/30, 23 p. [in French]. Ab_{sw}, Ab_{atm}. AnC, BiB, In_{sw}, In_{atm}, In_{gw}, In_{Pc}, InA_{gw}, InBi, $MeDf_{sw}$, $MeDf_{atm}$, $MeDf_{gw}$, Sa, SeEl.

L29 **Levskii, L. K.,** 1960, H^3 and Ar^{39} in iron meteorites: Radiokhimiya, v. 2, p. 491–494 [in Russian]. C.A. 56: 12590 f; N.S.A. 15: 3291. AbG_{met}, InA.

L30 **Lewis, D. C., and Burgy, R. H.,** 1964, The relationship between oak tree roots and ground water in fractured rock as determined by tritium tracing: Jour. Geophys. Research, v. 69, no. 12, p. 2579–2588. AbO, In_{gw}, InBi.

L31 (Reference deleted.)

Lewis, H. L. *See* Person, Stanley.

L32 **Lewis, J. E.,** 1959, Radiochemical analysis of tritiated methane and krypton-85 in natural gas: Louisville, Ky., Radiochemistry, Inc., 6 p.

U.S. Atomic Energy Comm. Pub., TID–7571, p. 162–167. N.S.A. 14 : 10677. AnC, In_{terr}, In_{gw}.

Libby, W. F. *See* Anderson, E. C.
Libby, W. F. *See* Begemann, Friedrich.
Libby, W. F. *See* Currie, L. A.
Libby, W. F. *See* Flamm, E.
Libby, W. F. *See* Kaufman, Sheldon.
Libby, W. F. *See* Miller, M. M.
Libby, W. F. *See* Von Buttlar, Haro.
Libby, W. F. *See* Von Grosse, A. V.

L33 **Libby, W. F.,** 1943, Vibrational frequencies of the isotopic water molecules; equilibria with the isotopic hydrogens: Jour. Chem. Physics, v. 11, p. 101–109. C.A. 37 : 2627[3]. Eq, SpVi, ThF.

L34 **Libby, W. F.,** 1946, Atmospheric helium-three and radiocarbon from cosmic radiation: Phys. Rev. v. 69, p. 671–672. C.A. 40 : 5330[7]. AbG, Nu.

L35 **Libby, W. F.,** 1947a, Measurement of radioactive tracers, particularly C^{14}, S^{35}, T, and other long-lived low-energy activities: Anal. Chemistry, v. 19, p. 2–6. C.A. 41 : 2323 e. AnC, Nu.

L36 **Libby, W. F.,** 1947b, Vibrational frequencies of the isotopic water molecules: equilibria with the isotopic hydrogens [Errata]: Jour. Chem. Physics, v. 15, p. 339. British Abs. 1947, AI–231. Eq, SpVi, ThF.

L37 **Libby, W. F.,** 1953, Potential usefulness of natural tritium: [U.S.] Natl. Acad. Sci. Proc., v. 39, p. 245–247. C.A. 47 : 7906 e. Ge of: AbG_{atm}, InA_{atm}, InA_{sw}, InA_{gw}, InBi, KiR, $MeDf_{atm}$.

L38 **Libby, W. F.,** 1954a, Radiocarbon and tritium dating—Possibility of using these isotopes in industry: Zeitschr. Elektrochemie, v. 58, p. 574–585. C.A. 49 : 6735 f. AbG, AnC, Ge, InA, Nu.

L39 **Libby, W. F.,** 1954b, Tritium in nature: Sci. American, v. 190, no. 4, p. 38–42. AbG_{atm}, AbG_{ocean}, AbG_{sw}, AbG_{terr}, AnC, BiB, Ha, In_{gw}, In_{Pe}, In_{atm}, In_{snow}, In_{Hy}, In_{sw}, In_{art}, InA_{atm}, InA_{gw}, InA_{sw}, InBi, $MeDf_{atm}$, NuB, NuR, SeAd, SeEl.

L40 **Libby, W. F.,** 1954c, Basic law of radioactive decay: Zeitschr. Elektrochemie, v. 58, p. 574. AbG, Ge, In.

L41 **Libby, W. F.,** 1955, Tritium in nature: Washington Acad. Sci. Jour., v. 45, p. 301–314. C.A. 50 : 5418 i. AbG, AnC, InA.

L42 **Libby, W. F.,** 1956, Radioactive strontium fallout: [U.S.] Natl. Acad. Sci. Proc., v. 42, p. 365–390. InA, MeDf.

L43 **Libby, W. F.,** 1958a, Radioactive fallout: [U.S.] Natl. Acad. Sci. Proc., v. 44, p. 800–820. N.S.A. 12 : 16148. Ab_{atm}, $MeDf_{atm}$.

L44 **Libby, W. F.,** 1958b, Radioactive fallout, particularly from the Russian October series [of 1958]: [U.S.] Natl. Acad. Sci. Proc., v. 45, p. 959–976. C.A. 53 : 21254 ab. Ab, Ha, In, MeDf (with 31 references).

L45 **Libby, W. F.,** 1959, Tritium in hydrology and meteorology, *in* Abelson, P. H., ed, Researches in geochemistry: New York, John Wiley & Sons, Inc., p. 151–168. C.A. 53 : 12110 b. AbG_{atm}, AbG_{gw}, AbG_{ocean}, AbG_{snow}, AbG_{sw}, AbG_{Hy}, In_{Hy}, In_{gw}, InA_{atm}, InA_{gw}, InA_{sw}, InA_{ocean}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{ocean}$, Nu, NuB, NuR.

L46 **Libby, W. F.,** 1960, Chemical effects of radiation: U.S. Atomic Energy Comm. Pub., AFOSR–TN–60–1269, 68 p. N.S.A. 15 : 19398. Ab, In_{atm}, In_{gw}, In_{sw}, In_{ocean}, InA.

L47 **Libby, W. F.,** 1961a, Tritium geophysics—Recent data and results, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series:

Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 5–32 [1962]. C.A. 57:5632 a; N.S.A. 16:16077. Ab_{atm}, Ab_{sw}, Ab_{gw}, Ab_{ocean}, Ge (with 46 references), In_{atm}, In_{sw}, In_{gw}, In_{ocean}, In_{hy}, InA, InBi.

L48 **Libby, W. F.,** 1961b, Tritium geophysics: Jour. Geophys. Research, v. 66, no. 11, p. 3767–3782. C.A. 56:12591 cd; N.S.A. 16:3250. AbG_{gw}, AbG_{atm}, AbG_{Hy}, In_{gw}, In_{atm}, In_{ocean}, In_{sw}, In_{hy}, InA_{gw}, InA_{ocean},, InA_{atm}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{ocean}$.

L49 **Libby, W. F.,** 1962, Tritium hydrology: Ann. Rept. to Director, Water Resources Center, Berkeley, Calif.. California. Univ. In.

L50 **Libby, W. F.,** 1963, Moratorium tritium geophysics: Jour. Geophys. Research, v. 68, p. 4485–4495. N.S.A. 17:32758. Ab_{art}, AbG_{atm}, AbG_{sw}, InA_{sw}, InA_{atm}, $MeDf_{sw}$, $MeDf_{atm}$, $MeDf_{Hy}$.

L51 **Libby, W. F.,** 1965, Natural radiocarbon and tritium in retrospect and prospect, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 745–749. AbG, Ge, InA.

L52 **Libby, W. F., and Cornog, R.,** 1941, Vapor-pressure determination of HTO and DTO: Phys. Rev., v. 60, p. 171–172. C.A. 37:2975[7]. ThSo.

Lieberman, J. A. *See* Peckham, A. E.

Lin, S. T. *See* Bitter, F.

Lindenmayr, G. *See* Gonsior, Bernhard.

L53 **Linderstroem, C. U.,** 1962, Stable isotope separation: II, Production processes: Dansk Kemi, v. 43, p. 165–171 [in Danish]. Ge of: SeAd.

Lindroth, Hans. *See* Westermark, Torbjorn.

Lingenfelter, R. E. *See* Flamm, E.

Linn, T. A., Jr. *See* Everett, R. J.

L54 **Linowitzki, V., and Hoffmann, W.,** 1965, Measurement of water-vapor permeability of films with the aid of tritium containing water: Kunststoffe, v. 55, no. 10, p. 765–767 [in German]. C.A. 64:9899 h. In, Ki, MeDf.

Lipovska, M. *See* Vavrejn.

Lipovska, M. *See* Franc, Z.

Lisco, Hermann. *See* Baserga, Renato.

List, R. J. *See* Machta, Lester.

L55 **Lister, James,** 1962, Body water estimation in the newborn using tritiated water: Archives Disease Childhood, v. 37, p. 195–197. C.A. 57:4970 g. AnC, InBi.

L56 **Little, G. A.,** 1962, Ionization chamber air-sample system for tritium: U.S. Atomic Energy Comm. Pub., HW–SA–2413. 10 p. C.A. 59:13564 c; N.S.A. 16:31820. AnC, Ha.

Ljunggren, Knut. *See* Knutsson, Gert.

L57 **Lloyd, R. A., Ellis, S. C., and Hallowes, K. H.,** 1961, Phosphorescence in liquid scintillation counting, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci. May 3–10, 1961, Proc., p. 263–277 [1962]. N.S.A. 16:16095. AnC, NuB, SpFl, Sy.

Lobanov, E. M. *See* Abdullaev, A. A.

L58 **Lobunez, Walter, and Karush, Fred,** 1959, The assay of tritium in the form of ammonia and the measurement of exchangeable hydrogen: Am. Chem. Soc. Jour., v. 81, p. 795–798. C.A. 53:11487 h. AnC, Ha, InBi, SeAd.

L59 **Lockhart, L. B., Jr., and King, Peter,** 1959, Speculation on atmospheric processes via fission-product levels: Am. Scientist, v. 47, no. 3, p. 386–396. Ab, InA_{atm}, $MeDf_{atm}$.

L60 **Lohmann, W., and Perkins, W. H.,** 1961, Stabilization of the counting rate by irradiation of the liquid scintillation counting solutions with uv [ultraviolet] light: Nuclear Instruments and Methods, v. 12, no. 2, p. 329–334. C.A. 62: 6107 f. AnC, Sy, Th.

Lombaert, Robert. *See* Schram, Eric.

L61 **Long, Austin,** 1965, Techniques of methane production for C^{14} dating, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 37–40. An, InA, Sy.

Long, F. A. *See* Schulze, Janos.

L62 **Loutit, J. F.,** 1959, Ionizing radiation and the whole animal: Sci. American, v. 201, no. 3, p. 117–134. BiB, Ha, InBi.

L63 **Loutit, J. F.,** 1962, Carcinogenesis, *in* Elbert, Michael, and Howard, Alma, eds., Radiation effects in physics, chemistry, and biology—Proceedings of the 2d International Congress of Radiation Research, Harrogate, Great Britain, Aug. 5–11, 1962: Amsterdam, Netherlands, North-Holland Publishing Co., p. 372–390 [1963]. N.S.A. 17: 25037. Ge of: BiC, InBi (with 16 papers).

L64 **Love, S. K.,** 1951, Natural radioactivity of water: Indus. and Eng. Chemistry, v. 43, p. 1541–1544. C.A. 45: 9780 h. Ge of: AbG_{sw}, AbG_{gw}, AbG_{ocean}, $MeDf_{sw}$, $MeDf_{gw}$, $MeDf_{ocean}$ (with 20 references).

L65 **Loveridge, B. A.,** 1963, The determination of tritium in effluent: Harwell, Berks, England, United Kingdom Atomic Energy Authority Pub., AERE–M–1219, 9 p. C.A. 63: 1231 b; N.S.A. 19: 7266. AnC, Ha, In_{art}.

Lowe, A. E. *See* Popják, G.

L66 **Ludwick, J. D.,** 1958, Tritium in meteorites—Norton County achondrite and the ussuri (Sikhote Alin) siderite: Ann Arbor, Mich., Univ. Michigan Microfilms L. C. card no. Mic–58–1798, 112 p.: Dissert. abs., v. 18, p. 1971–1972, 1958. C.A. 52: 16998 h. AbG_{met}.

L67 **Lujanas, V.,** 1963, Origin of atmospheric tritium: Akad. Lietuvos TSR Mokslu. Darbai [Lithuanian SSR], Ser. B 1 (32), 1963, no. 1, p. 21–28 [in Russian]. C.A. 59: 4744 c; N.S.A. 17: 32887. AbG_{atm}.

L68 **Lujanas, V.,** 1964, Application of natural ^3H and ^7Be to the investigation of vertical motions in the atmosphere: Akad. Lietuvos TSR Mokslu. Darbai, ser. B, 1964, no. 1, p. 11–20 [in Russian]. C.A. 61: 5402 b. Ab, AbG, In, MeDf, NuIn.

L69 **Lunden, P. M.,** 1963, Tritiated thymidine—Distribution and metabolism in the rat: Acta Isotopica, v. 3, no. 2, p. 181–196 [in English]. C.A. 61: 9857 e. BiZ, Ha.

Lundgren, L. B. *See* Östlund [Oestlund], H. G.

L70 **Luyanas, V. Yu.,** 1964, Estimate of the rate of formation of certain radioactive isotopes in the atmosphere, *in* Radioaktivnye izotopy v atmosfere i ikh, ispol'zovanie v meteorologii: Moscow, U.S.S.R., Atomizdat, p. 18–27. N.S.A. 20: 16689. AbG_{atm}.

Lykourezos, A. P. *See* Jordan, Pierre.

L71 **Lyubarskiĭ, G. D.,** 1947, The radioactive isotope of hydrogen (tritium) and its application as tracer in chemical reactions: Uspekhi Khim., v. 16, p. 422–442. C.A. 42: 2169 g. Ge (with 70 references). In.

L72 **Lyubimov, V. A., Eliseev, G. P., and Kosmachevskiĭ, V. S.,** 1955, Investigation with a mass spectrometer of the cosmic radiation at sea level by measuring the momentum and the ionizing faculty of individual particles: Akad. Nauk SSSR Izv. Ser. Fizika, v. 19, p. 720–731. Proc. of 3d All-Union Conf. on Physics of Cosmic Rays. C.A. 50: 7618 a. Ab, An, Ki.

Mc

McCaffery, Irmgarde. *See* Karmen, Arthur.

McClelland, Jean. *See* Milligan, M. F.

Mc1 **McClelland, Jean, Eutsler, B. C., Milligan, M. F., and Wilson, W. E.,** 1954, A portable apparatus for the determination of tritium in liquid samples: U.S. Atomic Energy Comm. Pub., LA–1678 [Declassified 1956], 19 p. N.S.A. 11: 2274. AnC, Ha.

Mc2 **McClelland, Jean, Milligan, M. F., Bayhurst, B. P., Eutsler, B. C., Foreman, W. W., Head, B. M., Hiebert, R. D., Watts, R. J., and Wilson, W. E.,** 1954, Determination of tritium in urine and water: U.S. Atomic Energy Comm. Pub., LA–1645 (Del) [Declassified with deletions, 1956], 13 p. N.S.A. 11: 2273. AnC, Ha, Sy.

McClinton, L. T. *See* Cannon, C. V.

Mc3 **McFadden, E. B., Garner, J. D., and Masler, R. A.,** 1964, Development of a tritium self-luminous liferaft light source: Paper presented at Ann. Mtg. of the Aerospace Med. Assoc., held at Miami, Fla., May 1964: U.S. Atomic Energy Comm. Pub., CONF–522–3, 15 p. N.S.A. 19: 9560. Ha, NuB, SpFl.

Mc4 **McGauhey, P. H.,** 1961, Ground-water contamination research and research needs: Cincinnati, Ohio, Apr. 5–7, 1961, U.S. Dept. Health, Education, and Welfare Symposium on Ground-Water Contamination, Sess. 5, p. 181–186. AnC, In_{gw}, In_{Hy}, $MeDf_{gw}$, Sa_{gw}.

McInteer, B. B. *See* Robinson, E. S.

Mc5 **McInteer, B. B., and Potter, R. M.,** 1957, Analysis of hydrogen-deuterium-tritium mixtures by mass spectrometry: U.S. Atomic Energy Comm. Pub., LA–2086, 36 p. C.A. 52: 3555 e; N.S.A. 12: 1486. An, AnMs.

Mc6 **McKellar, Andrew,** 1949, Isotopes in stellar atmospheres: Astron. Soc. Pacific Pub., v. 61, p. 199–209. C.A. 44: 32 b. AbG.

McKendry, M. A. *See* Kabara, J. J.

Mc7 **McKown, D. A.,** 1963, Health physics bibliography on tritium: U.S. Atomic Energy Comm. Pub., LAMS–2946, 87 p. N.S.A. 18: 18066. Ge of: Ha (with 87 annotated papers and a few bibliographies).

McLafferty, F. W. *See* Reilley, C. N.

Mc8 **McMahon, J. W.,** 1964, The dispersion of tritium in Perch Lake: Chalk River, Ontario, Canada, Atomic Energy Canada, Ltd., Pub., AECL–1889, 8 p. C.A. 60: 15588 f; N.S.A. 18: 18039. Ab_{sw}, In_{sw}, In_{gw}, In_{Pe}, $MeDf_{sw}$.

Mc9 **McQuade, H. A.,** 1960, Radiation effects of thymidine-H^3 and thymidine C^{14}: Experimental Cell Research, v. 21, p. 118–125. C.A. 56: 1725 cd. BiB.

Mc10 **McQuade, H. A.,** 1963, Induction of aberrations in meiotic chromosomes of wheat by means of thymidine-H^3: Radiation Research, v. 20, p. 451–465. N.S.A. 18: 1424. BiB.

M

MacDonald, G. J. F. *See* Flamm, E.

Machta, Lester. *See* Friedman, I.

Machta, Lester. *See* Hagemann, F. T.

M1 **Machta, Lester,** 1957, The nature of radioactive fallout and its effect on man: Hearings before Spec. Subcomm. on Radiation, Joint Comm. on Atomic Energy, 85th Cong., 1st sess., May 27–29 and June 3, 1957, pt. 1, p. 141. BiZ, Ha, InA_{atm}, $MeDf_{atm}$.

M2 **Machta, Lester,** 1960, Radioactive tracers in hydrometeorology: Am. Soc. Civil Engineers Proc., Jour. Hydraulics Div., v. 4, p. 49–60. Ab_{atm}, Ge of: $MeDf_{atm}$; In_{atm}.

M3 **Machta, Lester, and List, R. J.,** 1959, Fallout from nuclear weapon tests: Hearings before Spec. Subcomm. on Radiation, Joint Comm. on Atomic Energy, 86th Cong., 1st sess., May 5–8, 1959. Washington, U.S. Govt. Printing Office. Ab_{atm}, In_{atm}, InA_{atm}, $MeDf_{atm}$, NuB.

M4 **Machta, Lester, and List, R. J.,** circa 1961, Atmospheric traces above 100,000 feet: U.S. Atomic Energy Comm. Pub., SCR–420, p. 25–39. N.S.A. 15: 26360. Ab_{atm}, $MeDf_{atm}$.

M5 **Machta, Lester, List, R. J., and Telegadas, K.,** 1962, A survey of radioactive fallout from nuclear tests: Jour. Geophys. Research, v. 67, no 4, p. 1389–1400. Ab_{atm}, In_{atm}, InA_{atm}, $MeDf_{atm}$, NuB.

MacKay, C. F. *See* Wolfgang, R. L.

M6 **Maddock, A. G.,** 1963, Radioactive measurements in radiochemistry: Montevideo, Uruguay, 1st Inter-Am. Conf. on Radiochemistry, Proc., p. 359–362. C.A. 64: 18905 a. Ge of: AnC.

M7 **Magata, N. Ya.,** 1963, Use of tritium, carbon-14, strontium-90, and cesium-137: Genshiryoku Kogyo, v. 9, no. 8, p. 13–16. N.S.A. 19: 30425. Ge of: Ab_{atm}, Ab_{sw}, Ab_{gw}; In_{atm}, In_{Hy}, In_{sw}, In_{gw}, Is, $SeAd_{atm}$, $SeAd_{terr}$.

M8 **Maggio, R. C., and Christianson, Charles,** 1960, Detector for radioactive hydrogen gas: U.S. Patent 3,183,389 [May 11, 1965]. N.S.A. 19: 32612. AnC, In_{atm}, MeDf, SeAd.

M9 **Magin, G. B., Jr., and Bizzell, O. M.,** winter of 1964–65, Some applications of radioactive technology to water resources investigations and utilization: Isotopes and Radiation Technology, v. 2, p. 124–133. N.S.A. 19: 13830. Ge of: In; In_{gw}, In_{hy}, InA_{atm}, $MeDf_{gw}$.

Maidebor, V. N. *See* Alekseev, F. A.

Maidebor, V. N. *See* Vasil'eva, N. A.

Maisin, J. R. *See* Dulcino, J.

M10 **Maksimovic, Zoran, and Ceranic, Tatjama,** 1963, The production and application of tritium: Tehnika, v. 18, p. 434–440. C.A. 61: 3955 h. Ge of: Ab, In (with 40 references).

Malakhov, S. G. *See* Karol, I. L.

Malhorta, P. K. *See* Lal, Devendra.

M11 (Reference deleted.)

Mandel, S. *See* Halevy, E.

Mandel, S. *See* Harpaz, Y.

Mann, W. B. *See* Seliger, H. H.

M12 **Mann, W. B., Medlock, R. W., and Yura, Osuma,** 1964, Recalibration of the National Bureau of Standards tritiated water standards by gas counting: Internat. Jour. Appl. Radiation and Isotopes, v. 15, p. 351–361. C.A. 61: 7685 h; N.S.A. 18: 30070. AnC, AnCl, Th.

M13 **Mantescu, Constanta, and Genunche, Ana,** 1964, Tritium measurement and preparation of labelled molecules: Acad. Romîne Studii Şi Fizica Atomica, 110 p. N.S.A. 19: 30300. Ge of: An, In, Sy (with 558 references).

M14 **Mantescu, Constanta, and Genunche, Ana,** 1965, Determination of tritium and carbon-14 in the gas phase: II, Quantitative determination of

the activity of preparations containing tritium and carbon-14: Acad. Romîne Studii Şi Cercetari Chim., v. 13, no. 10, p. 1101–1113. C.A. 64: 10715 g. AnC, ThSo.

Maraini, G. *See* Gavosto, F.

Marano, B. J. *See* Eidinoff, M. L.

Marano, B. J. *See* Perri, G. C.

Marchi, R. P. *See* Benson, S. W.

M15 **Marcuzzi, Giorgio, and Santoro, Vittoria,** 1959, Studies on the water exchange of *Tenebrio molitor* by tritiated water: Ricerca Sci., v. 29, p. 2576–2581. C.A. 54: 16677 a. InBi, MeDf.

Margnetti, C. *See* Henriques, F. C., Jr.

Margrita, R. *See* Guizerix, J.

Marignan, R. *See* Aussel, P.

M16 **Marion, J. B.,** 1962, A comment on precision measurements of the binding energy of the deuteron: Nuclear Physics, v. 29, p. 341–344 [in English]. N.S.A. 16: 10842. AnMs, NuB.

Markelov, V. V. *See* Zav'yalov, A. P.

M17 **Marquez, L., Costa, N. L., and Almeida, I. G.,** 1958, Radioisotopes from fusion in rain water: Geneva, Switzerland, United Nations 2d Internat. Conf. on Peaceful Uses of Atomic Energy Proc. v. 18, p. 586–587. C.A. 54: 8312 g. AbG.

Marshall, R. O. *See* Smith, G. N.

Marston, A. L. *See* West, D. L.

Martell, E. A. *See* Arnold, J. R.

M18 **Martell, E. A.,** 1959a, Artificial radioactivity from nuclear tests up to November 1958: U.S. Atomic Energy Comm. Pub., AFCRC–TN–59–444, GRD Research Notes no. 19, 19 p. N.S.A. 14: 8615. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

M19 **Martell, E. A.,** 1959b, Atmospheric aspects of strontium-90 fallout: Science, v. 129, p. 1197–1206. C.A. 53: 16719 h. AbG_{atm}, $MeDf_{atm}$.

M20 **Martell, E. A.,** 1963, On the inventory of artificial tritium and its occurrence in atmospheric methane: Jour. Geophys. Research, v. 68, no. 13, p. 3759–3769. C.A. 59: 3508 h; N.S.A. 17: 30695. AbG_{atm}, EqI, In_{atm}, IsKi, $MeDf_{atm}$, $SeAd_{atm}$.

M21 **Martell, E. A., and Drevinsky, P. J.,** 1960, Atmospheric transport of artificial radioactivity: Science, v. 132, p. 1523–1531. Ab_{atm}, InA_{atm}, $MeDf_{atm}$.

M22 **Martens, J. H., ed.,** 1962, Transactions of the American Nuclear Society, 1962, Annual Meeting Boston, Massachusetts, June 18–21, 1962: Am. Nuclear Soc. Trans., v. 5, no. 1, 272 p. (See especially p. 203–204.) N.S.A. 16: 24338. AnC.

Martin, D. W. *See* Richmond, C. R.

Martin, W. L. *See* Pro, M. J.

Maruo, Bunji. *See* Hattori, Toshie.

Maruo, Bunji. *See* Mizuno, Shigeki.

Maruo, Bunji *See* Takahashi, Hajime.

Masironi, R. *See* Giovannozzi-Sermanni, G.

Masler, R. A. *See* McFadden, E. B.

Mason, S. G. *See* Lang, R. J.

Mason, S. G. *See* Sepall, O.

M23 **Massey, B. J.,** 1957, Tritium handling system: U.S. Atomic Energy Comm. Pub., ORNL–2238, 6 p. C.A. 51: 8540 h; N.S.A. 11: 4327. Ha.

Masson, J. *See* Fallot, P.

Matheson, M. S. *See* Grossweiner, L. I.

Matsukawa, E. *See* Eaborn, C.

Mattraw, H. C. *See* Dorfman, L. M.

M24 **Mattraw, H. C., and Patterson, R. E.,** 1963, The conversion of the consolidated-Nier mass spectrometer to a recording automatic instrument and its application to continuous sampling and analysis: U.S. Atomic Energy Comm. Pub., KAPL–902, 25 p. N.S.A. 17 : 14596. An, AnMs, Sy.

M25 **Maurer, Rainer, Wenzel, Martin, and Karlson, Peter,** 1964, Tritium labelling of natural products: Nature, v. 202, no. 4935, p. 896–898. C.A. 61 : 4626 f, C.A. 59 : 1954 e, C.A. 59 : 4989 c, C.A. 58 : 3064 e, C.A. 55 : 21681 d. An, Sy.

Maute, R. L. *See* Benson, R. H.

M26 **Mayneord, W. V.,** 1961, The natural radioactivity of the human body: Prog. Biophysics and Biophys. Chemistry, v. 11, p. 1–24. N.S.A. 18 : 43210. AbO, BiB, BiC, BiZ, Ha, In_{Pe}, In_{sw}, InBi.

M27 **Mayr, Giovanna,** 1958, Experiments relative to the presence of tagged hydrogen in substances in contact with a tritium source: Ricerca Sci., v. 28, p. 1015. C.A. 52 : 17860 f. AnC, In.

M28 **Mazzagatti, R. P.,** 1956, Displacement fluid for secondary recovery: U.S. Patent 2,769,913 (Nov. 16, 1956). In_{gw}.

Medlock, R. W. *See* Mann, W. B.

M29 **Meissner, J.,** 1965, Efficiency of measurements of radioactivity in relation to sample preparation and measuring arrangement: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioisotope Sample Measurement Techniques in Medicine and Biology, 1965, Proc., p. 563–572. C.A. 65 : 3284. AnC, InBi, Sa.

Melbourne, K. V. *See* Eden, G. E.

M30 **Melhuish, W. H.,** 1960, The measurement of carbon-14 and tritium-activities in gas-filled Geiger counters: New Zealand Jour. Sci., v. 3, p. 549–558. C.A. 55 : 9084 i; N.S.A. 15 : 8718. AnC.

M31 **Mendelsohn, M. L.,** 1960, Growth and survival of cells labeled with tritiated thymidine: Jour. Natl. Cancer Inst., v. 25, p. 485–500. C.A. 54 : 25222 i. Ha.

Menke, K. H. *See* Scharpenseel, H. W.

Menon, M. G. K. *See* Daniel, R. R.

M32 **Mercado, A., and Halevy, E.,** 1966, Determining the average porosity and permeability of a stratified aquifer with the aid of radioactive tracers: Water Resources Research, v. 2, no. 3, p. 525–542. In_{gw}, In_{hy}, InA_{gw}, InA_{Hy}.

Meriwether, H. T. *See* Rosenblum, Charles.

M33 **Merrill, J. R., Honda, Masatake, and Arnold, J. R.,** 1959, "Solar radioactivity" studies, *in* Arnold, J. R., Studies of natural and induced radioactivities: U.S. Atomic Energy Comm. Pub., OOR–1574.5, Paper 3. N.S.A. 13 : 20329. AbG_{atm}.

M34 **Merrill, R. T.,** 1965, An analyzer for radioactive gas: U.S. Atomic Energy Comm. Pub., RFP–500, 14 p. C.A. 63 : 12609 e; N.S.A. 19 : 30528. AnC, Ha, In_{atm}.

Merritt, W. F. *See* Hawkings, R. C.

M35 **Merritt, W. F.,** 1958, Radiochemical analysis system for counting tritium as water vapor: Anal. Chemistry, v. 30, p. 1745–1747. C.A. 53 : 2926 d. AnC.

M36 **Merritt, W. F.,** 1961, Movement of radioactive wastes through soil: 2.

Measurement of direction and effective velocity of ground-water movement: Chalk River, Ontario, Canada, Sci. Doc. Distrib. Office, Atomic Energy of Canada, Ltd., Pub., CRER–972. In_{gw}, In_{Pe}, In_{hy}, $SeAd_{Pe}$.

M37 **Merritt, W. F.,** 1962, Routine measurements of ground-water velocity using S^{35}: Health Physics, v. 8, p. 185–189. C.A. 57:3206 h; N.S.A. 16:17897. Ha, In_{gw}, In_{hy}, InA_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

Metcalf, R. P. *See* Cannon, C. V.

Meyer, L. H. *See* Albenesius, E. L.

Meyer, L. H. *See* Johnson, B. S., Jr.

M38 **Meyer, L. H.** 1965, Tritium: Kirk-Othmer Encyclopedia Chem. Technology, 2d ed., v. 6, p. 910–918 [in English]. C.A. 65:8239 g. Ge of: AbG, AnC, Eq, Ha, In, Ki, MeDf, Nu, Se, Th (with 51 references).

M39 **Mihram, R. G.,** circa 1963. Some uses of fluid tracers in oil wells: U.S. Atomic Energy Comm. Pub., TID–7689, p. 38–45. N.S.A. 18:16192. In_{gw}.

Mikhalenko, I. P. *See* Popov, M. M.

Mikulski, Andrzej. *See* Chwalinski, Stanislaw.

M40 **Milde, G.,** 1962, The use of radioactive isotopes for mining hydrogeological investigations: Isotopentechnik, v. 2, p. 328–335 [in German]. N.S.A. 17:8403. Ge of: In_{gw}.

M41 **Milic, Patricia,** 1956, Natural and bomb-produced variation of tritium in rainfall [abs.]: Am. Meteorol. Soc. Bull., v. 37, p. 305. In_{atm}, $MeDf_{atm}$.

M42 **Miller, L., and Carman, P. C.,** 1964, Self-diffusion in mixtures; Pt. 6, Self-diffusion of hydrogen in certain gaseous mixtures: Faraday Soc. Trans., v. 60, p. 33–37. N.S.A. 18:16054. In, MeDf, Nu, SeAd.

M43 **Miller, M. M., Leventhal, J. S., and Libby, W. F.,** 1965, Tritium in Mount Everest ice—Annual glacier accumulation and climatology at great equatorial altitudes: Jour. Geophys. Research, v. 70, no. 16, p. 3885–3888. C.A. 63:8063 e. AbG_{snow}, InA_{snow}, $MeDf_{atm}$.

Milligan, M. F. *See* McClelland, Jean.

M44 **Milligan, M. F., Campbell, E. E., Eutsler, B. C., McClelland, Jean, and Moss, W. D.,** 1958, Analytical procedures of the Industrial Hygiene Group: U.S. Atomic Energy Comm. Pub., LA–1858, 2d ed., 261 p. N.S.A. 12:16220. Ge of: An, Ha.

Mills, R. O. See Everett, R. J.

M45 **Mirolli, M.,** 1965, Tritium—Distribution in *Busycan canaliculatum* (L.) injected with labeled reserpine: Science, v. 149, no. 3691, p. 1503. BiC, InBi.

Mitchell, R. N. *See* Eutsler, B. C.

Mitchell, R. N. *See* Robbins, M. C.

M46 **Mitsis, G. J., Plebuch, R. R., and Gordon, K. F.,** 1960, A scintillation method for determining liquid-liquid interfacial areas: Am. Inst. Chem. Engineers Jour., v. 6, p. 505–509. C.A. 56:4339 a. ThSo.

M47 **Mittehauser, H. M., and Thodos, G.,** 1964, Vapour pressure relationships up to the critical point of hydrogen, deuterium, and tritium, and their diatomic combinations: Cryogenics, v. 4, p. 368–373. N.S.A. 19:23548. ThP, ThSo.

M48 **Mizuno, Shigeki, Takahashi, Hajime, and Maruo, Bunji,** 1960, Tritium counting with a windowless gas-flow counter: Nippon Nogeikagaku Kaishi, v. 34, p. 976–977. C.A. 59:4757 e: N.S.A. 16:2005. Ad, AnC.

M49 **Mlinko, S., and Szarvas, T.,** 1963, Gas analysis of tritium in the form of ethane: Internat. Jour. Appl. Radiation and Isotopes, v. 14, no. 4, p. 197–203. C.A. 59:6004 d: N.S.A. 17:27273. AnC.

M50 **Mlinko, S., and Szarvas, T.,** 1964, Gas phase methods operating at atmospheric pressure for the analysis of soft β-emitting isotopes: U.S. Atomic Energy Comm. Pub., A/CONF.28/P/855, 16 p. N.S.A. 18: 37504. AnC.

M51 **Modes, D., and Koch, H.,** 1964, Absolute activity determination of tritiated water by means of a proportional counter: Kernenergie, v. 7, nos. 6–7, p. 538–540 [in German]. C.A. 62: 15723 e. AnC.

Moghissi, A. *See* Wilkniss, P.

M52 **Moghissi, A., and Hogrebe, K.,** 1964, Quantitative decomposition of tritiated water to a hydrocarbon: Internat. Jour. Appl. Radiation and Isotopes, v. 15, p. 165–167 [in German]. C.A. 61: 3909 f. AnC.

Mohler, F. L. *See* Dibeler, V. H.

M53 **Mohler, F. L. Dibeler, V. H. Wells, E. J., Jr., and Reese, R. M.,** 1950, Mass spectra of isotopic hydrogen molecules [Abs.]: Phys. Rev., v. 79, p. 223. C.A. 45: 2765 i. SeMs, Sr.

Molinari, Philippe. *See* Botter, Fernande.

Moljk, A. *See* Drever, R. W. P.

M54 **Monfeuga, Suzanne,** 1958, Use of external Geiger counters to determine tritium: Mikrochim. Acta, 1958, no. 2, p. 177–180 [in French]. C.A. 53: 8916 c. AnC.

Monk, C. B. *See* Jones, J. R.

Moore, D. *See* Popják, G.

M55 **Moore, Richard,** 1962, A comparison of HTO in plasma and expired water vapor; Health Physics, v. 7, p. 161–169. N.S.A. 16: 9823. AbO, BiC, BiZ, Ha, InBi.

M56 **Morecraft, W. T.,** 1963, Tritium hazards associated with a heavy-water-moderated reactor: Am. Indus. Hygiene Assoc. Jour., v. 24, p. 87–90. C.A. 58: 12144 a; N.S.A. 17: 14541. BiC, Ha, In_{atm}.

Morikawa, Naotake. *See* Itō, Ryōiche.

Morikawa, Naotake, *See* Ryōichi, Itō.

Morimitsu, Wataru. *See* Ohno, Akira [Ono, Akira].

Morimitsu, Wataru. *See* Ono, Akira [Ohno, Akira].

Morisaki, Naoko. *See* Kasida, Yosihiko [Yoshiko (or Kashida, Yoshihiko)].

Morozov, N. M. *See* Taikhert, A. M.

M57 **Morozov, V. P.,** 1953, Rule of order for nonlinear XY_2 molecules: Zhur. Fiz. Khimii, v. 27, p. 233–236. C.A. 48: 2477 b. IsSp, StD.

Morozov, Yu. M. *See* Popov, M. M.

M58 **Morrison, P., and Pines, J.,** 1955, Radiogenic origin of helium isotopes in rocks: New York Acad. Sci. Annals, v. 62, p. 69. C.A. 50: 3907 d. AbG_{atm}, AbG_{terr}, AbG_{met}, AnC, NuR.

M59 **Moses, V., and Calvin, M.,** 1959a, Photosynthesis studies with tritiated water: Biochim. et Biophys. Acta, v. 33, p. 397–312 [in English]. C.A. 53: 17250 d: N.S.A. 13: 17673. AnC, BiC, InBi, KiB, MeDf, SeAd.

M60 **Moses, V., and Calvin, M.,** 1959b, Path of hydrogen in photosynthesis: Jour. Biochemistry, v. 71, p. 16P. C.A. 53: 5415 b. BiB, InBi.

M61 **Moskalev, Yu. I.,** 1957, Peculiarities of distribution and biological action of radioactive isotopes: Moscow, U.S.S.R., Vsesoyuz. Nauchnyi-Tekhnicheskii Konferentsiya po Primenen. Radioaktiv. i Stabil. Izotopov i Izlucheniĭ v Narod. Khoz. i Nauke, Med. Radiobiologie Trudy [Transactions

of the All-Union Sci. Tech. Conf. on Use of Radioactive and Stable Isotopes], p. 314–326 [1960]. C.A. 55:1736 g. AbO, Bi, Ha.

Mosley, J. R. *See* Dunn, F. J.

M62 **Moss, Gerald,** 1964, Scintillation counting of plasma tritiated water (HTO): Jour. Lab. and Clinical Medicine, v. 63, p. 315–318. N.S.A. 18:9999. AnC, InBi.

Moss, W. D. *See* Milligan, M. F.

M63 **Moum, J., and Rosenqvist, I. Th.,** 1958, Hydrogen(protium)-deuterium exchange in clays: Geochim. et. Cosmochim. Acta, v. 14, p. 250–252. C.A. 53:2952 i. Ad, InA, SeAd.

M64 **Muenich, K. O.,** 1959, Detection of gaseous tritium in air: German Patent 1,107,967. C.A. 56:2684 f. Ad, Ha.

Mühlemann, C. *See* Renaud, Andre.

Mulligan, W. *See* Francis, G. E.

Münnich, K. O. *See* Brinkman, Roland.

Münnich, K. O. *See* Ehhalt, D.

Münnich, K. O. *See* Zimmermann, U.

M65 **Münnich, K. O.,** 1963a, Le tritium des bombs atomiques comme indicateur en hydrologie: (Translated into French from Phys. Blätter, heft 9, no. 19, p. 418–421.) Saclay, France, Comm. à l'Énergie Atomique, Centre d'Études Nucléaires Rap., SEA–tr–A–1729, 10 p. N.S.A. 19:20174. Ab_{art}, Ab_{atm}, Ab_{Hy}, Ab_{gw}, Ab_{sw}, AnC, In_{atm}, In_{Hy}, In_{gw}, In_{sw}, In_{Pc}, $MeDf_{atm}$, $MeDf_{Hy}$, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{Pc}$.

M66 **Münnich, K. O.,** 1963b, Atombomben-tritium als indikator in der hydrologie: Phys. Blätter, heft 9, no. 19, p. 418–421. Ab_{art}, Ab_{atm}, Ab_{Hy}, Ab_{gw}, Ab_{sw}, Anc, In_{atm}, In_{gw}, In_{sw}, In_{Pc}, In_{Hy}, $MeDf_{atm}$, $MeDf_{Hy}$, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{Pc}$.

M67 **Münnich, K. O.,** 1964, The Heidelberg present and future hydrology program—The C–14 Laboratory working paper: Vienna, Austria, Paper submitted for the Internat. Atomic Energy Agency meeting on Isotopes in Hydrology, Apr. 6–10, 1964. In_{Hy}.

M69 **Münnich [Muennich], K. O., and Roether, W.,** 1963, A comparison of carbon-14 and tritium ages in groundwater, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 397–406. N.S.A. 18:1930. Ab_{atm}, Ab_{gw}, In_{gw}, InA_{gw}, SeAd.

M69 **Münnich, K. O., Roether, W., and Thilo, L.,** 1966, Dating of groundwater with tritium and C–14: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/21, 22 p. Ab_{atm}, Ab_{gw}, Ab_{art}, BiB, In_{Pc}, In_{gw}, In_{atm}, In_{by}, In_{Hy}, InA_{atm}, InA_{gw}, InA_{Pc}, $MeDf_{Pc}$, $MeDf_{gw}$, Sa.

Musgrave, Burdon, *See* Lee, J. K.

M70 **Myers, I. T.,** 1953, An ionization chamber method for the standardization of tritiated water samples: U.S. Atomic Energy Comm. Pub., HW–29282, 20 p. [1957]. N.S.A. 11:3952. A bibliography. Ge of: AnC, KiI, Me, SeAd, Th.

M71 **Myers, L. S., Jr., and Rosenblum, Cynthia,** 1963, A rapid method for determining tritium water in urine following acute exposure: Health Physics, v. 9, p. 345–347. C.A. 59:6712 g. Ha.

N

Nagel, J. F. *See* Ehhalt, D.

Naidenov, V. O. *See* Viktorov, S. V.

Nakamura, Asao. *See* Itō Ryōiche [Ryōichi, Itō].

Nakamura, Asao. *See* Ryōichi, Itō [Itō, Ryōche].

N1 **Nakayama, F. S., and Jackson, R. D.,** 1963a, Diffusion of tritiated water ($H^3H^1O^{16}$) in agar gel and water: Jour. Phys. Chemistry, v. 67, p. 932–933. C.A. 59:58 f. AnC, In, MeDf.

N2 **Nakayama, F. S., and Jackson, R. D.,** 1963b, Diffusion of tritiated water in soils: Soil Sci. Soc. America Proc., v. 27, no. 3, p. 255–258. In_{Pe}, $MeDf_{Pe}$, $SeAd_{Pe}$.

N3 **Nalborczyk, Emil,** 1962, Tritium in biochemical and biological investigations: Postepy Biochemii, v. 8, no. 1, p. 95–107. C.A. 56:13177 a. AbO, Bi, BiC, Ge (with 96 references).

N4 **Naoru, Yu.,** 1963, Standard radioactivity measurements: Genshiryoku Kogyo, v. 9, no. 2, p. 28–32. N.S.A. 19:15650. AnCl; Ge of: AnC; Sy.

Naranan, S. *See* Daniel, R. R.

Nash, J. B. *See* Casaletto, G. J.

N5 **Nash, J. B.,** 1965, The production of tritium-labeled methane and ethane in the CH_4–T_2 [methane-tritium] system: Berkeley, Calif., California Univ. (Berkeley) thesis. U.S. Atomic Energy Comm. Pub., UCRL–16009, 114 p. N.S.A. 19:28363. IsKi, KiR, NuB, ThSo.

N6 **[U.S.] National Academy of Science—National Research Council,** 1963, Nuclear Geophysics: Washington, [U.S.] Natl. Acad. Sci.—Natl. Research Council Conf. on Nuclear Geophysics, held at Woods Hole, Mass., June 7–9, 1962, Proc. U.S. Atomic Energy Comm. Pub., NAS–NRC–1075, 253 p. N.S.A. 17:25456. Ab_{ocean}, In_{ocean}, InA_{ocean}, $MeDf_{ocean}$, No.

N7 **[U.S.] National Research Council,** 1955, Nuclear processes in geological settings, 2d Conference of the National Academy of Science—National Research Council, held at Pennsylvania State University, Sept. 8–10, 1955, Proceedings: Washington, [U.S.] Natl. Acad. Sci.—Natl. Research Council, Nuclear Sci. Ser. Rept. 19, 210 [209] p. [1956]. N.S.A. 11:5374, N.S.A. 11:8001. Ge of: AbG.

N8 **[U.S.] National Research Council,** 1957, Cosmological and geological implications of isotope ratio variations: Informal Conf. Natl. Acad. Sci.—Natl. Research Council, held at Massachusetts Inst. Technology, Boston, Mass., June 13–15, 1957, Proc., Natl. Research Council, Nuclear Sci. Ser. Rept. 23, 191 p.; NRC Pub. 572, 191 p. [1958]. N.S.A. 13:19552. AbG_{atm}, AbG_{ocean}, Nu.

Nauta, H. *See* Kuper, E.

N9 **Nelson, R. W. and Reisenauer, A. E.,** 1962, Application of radioactive tracers in scientific ground-water hydrology: U.S. Atomic Energy Comm. Pub., HW–SA–2798, 41 p. N.S.A. 17:14473. Ge of: In_{gw}, MeDf, Sa.

Nerukar, N. W. *See* Daniel, R. R.

Ness, S. L. *See* Curtis, M. L.

Nesterov, V. E. *See* Belikov, M. P.

Neta, P. *See* Anbar, M.

Neuburg, H. A. C. *See* Shen, S. P.

N10 **New England Nuclear Corporation,** 1957, Symposium on tritium in tracer applications, Proceedings: Boston, Mass., 43 p. N.S.A. **13:7462.** AnC, BiC: Ge of: In; Ha, In_{gw}, InBi, KiP, Sy.

N11 **New England Nuclear Corporation,** 1958, Symposium on Advances in tracer applications of tritium, New York, N.Y., Oct. 31, 1958, Proceedings: Boston, Mass., 69 p. [1959]. N.S.A. 13: 17947, N.S.A. 16: 25093. AnC, AnMs, BiC, Ge (with 11 papers), In, InBi, KiR, Sy.

N12 **New England Nuclear Corporation,** 1962, Advances in tritium tracer applications: Annual symposia sponsored by and available from New England Nuclear Corp., Boston, Mass. Ge of: In.

N13 **New Zealand Institute of Nuclear Sciences,** 1962, Report on the work of the Institute of Nuclear Sciences: Lower Hutt, New Zealand, New Zealand Inst. Nuclear Sci. ann. rept. 4, Mar. 1, 1961–Feb. 28, 1962, 124 p.; U.S. Atomic Energy Comm. Pub., NP–14825, 124 p. N.S.A. 19: 28420. In.

N14 **New Zealand Department of Scientific and Industrial Research, Institute of Nuclear Science,** 1960, Annual report 3, March 1, 1960 to February 28, 1961: Lower Hutt, New Zealand Dept. Sci. Indus. Research, Div. Nuclear Sci., Pub. AEC–65, 86 p.; U.S. Atomic Energy Comm. Pub., NP–10593. N.S.A. 15: 27295 AnC, InA.

N15 **New Zealand Department of Scientific and Industrial Research, Institute of Nuclear Science,** 1962, Annual report 4, March 1961–February 1962: U.S. Atomic Energy Comm. Pub., NP–12381, 124 p. N.S.A. 17: 10243. AbG, InA.

N16 **Newkirk, L. L.,** 1963, Calculation of low-energy neutron flux in the atmosphere by the S_n method: Jour. Geophys. Research, v. 68, no. 7, p. 1825–1833. C.A. 58: 10942 a; N.S.A. 17: 19020. AbG_{atm}, Ad, MeDf, NuIn.

N17 **Newmarch, G. A.,** 1963, Outline on tracers: Geotimes, Data sheet 43, Am. Geol. Inst. Pub., Sept. issue. Ad_{gw}, In_{gw}, $MeDf_{gw}$, Nu, $SeAd_{gw}$.

Nicholson, C. K. *See* Johnson, B. S., Jr.

N18 **Nief, G., and Botter, R.,** 1958, Isotopic analysis of simple hydrogen compounds, *in* Waldron, J. D., ed., Advances in mass spectrometry: New York, Pergamon Press, p. 515–525 [1959]. C.A. 54: 13847 a. AnC, AnMs.

Nielsen, D. R. *See* Biggar, J. W.

Nielsen, J. M. *See* Perkins, R. W.

Nielsen, N. O. *See* Cottier, H.

Nikolaev, D. A. *See* Zel'venskii, Ya. D.

Nir, Aharon. *See* Avinur, P.

Nir, Aharon. *See* Dostrovsky, I.

Nir, Aharon. *See* Gat, J. R.

Nir, Aharon. *See* Halevy, E.

Nir, Aharon, *See* Harpaz, Y.

Nir, Aharon. *See* Kaufman, W. J.

N19 **Nir, Aharon,** 1964, On the interpretation of tritium "age" measurements of groundwater: Jour. Geophys. Research, v. 69, no. 12, p. 2589–2595. N.S.A. 18: 25701. AbG, In_{gw}, InA_{gw}, $MeDf_{gw}$.

N20 (Reference deleted.)

N21 **Nishiwaki, Yasushi, and Kawai, Hiroshi,** 1962, Measurement of the tritium concentration in natural waters; Shitsuryo Bunseki, v. 10, no. 21, p. 83–90 [in Japanese]. C.A. 60: 14253 d; N.S.A. 18: 3697. Ab_{atm}, Ab_{sw}, AnC, In_{atm}, In_{sw}, MeDf, SeEl.

N22 **Nishiwaki, Yasushi, Kawai, Hiroshi, Oshima, Yotaro, and Koyama, Masaki,** 1962, Liquid scintillation counter with cooled photomultiplier: Japanese Jour. Appl. Physics, v. 1, p. 237–238. C.A. 59: 2355 bc. AnC.

N23 **Noakes, J. E., Kim, S. M., and Stipp, J. J.,** 1965, Chemical and counting advances in liquid scintillation age dating, *in* Chatters, R. M., and Olson,

E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 68–92. AnC, AnMs, SeAd.

N24 **Norwood, D. W.,** 1962, Radioactive material in the body—Detection and treatment: Archives Environmental Health, v. 5, p. 167–172; U.S. Atomic Energy Comm. Pub., HW–CA–2278. N.S.A. 17: 1183. Ge of: Ha.

Nozaki, Tadashi. *See* Itō, Ryōiche [Ryōichi, Itō].

Nozaki, Tadashi. *See* Ryōichi, Itō [Itō, Ryōiche].

N25 **Nussbaum, Elmer,** 1962, Diffusion of radon and tritium through semipermeable materials: U.S. Atomic Energy Comm. Pub., TID–15160, 27 p. N.S.A. 16: 12113. MeDf, Sa, SeDf.

O

O'Brian, D. M. *See* Grillo, R. S.

O'Brien, B. J. *See* Bainbridge, A. E.

O1 **O'Brien, B. J.,** 1961, The measurement of natural T levels in Geiger counters, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 343–351 [1962]. C.A. 57: 9427 i; N.S.A. 16: 16101. AnC.

O'Brien, K. M. *See* Grillo, R. S.

Obukhova, M. P. *See* Finkel'shtein, Ya. B.

O2 **Odén, Svante,** 1964, C^{14} och tritium isotopenas förekomst över Skandinavien under senare år med tillämpning inom markära och hydrologi: Grundförbättring, v. 2, p. 122–142. Ab_{atm}.

Oeschger, Hans. *See* Houtermans, F. G.

Oeschger, Hans. *See* Geiss, Johannes.

Oeschger, Hans. *See* Renaud, André.

O3 **Oeschger, Hans,** 1962, Researches on C^{14} and other radioactive substances: Schweizer Archiv Angew. Wiss. Tech., v. 28, no. 2, p. 55–63. C.A. 57: 1817 d. AbG, InA.

O4 **Oeschger, Hans, Renaud, André, and Schumacher, Ernst,** 1962, An attempt to determine the age of the glacier snow strata of the Jungfrau Glacier snowfield by tritium content, and determination of the yearly increase: Soc. Vaudoise Sci. Nat. Bull. 68, p. 49–56. C.A. 61: 11800 cd. AnC, InA_{snow}, SeEl.

O5 **Oganov, M. N., and Striganov, A. R.,** 1957, Quantitative spectroscopic analysis of a gaseous mixture of hydrogen, deuterium, and tritium: Atomnaya Energiya, v. 3, no. 8, p. 112–120. N.S.A. 12: 9027, N.S.A. 13: 4512. AnMs.

O6 **Oganov, M. N., and Striganov, A. R.,** 1958, Quantitative analysis, by a spectrographic method, of the isotopic composition of hydrogen, deuterium, and tritium mixtures: Spectrochim. Acta, v. 13, p. 139–149. N.S.A. 12: 9027, N.S.A. 13: 4512. AnMs.

Ogloblin, A. A. *See* Varshavskii, Ya. M.

O7 **Ohno, Akira [Ono, Akira], and Morimitsu, Wataru,** 1961, Measurement of gaseous tritium by a proportional counter: Tokyo, Japan, Radioisotopes, v. 10, p. 47–60. C.A. 55: 23098 c. AnC.

Ohno, S. *See* Takahashi, Tan.

O8 **Ojima, Tsutomu, Toratani, Hirokazu, and Fujimoto, Hiroshi,** 1963, A liquid scintillation counting method for measuring tritiated water in soil:

Osaka Prefect Radiation Center Ann. Rept., v. 4, p. 103–106 [in English]. C.A. 62 : 3623 d ; N.S.A. 18 : 23419. AnC, In_{Pe}, Sy, ThD.

O9 **Ojima, Tsutomu, Toratani, Hirokazu, and Fujimoto, Hiroshi,** 1965, Behavior of water in soil aggregates : Nippon Dojo-Hiryogaku Zasshi, v. 36, no. 7, p. 211–215 [in Japanese]. C.A. 64 : 9459 c. AnC, In_{Pe}, $MeDf_{Pe}$.

Okano, Masaharu. *See* Yamazaki [Yamasaki], Fumio.

O10 **Okano, Masaharu,** 1961, Liquid scintillation counting of tritium : Tokyo, Japan, 4th Japan Conf. on Radioisotopes, Oct. 10–12, 1961, Proc., p. 710–712 [in Japanese]. N.S.A. 17 : 29986. Ge of : AnC.

O11 **Okita, G. T., Kabara, J. J., Richardson, Florence, and LeRoy, G. V.,** 1957, Assaying compounds containing tritium and carbon-14 : Nucleonics, v. 15, no. 6, p. 111–114. C.A. 51 : 13597 d ; N.S.A. 11 : 9008. AnC, In.

O12 **Okita, G. T., and Spratt, J. L.,** 1961, Determination of radiotracer stability of tritium-labeled compounds in biological studies, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series : Vienna, Austria, Internat. Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc. U.S. Atomic Energy Comm. Pub., ACRH–16, p. 50–53. N.S.A. 16 : 8526. An, MeDf, SeAd.

O13 **Okita, G. T., Spratt, J. L., and LeRoy, G. V.,** 1956, Liquid-scintillation counting for assay of tritium in urine : Nucleonics, v. 14, no. 3, p. 76–79. An, BiZ.

Olive, Philippe. *See* Blavoux, Bernard.

Olive, Ph. *See* Fontes, J. C.

O14 **Oliver, R., and Lajtha, L. G.,** 1960, Hazard of tritium as a deoxyribonucleic acid label in man : Nature, v. 186, p. 91–92. N.S.A. 14 : 12485. Ha.

O15 **Oliverio, V. T., Denham, Charlene, and Davidson, J. D.,** 1962, Oxygen flask combustion in determination of C^{14} and H^3 in biological materials : Anal. Biochemistry, v. 4, p. 188–189. C.A. 58 : 737 a ; N.S.A. 16 : 31841. AnC, BiC, BiZ.

O16 **Olivieri, G., and Brewen, J. G.,** 1966, Evidence for nonrandom rejoining of chromatid breaks and its relation to the origin of sister-chromatid exchanges : Mutation Research, v. 3, p. 237–248 ; U.S. Atomic Energy Comm. Pub., ORNL–P–1673. N.S.A. 20 : 38649. BiC, Ha, SeAd.

Olson, E. A. *See* Chatters, R. M.

O'Neal, Denny. *See* Wood, F. W.

O17 **Ono [Ohno] Akira, and Morimitsu, Wataru,** 1961, The determination of gaseous tritium compounds with a proportional counter : Tokyo, Japan, 4th Japan Conf. on Radioisotopes, Oct. 10–12, 1961, Proc., p. 713–716 ; U.S. Atomic Energy Comm. Pub., AEC–tr–5639, 15 p. [includes original 4 p.]. AnC.

Oppenheim, Irwin. *See* Johnson, V. R.

O18 **Oppenheim, Irwin, and Friedman, A. S.,** 1961, Quantum statistical mechanics of isotope effects : Jour. Chem. Physics, v. 35, p. 35–40. C.A. 56 : 942 h. Is, ThS.

Orlob, G. T. *See* Kaufman, W. J.

O19 **Ormos, Gyorgy, and Csanyi, Piroska (Mrs. Fodor),** 1963, Determination of isotopes emitting soft β-rays by liquid scintillators in single-channel measuring instruments ; I, The noise caused by the electron multiplier, the cuvet, and the phosphorescence of the solvent : Magyar Kémiai Folyóirat, v. 69, p. 198–203. C.A. 59 : 7128 d. AnC.

Osborne, A. R. *See* Barclay, F. R.

Osborne, A. R. *See* Goldsmith, P.

O20 **Osborne, D. W., ed.,** 1950, Chemistry Division, Section C–1, Summary report for January, February, and March 1950: U.S. Atomic Energy Comm. Pub., ANL–4469 (Del. 2) [Declassified with deletions], 63 p. [1957]. N.S.A. 12: 12215. An, Se.

Oshima, Yotaro. *See* Nishiwaki, Yasushi.

O21 **Oinski, P. A.,** 1960, Detection and determination of tritium-labeled compounds on paper chromatograms: Internat. Jour. Appl. Radiation and Isotopes, v. 7, 306–310 [in English]. AdC, AnC.

O22 **O'Steen, W. K., and Walker, B. E.,** 1960, Radioautographic studies of regeneration in the common newt: I, Physiological regeneration: Anatomical Rec., v. 137, p. 501–509. AnC, BiC, BiZ, InBi.

O23 **O'Steen, W. K., and Walker, B. E.,** 1961, Radioautographic studies of regeneration in the newt: II, Regeneration of the forelimb: Anatomical Rec., v. 139, p. 547–555. AnC, BiC, BiZ, InBi.

O24 **O'Steen, W. K., and Walker, B. E.,** 1962, Radioautographic studies of regeneration in the common newt: III, Regeneration and repair of the intestine: Anatomical Rec., v. 142, p. 179–188. AnC, BiC, BiZ, InBi.

O25 **Östlund [Oestlund], H. G.,** 1961, A hydrogen gas counting system for natural tritium measurements, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 333–341 [1962]. C.A. 57: 9427 h; N.S.A. 16: 16100. AnC, In_{atm}, SeAd.

O26 **Östlund [Oestlund], H. G.,** 1965a, 1964 hurricane tritium: U.S. Atomic Energy Comm. Pub., Accession 519, CONF–650652–5, 6 p. [in English]. C.A. 65: 8605 a. Ab_{atm}, AbG_{atm}, In_{atm}, $MeDf_{atm}$.

O27 **Östlund [Oestlund], H. G.,** 1965b, 1964 hurricane tritium, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 560–564. Ab_{atm}, In_{atm}.

O28 **Östlund [Oestlund], H. G., Brown, R. M., and Bainbridge, A. E.,** 1964, Standardization of natural tritium measurements: Tellus, v. 16, p. 131–134. N.S.A. 18: 41660. AnC.

O29 **Östlund [Oestlund], H. G., and Lundgren, L. B.,** 1964, Stockholm natural tritium measurements, I: Tellus, v. 16, p. 118–130. N.S.A. 18: 41659. Ab_{atm}, Ab_{sw}, Ab_{gw}, Ab_{ocean}, AbG_{atm}, AnC, In_{atm}, In_{sw}, In_{gw}, In_{ocean}, In_{snow}, InA_{atm}, InA_{gw}, InA_{snow}, InBi, Sa, Sy.

O30 **Östlund [Oestlund], H. G. and Werner, O. E.,** 1961, The electrolytic enrichment of tritium and deuterium for natural tritium measurements, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 95–104 [1962]. C.A. 57: 16319 e: N.S.A. 16: 16083. AnC, IsKi, SeAd, SeEl.

Otlet, R. L. *See* Allen, R. A.

O31 **Otsuka, Iwao,** 1965, Utilization of radioisotopes: Genshiryoku Kogyo, v. 11, no. 4, p. 33–36. N.S.A. 19: 39060. Ge of: In.

Owens, D. R. *See* Phillips, T. R.

P

P1 **Pace, N. Kline, L. Schachman, H. K., and Harfenist, M.,** 1947, Studies on body composition: IV, Use of radioactive hydrogen for measurement

in vivo of total body water: Jour. Biol. Chemistry, v. 168, p. 459–469. C.A. 41:5567 b. AnC, InBi, NuR, Sy.

P2 **Paerisch, M., Buettner, K., Langer, H., and Bothe, H.-K.,** 1964, Determinations of body water in humans with the aid of tritium: Archiv. Gesamte Physiologie, v. 281, p. 374–378 [in German]. N.S.A. 19:19480. AnC, BiC, BiZ, Ha, InBi.

P3 **Paganelli, C. V., and Solomon, A. K.,** 1957, Rate of exchange of tritiated water across the human red-cell membrane: Jour. Gen. Physiology, v. 41, p. 259–277. C.A. 52:5593 c. AbO, BiZ, Ha, MeDf.

Painter, R. B. *See* Drew, R. M.

P4 **Painter, R. B., and Drew, R. M.,** 1959, Studies on deoxyribonucleic acid metabolism in human cancer-cell cultures (HeLa): I. The temporal relationships of deoxyribonucleic acid synthesis to mitosis and turnover time: Lab. Inv., v. 8, p. 278–285. N.S.A. 13:7413. An, BiZ, InBi, KiR.

P5 **Painter, R. B., Drew, R. M., and Hughes, W. L.,** 1958, Inhibition of HeLa growth by intranuclear tritium: Science, v. 127, p. 1244–1245. N.S.A. 12:9615. BiC, InBi.

P6 **Painter, R. B., and Robertson, J. S.,** 1959, Effect of irradiation and theory of role of mitotic delay on the time course of labeling of HeLa S^3 cells with tritiated thymidine: Radiation Research, v. 11, p. 206–217. N.S.A. 13:18842. BiZ, Ha, KiB.

Pal, Yash. *See* Daniel, R. R.

P7 **Panaretto, B. A.,** 1960, Use of antipyrine, N-acetyl-4 aminoantipyrine and tritium for the estimation of body water and gut water in living ruminants: Ann Arbor, Mich., Univ. Michigan Microfilms, L. C. Card Mic. 60–2340, 115 p. C.A. 55:1761 b. InBi.

P8 **Paneth, F. A.,** 1959, Meteorite of Breitscheid, Pt. 1: Geochim. et Cosmochim. Acta, v. 17, p. 315–319 [in German]. N.S.A. 14:24361. AbG_{atm}, AbG_{met}, AnC.

Papadimitropoulos, T. *See* Burdon, D. J.

Papageorgiou, S. *See* Blim Stoyle, R. J.

Papakis, N. *See* Burdon, D. J.

Pardee, A. B. *See* Rachmeler, Martin.

Parham, A. G. *See* Brown, F.

Parks, G. *See* Kaufman, W. J.

P9 **Parsons, P. J.,** 1960, Movement of radioactive wastes through soil: I, Soil and groundwater investigations in lower Perch Lake basin: Chalk River, Ontario, Canada, Atomic Energy of Canada, Ltd., Pub., AECL–1038, 51 p.: Sci. Doc. Distrib. Office, CRER–932, 51 p. C.A. 54:2549 i. In_{hy}, In_{gw}, InA_{Pe}, InA_{gw}, $MeDf_{gw}$, $MeDf_{Pe}$, $SeAd_{Pe}$.

P10 **Parsons, P. J.,** 1963, The movement of tritium from the Chalk River liquid disposal area: Chalk River, Ontario, Canada, Atomic Energy of Canada, Ltd., Pub., AECL–1739, 16 p.: Sci. Doc. Distrib. Office, CRER–1146, 16 p. N.S.A. 17:29866. Ab_{gw}, In_{gw}, In_{hy}.

Parsons, R. J. *See* Prentice, T. C.

P11 **Parups, E., Hoffman, I., and Jackson, H. R.,** 1960, Scintillation radioautography of tritium-labeled compounds on paper chromatograms: Talanta, v. 5, p. 75–77. C.A. 55:3268 i. AnC.

P12 **Patterson, M. S., and Greene, R. C.,** 1965, Measurement of low-energy β-emitters in aqueous solution by liquid scintillation counting of emulsions: Anal. Chemistry, v. 37, p. 854–857. N.S.A. 19:30095. AnC, Sy.

Patterson, R. E. See Mattraw, H. C.

Paul, C. M. *See* Christman, D. R.
Payne, B. R. *See* Burdon, D. J.
Payne, B. R. *See* Cameron, J. F.
Payne, B. R. *See* Davis, G. H.
Payne, B. R. *See* Peckham, A. E.
Payne, B. R. *See* Seligman, H.
Payne, B. R. *See* Thatcher, L. L.

P13 **Payne, B. R., Cameron, J. F., Peckham, A. E., and Thatcher, L. L.,** 1964, The role of radioisotope techniques in hydrology: Vienna, Austria, Internat. Atomic Energy Agency Proc., U.S. Atomic Energy Comm. Pub., A/CONF .28/P/875, 20 p. Ge of: In_{Hy}.

P14 **Payne, B. R., and Dincer, Turgut,** 1965a, Isotope survey of the karst region of southern Turkey: U.S. Atomic Energy Comm. Pub., Accession 538, CONF–650652–2, 15 p. [in English]. C.A. 65: 10323 g. Ab_{gw}, Ab_{sw}, In_{gw}, In_{sw}, In_{Hy}, In_{atm}, InA_{gw}, InA_{sw}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{Hy}$.

P15 **Payne, B. R., and Dincer, Turgut,** 1965b, Isotope survey of the karst region of southern Turkey, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 671–686. Ab_{gw}, Ab_{sw}, In_{sw}, In_{gw}, In_{Hy}, In_{atm}, InA_{gw}, InA_{sw}, $MeDf_{sw}$, $MeDf_{gw}$, $MeDf_{Hy}$, $MeDf_{atm}$.

Payne, P. R. *See* Campbell, U. G.
Payne, P. R. *See* White, D. F.

P16 **Payne, P. R., Campbell, I. G., and White, D. F.,** 1952, Combustion of tritium-labeled organic compounds: Jour. Biochemistry, v. 50, p. 500–502. C.A. 46: 3334 g. Ge of: AnC.

P17 **Payne, P. R., and Done, J.,** 1958, Routine assay of tritium in water and labeled substances in the range of 20 to 10^4 $\mu\mu$c [micromicrocurie]: Physics in Medicine and Biology, v. 3, p. 16–26. C.A. 52: 19721 i; N.S.A. 12: 16962. AnC, In.

Peabody, C. O. *See* Bishop, K. F.
Peckham, A. E. *See* Payne, B. R.

P18 **Peckham, A. E., and Belter, W. G.,** 1962, Considerations for selection and operation of radioactive waste-burial sites: U.S. Atomic Energy Comm. Pub., TID–7628, p. 428–436. C.A. 58: 1235 de. Ad, Ha, In, MeDf.

P19 **Peckham, A. E., and Lieberman, J. A.,** 1961, Research in ground-water hydrology and its relation to nuclear-energy wastes: Cincinnati, Ohio, U.S. Dept. of Health, Education, and Welfare Symposium on Groundwater Contamination, Apr. 5–7, 1961, sess. 5, p. 198–202. AdC, In_{gw}, In_{Pc}, $MeDf_{gw}$, $SeAd_{gw}$, $SeAd_{Pc}$, ThSo.

P20 **Peckham, A. E., and Payne, B. R.,** 1965, Isotope investigations of the hydrology of Lake Chala and its associated ground-water system, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 687–697. InA_{sw}, InA_{gw}.

Peets, E. *See* Buyske, D. A.
Peets, E. A. *See* Kelly, R. G.

P21 **Peets, E. A., Florini, J. R., and Buyske, D. A.,** 1960, Tritium radioactivity determination of biological materials by a rapid dry-combustion technique: Anal. Chemistry, v. 32, p. 1465–1468. N.S.A. 15: 40. AnC.

P22 **Pellerin, P., Fallot, P., Laine-Boszormenyi, and Serrel, F.,** 1960, Adaptation de l'autoradiographie à basse température à la détection du tritium

par élimination d'une luminescence parasite [Adaptation of low-temperature autoradiography to tritium detection by elimination of interfering luminescence]: Saclay, France, Comm. à l'Énergie Atomique, Centre d'Études Nucléaires Rap., CEA–1675, 14 p. [in French]. N.S.A. 15: 12834. AnC, InBi, Kip, MeDf, SpFl.

P23 **Peng, C. T.,** 1960, Quenching of fluorescence in liquid scintillation counting of labeled organic compounds: Anal. Chemistry, v. 32, p. 1292–1296. C.A. 55: 148 c, C.A. 62: 4595 c. AnC.

P24 **Peng, C. T.,** 1964, Correction of quenching in liquid scintillation counting of homogeneous samples containing both carbon-14 and tritium by extrapolation method: Anal. Chemistry, v. 36, no. 13, p. 2456–2461. C.A. 62: 4595 c, C.A. 55: 148 c; N.S.A. 19: 4067. AnC, AnMs.

P25 **Penna-Franca, Eduardo,** 1960, Analysis of radioactive contaminants in biological materials: Buenos Aires, Argentina, 2d Inter-Am. Symposium on Peaceful Application of Nuclear Energy Proc., p. 65–75. C.A. 56: 9055 c. AbO, Ad, EqL, Ge, Ha, InBi, Is.

P26. **Perkins, R. W., and Nielsen, J. M.,** 1965, Cosmic-ray-produced radionuclides in the environment: Health Physics, v. 11, no. 12, p. 1297–1304. C.A. 64: 15290 g. AbG.

Perkins, W. H. *See* Lohmann, W.

Perkins, W. H. *See* Shapiro, Jacob.

Perri, G. C. *See* Eidinoff, M. L.

P27 **Perri, G. C., Eidinoff, M. L., Knoll, J. E., and Marano, B. J.,** 1954, Preferential utilization of isotopes of hydrogen in biological systems: Boll. Soc. Italiana Biologia Sperimentale, v. 30, p. 134–135. C.A. 48: 10074 a. BiC, InBi.

Perschke, H. *See* Crespi, M. B. A.

P28 **Person, Stanley,** 1963, Comparative killing efficiencies for decays of tritiated compounds incorporated into *E. coli*: Biophys. Jour., v. 3, p. 183–187. N.S.A. 17: 23108. BiB, InBi, KiR.

P29 **Person, Stanley, and Bockrath, R. C., Jr.,** 1964, Differential mutation production by the decay of incorporated tritium compounds in *E. coli*: Biophys. Jour., v. 4, p. 355–365. N.S.A. 18: 38813. BiB, InBi.

P30 **Person, Stanley, and Lewis, H. L.,** 1962, Effects of decay of incorporated H^3–thymidine on bacteria: Biophys. Jour., v. 2, p. 451–463. N.S.A. 17: 5793. BiB, BiC, InBi, KiB.

Peter-Juergen, Meyer. *See* Ziegler, Albert.

Peters, B. *See* Lal, Devendra.

P31 **Peters, B.,** 1959a, Progress in cosmic-ray research since 1947: Jour. Geophys. Research, v. 64, no. 2, p. 155–173. AbG_{atm}, In_{atm}, In_{ocean}, In_{gw}, In_{sw}, InA, $MeDf_{atm}$, NuB.

P32 **Peters, B.,** 1959b, Use of cosmic-ray-produced isotopes for studying large-scale circulations in the atmosphere, *in* Landsberg, H. E., and van Mieghem, J., eds., Advances in geophysics: New York, Academic Press, p. 289–296. C.A. 54: 3810 i. MeDf.

P33 **Peterson, D. F.,** 1961, The growth of monodisperse populations of mammalian cells exposed to internal beta radiation: U.S. Atomic Energy Comm. Pub., TID–13613, 18 p. N.S.A. 17: 5773. BiC, BiZ, Ha, InBi.

Peterson, R. A., *See* Isbell, H. S.

P34 **Pethe, V. A., and Sangodkar, D. B.,** 1964, Dependence of efficiency of a coincidence tritium counter on photocathode sensitivity: Nuclear Instru-

ments and Methods, v. 30, no. 2, p. 306–308. C.A. 61:15630 h–z, C.A. 61:15631 a. AnC.

P35 **Petrozzi, Enrico,** 1963. Determination of tritium and C^{14} with liquid scintillators: Minerva Nucleare, v. 7, no. 3, p. 91–103 [in Italian]. C.A. 59:4755 g; N.S.A. 17:25637. AdC; Ge of; AnC; Ha, In, SpFl, Sy.

P36 **Phillips, T. R., and Owens, D. R.,** 1963. The analysis by gas chromatography of hydrogen isotopes and mixtures containing hydrogen and helium: U.S. Atomic Energy Comm. Pub., PG–Report–419, 13 p. N.S.A. 16:14149. AdC, An, EqH.

P37 **Picciotto, Edgard, Crozaz, G., and De Brueck, W.,** 1964, Rate of accumulation of snow at the South Pole as determined by radioactive measurements: Nature, v. 203, p. 393–394. Ab, InA, MeDf.

P38 **Picciotto, Edgard, and Wilgain, S.,** 1963, Fission products in Antarctic snow—A reference level for measuring accumulation: Jour. Geophys. Research, v. 68, p. 5965–5972. Ab_{snow}, InA_{snow}, $MeDf_{snow}$.

P39 **Pichat, L., Sharefkin, D., and Herbert, M.,** 1962, Method of preparing tritiated benzene for scintillation measurement of low-level tritium contents in hydrology: Saclay, France, Comm. à l'Énergie Atomique Rap., CEA–2234; Translated into English by E. R. Appleby, U.S. Atomic Energy Comm. Hanford Atomic Products Operation Pub., HW–tr–60, 13 p. N.S.A. 18:4934. AnC, In, SeAd, Sy.

P40 **Pickworth, J. W., Cotton, K., and Skyring, A. P.,** 1963. Double-emulsion autoradiography for identifying tritium-labeled cells in sections: Stain Technology, v. 38, p. 237–244. N.S.A. 18:11566. AnC, InBi, Sy.

Piet, G. J. *See* Cramer, W. A.

Pietig, F. *See* Scharpenseel, H. W.

P41 **Piez, K.,** 1963. Continuous scintillation counting of weak beta emitters in flowing aqueous streams: Nuclear-Chicago Tech. Bull. 15. N.S.A. 19:24462. AdC, AnC, In.

Pileri, A. *See* Gavosto, F.

P42 **Pillinger, W. L.,** 1961a, Radiometric assay by precision calorimetry: U.S. Atomic Energy Comm. Pub., TID–7615, p. 90–101. C.A. 56:4549 e; N.S.A. 16:3273. An, IsTh, No, NuR.

P43 **Pillinger, W. L.,** 1961b, Tritium decay energy: Phys. Rev., v. 121, p. 232–233. C.A. 55:7087 b. AnCl, InA, NuB, Th.

Pines, J. *See* Morrison, P.

P44 **Pinson, E. A.,** 1952, Water exchanges and barriers as studied by the use of hydrogen isotopes: Physiol. Rev., v. 32, p. 123–134. C.A. 46:8229 e. BiC, EqL, InBi, MeDf, SeAd.

P45 **Pinson, E. A., and Langham, W. H.,** 1957, Physiology and toxicology of tritium in man: Jour. Applied Physiology, v. 10, 108–126. C.A. 51:12357 gh; N.S.A. 11:6226. AbO, BiZ, Ha, InBi, NuIn, SeDf.

Piper, E. A. *See* James, A. T.

Pirogov, Yu. A. *See* Bernotas, V. I.

P46 **Pittendrigh, L. W. D., and Vousden, J. E.,** 1954, Differential ionization chamber method for continuous-flow monitoring of tritium in air in the presence of a significant γ-background and with occasional traces of radon in the sampled air: Atomic Energy Research Lab. (Great Britain) Rept. HP/R 1585, 12 p. AnC, Bi.

Plebuch, R. R. *See* Mitsis, G. J.

Plonka, A. M. *See* Kroh, J.

Polach, H. A. *See* Taylor, C. B.

Pomerance, H. S. *See* Cannon, C. V.

P47 **Popják, G., Lowe, A. E., and Moore, D.,** 1961, Simultaneous measurement of C^{14} and H^3 during gas-liquid chromatography, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 127–146 [1963]. N.S.A. 17: 18484. AdC, KiP.

P48 **Popják, C., Lowe, A. E., and Moore, D.,** 1962, Scintillation counter for simultaneous assay of H^3 and C^{14} in gas-liquid chromatographic vapors: Jour. Lipid Research, v. 3, p. 364–371. N.S.A. 17: 22026. AdC, AnC.

P49 **Pople, J. A.,** 1953, The viscosity of isotopic substances: Physica, v. 19, p. 668. C.A. 48: 3740 e. Is, MeV.

P50 **Popov, M. M., Gagarinskiĭ, Yu. V., Senin, M. D., Mikhalenko, I. P., and Morozov, Yu. M.,** 1958, Average [mean] β-particle energy and decay constant of tritium: Soviet Jour. Atomic Energy, v. 4, p. 393–396 [English translation]. C.A. 53: 12872 i. AnCl, Nu.

Poretti, G. G. *See* Zuppinger, Adolph.

P51 **Porter, F. T.,** 1959, β-decay energy of tritium: Phys. Rev., v. 115, p. 450–453. C.A. 54: 8328 ab. NuB, NuM.

Porter, J. W. *See* Weinberger, D.

P52 **Porter, J. W., and Knauss, H. J.,** 1954, Inhibition of growth of *Chlorella pyrenoidosa* by β-emitting radioisotopes: Plant Physiology, v. 29, p. 60–63. C.A. 48: 6518 d. BiZ, InBi.

P53 **Porter, J. W., and Watson, M. S.,** 1954, Gross effects of growth inhibiting levels of tritium oxide on *Chlorella pyrenoidosa*: Am. Jour. Botany, v. 41, p. 550–555. C.A. 48: 12937 c. BiB, InBi.

Poss, H. L. *See* Bitter, F.

P54 **Post, Joseph,** 1963, Effects of tritium thymidine as a DNA label in the rat liver: U.S. Atomic Energy Comm. Pub., TID–19545, 6 p. N.S.A. 18: 45. BiZ, InBi.

P55 **Post, Joseph, and Hoffman, Joseph,** 1961, Some effects of tritiated thymidine as a deoxyribonucleic-acid label in the rat liver: Radiation Research, v. 14, p. 713–720. N.S.A. 15: 22124. BiC, BiZ, Sy.

Potter, R. M. *See* Dunn, F. J.

Potter, R. M. *See* McInteer, B. B.

Potter, R. M. *See* Robinson, E. S.

P56 **Powell, C. F.,** 1955, The primary cosmic radiation: Observatory, v. 75, p. 14–27. C.A. 49: 10078 h. AbG.

P57 **Powers, E. L., and Shefner, D.,** 1951, Tritium-induced effects in *Paramecium aurelia*: Soc. Experimental Biology Medicine Proc., v. 78, p. 493–497. C.A. 46: 2122 i. BiZ, InBi.

P58 **Pratt, T. H., and Wolfgang, Richard,** 1960, The self-induced exchange of tritium gas with methane, v. 3, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Conf. on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 16–17, 1960. Proc., p. 159–178 [1962]. C.A. 58: 953 h. AnC, Is, SeAd.

P59 **Pratt, T. H., and Wolfgang, Richard,** 1961, The self-induced exchange of tritium gas with methane: Am. Chem. Soc. Jour., v. 83, p. 10–17. N.S.A. 15: 7337. Is, Ki, NuB, SeAd.

P60 **Prensky, Wolf, and Smith, H. H.,** 1963, Incorporation of ^{3}H-arginine in chromosomes of *Vicia faba*: U.S. Atomic Energy Comm. Pub., BNL–7007, 13 p. N.S.A. 18: 19518. AnC, BiB, BiC, InBi.

P61 **Prentice, T. C., Siri, W., Berlin, N. I., Hyde, G. M., Parsons, R. J., Joiner, E. E., and Lawrence, J. H.,** 1952, Studies of the total body water with tritium: Jour. Clinical Inv., v. 31, p. 412–418. C.A. 46:1640 d. InBi.

Presson, T. L. *See* Baggett, Billy.

P62 **Price, A. H.,** 1958, Vapor pressure of tritiated water: Nature, v. 181, p. 262. C.A. 52:8660 e. ThSo.

P63 **Pro, M. J.,** 1962, Age determination of distilled spirits, *in* Ferrier, M. D., ed., Transactions of the American Nuclear Society, 1962 winter meeting, Washington, D.C., November 26–28, 1962 [Abs.]: Am. Nuclear Soc. Trans., v. 5, no. 2, p. 284. N.S.A. 17:3671. AbO, AnC, InA, InBi.

P64 **Pro, M. J., and Etienne, A. D.,** 1959, Dating distilled spirits: Jour. Assoc. Official Agr. Chemists, v. 42, no. 2, p. 386–392. C.A. 53:14410 h. AbO, AnC, InA, InBi.

P65 **Pro, M. J., Martin, W. L., and Etienne, A. D.,** 1961a, Tritium exchange between water and some aliphatic alcohols: U.S. Atomic Energy Comm. Pub., TID–13828, 9 p. C.A. 56:8250 a. An, SeAd, Sy.

P66 **Pro, M. J., Martin, W. L., and Etienne, A. D.,** 1961b, Tritium exchange between water and some aliphatic alcohols: Jour. Assoc. Official Agr. Chemists, v. 44, no. 4, p. 789. AbO, In, SeAd.

P67 **Prockop, D. J., and Ebert, P. S.,** 1963, A simple method for differential assay of tritium and carbon-14 in water-soluble biological materials: Anal. Biochemistry, v. 6, p. 263–271. C.A. 59:11878 c; N.S.A. 17:35353. AnC, InBi.

P68 **Pshezhetskii, S. Ya., and Dmitriev, M. T.,** 1957, Mechanism of some simple chemical reactions proceeding under the influence of ionizing radiations: Uspekhi Khim., v. 26, p. 725–767. C.A. 52:894 e. Ge, NuIn

Puckett, B. J. *See* Cameron, J. F.

Purcell, D. H. *See* Foster, R. R.

Q

Quastler, Henry. *See* Stein, O. L.

Quastler, Henry. *See* Wimber, D. E.

Q1 **Quazi, A. H.,** 1965, Influence of sample volume on weak β-counting efficiency in liquid scintillation counting: Naturwissenschaften, v. 52, p. 490–491. N.S.A. 20:5510. AnC, Sy.

R

Rachele, J. R. *See* Verly, W. G.

R1 **Rachinskii, V. V., and Lenskii, L. A.,** 1965a, The reciprocal action of tritium-labeled water and soil: Akad. Nauk Ukrain. Timiryazevskoi Sel'skokhoz. Izv. [Bulletin of the Timiryazev Agricultural Academy], v. 1, p. 133–144. C.A. 64:23 g. AdL, In_{gw}, In_{Pe}, Is_{Pe}, $MeDf_{gw}$, $MeDf_{Pe}$.

R2 **Rachinskii, V. V., and Lenskii, L. A.,** 1965b, Interaction between tritium-labeled water and soils: Akad. Nauk Ukrain. Timiryazevskoi Sel'skokhoz. Izv. [Bulletin of the Timiryazev Agricultural Academy]. v. 1965, no. 3, p. 218–236 [in Russian]. C.A. 63:9016 c. Ad, In, $SeAd_{Pe}$.

R3 **Rachinskii, V. V., and Lenskii, L. A.,** 1965c, Distribution and transfer of tritium in the system ion-exchange resin-water: Akad. Nauk Ukrain. SSR Teoreticheskie i Eksperimental'Naya Khimiya, ser. 1, no. 6, p. 785–795 [in Russian]. C.A. 64:11940 h. Ad, KiH, KiL, MeDf, SeAd, StD, ThD, ThP, ThSo.

R4 **Rachmeler, Martin, and Pardee, A. B.,** 1963, Loss of viability and β-[beta] galactosidase-forming ability as a consequence of tritium decay *in Escherichia coli*: Biochim. et Biophys. Acta, v. 68, p. 62–67 [in English]. N.S.A. 17: 14005. BiB, BiC, InBi, KiR.

R5 **Radoszewski, Thomasz,** 1962, Carbon-14 and tritium measurements with the aid of a liquid scintillation counter: Nukleonika, v. 7, p. 499–509 [in English]. C.A. 58: 8602 c; N.S.A. 17: 7957. AnC, Sy.

Rafter, T. A. *See* Taylor, C. B.

R6 **Rafter, T. A.,** 1959, Effect of atomic radiation: U.S. Atomic Energy Comm. Pub., A/AC.82/G/L.314, 6 p. C.A. 57: 11487 i; N.S.A. 14: 11825. AbG_{atm}, AbG_{sw}, AbG_{ocean}, Ha, InBi, $MeDf_{atm}$, $MeDf_{sw}$, $MeDf_{ocean}$, $SeAd_{ocean}$.

R7 **Rafter, T. A.,** 1965, Problems in the establishment of a carbon-14 and tritium laboratory, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7-11, 1965, Proc., p. 752–761. An, In, SeAd.

Rajagopalan, G. *See* Lal, Devendra.

Rama. *See* Athavale, R. N.

Rama. *See* Lal, Devendra.

R8 **Raney, Franklin, and Yoash, Vaadia,** 1965a, Movement of tritiated water in the root system of *Helianthus annuus* in the presence and absence of transpiration: Plant Physiology, v. 40, p. 378–382. N.S.A. 19: 31740. AbO, BiB, InBi, MeDf, SeAd.

R9 **Raney, Franklin, and Yoash, Vaadia,** 1965b, Movement and distribution of THO [tritium hydroxide] in tissue water and vapor transpired by shoots of *Helianthus* and *Nicotiana*: Plant Physiology, v. 40, p. 383–388. N.S.A. 19: 31471. AbO, BiB, InBi, MeDf, SeAd.

R10 **Rankama, Kalvero,** 1954, Isotope geology: New York, Pergamon Press, 535 p. Ge.

R11 **Rankama, Kalvero, and Sahama, Th. G.,** 1949, Geochemistry: Chicago, Ill., Chicago Univ. Press, 912 p. AbG.

R12 **Rarrick, H. L., and Tucker, G. E., Jr.,** 1959, An approximation of radiation dose resulting from an accidental release of tritium gas: U.S. Atomic Energy Comm. Pub., SCTM-406-59(33), 5 p. N.S.A. 14: 6547. Ha.

Rau, H. *See* Heusinger, H.

Rawson, D. S. *See* Allen, R. A.

Rawson, D. S. *See* Smith, D. B.

Reed, R. D. *See* Chen, Ru-yong.

R13 **Reed, R. D., Henderson, Douglas, and Chen, Ru-yong,** 1965, Isotopic effects in liquid hydrogen: Jour. Chem. Physics, v. 43, p. 1836–1838. N.S.A. 19: 38639. IsTh.

R14 **Reeder, H. O.,** 1963, Tritium used as a ground-water tracer between Lake McMillan and Major Johnson Springs, Eddy County, New Mexico: U.S. Atomic Energy Comm. Pub., TEI-839, 135 p. N.S.A. 18: 25684. Ab_{sw}, AbG_{atm}, AbG_{sw}, In_{gw}, In_{sw}, In_{hy}, InA_{Hy}, $MeDf_{sw}$.

R15 **Reeder, H. O.,** 1964, Tritium content as an indicator of age and movement of ground water in the Roswell basin, New Mexico: U.S. Geol. Survey Prof. Paper 501-C, p. C161–C163. AbG_{gw}, In_{hy}, InA_{gw}, $MeDf_{gw}$.

Reese, R. M. *See* Dibeler, V. H.

Reese, R. M. *See* Mohler, F. L.

R16 **Reichenbacher, W., and Klemm, A.,** 1964, Thermal diffusion in T_2–H_2, DT–H_2, and T_2–D_2: Zeitschr. Naturforschung, v. 19a, p. 1051–1057. N.S.A. 19: 2705. An, SeDf, ThD.

R17 **Reichert, S. O.,** 1962, Radionuclides in ground water at the Savannah River Plant waste-disposal facilities: Jour. Geophys. Research, v. 67, p. 4363–4374. N.S.A. 17: 4700. Ab_{sw}, In_{sw}, In_{Pe}, In_{gw}, $MeDf_{gw}$, $MeDf_{Pe}$, $SeAd_{Pe}$.

R18 **Reilley, C. N., and McLafferty, F. W.,** 1966, Advances in analytical chemistry, v. 5: New York, Intersci. Publishers, 398 p. Ge of: AnC.

R19 **Reinig, W. C., and Albenesius, E. L.,** 1963, Control of tritium health hazards at the Savannah River Plant: Am. Indus. Hygiene Assoc. Jour., v. 24, p. 276–283: U.S. Atomic Energy Comm. Pub., DPSPU–62–30–5, 16 p. C.A. 59: 10959 c: N.S.A. 17: 6309. An, BiB, BiC, BiZ, Ha, In_{atm}, In_{sw}, InBi.

Reisenauer, A. E. *See* Haney, W. A.

Reisenauer, A. E. *See* Nelson, R. W.

Renaud, André. *See* Oeschger, Hans.

R20 **Renaud, André, Schumacher, Ernst, Hughes, B., Oeschger, Hans, and Mühlemann, C.,** 1963, Tritium variations in Greenland ice: Jour. Geophys. Research, v. 68, no. 13, p. 3783. AbG_{snow}, AnC, In_{snow}.

R21 **Revinson, David,** 1956, Selected bibliography on analysis of certain radioactive elements in biological materials: U.S. Atomic Energy Comm. Pub., NYO–4702. 18 p. C.A. 51: 9728 d. Ge of: BiC (with 161 references).

Rhodehamel, E. C. *See* Carlston, C. W.

Richardson, Florence. *See* Okita, G. T.

R22 **Richmond, C. R., Furchner, J. E., and Langham, W. H.,** circa 1961, Estimation of maximum permissible concentrations of radioisotopes in water (MPC) from interspecies correlations, Part 1, Comparison of estimated and measured values for $zinc^{65}$ and tritium: U.S. Atomic Energy Comm. Pub., LAMS–2526, p. 25–33. N.S.A. 15: 23232. Ab, Ha.

R23 **Richmond, C. R., Trujillo, T. T., and Martin, D. W.,** 1960, Volume and turnover of body water in *Dipodomys deserti* (kangaroo rat) with tritiated water: Soc. Experimental Biology Medicine Proc., v. 104, p. 9–11. C.A. 54: 16589 d. InBi, MeDf, SeAd.

R24 **Richter, H. G.,** 1961, Investigation of a tritium-enrichment technique: U.S. Atomic Energy Comm. Pub., ORO–492, 22 p. N.S.A. 16: 451. An, SeAd, SeDf.

R25 **Riddiford, L. M.,** 1960, Autoradiographic studies of tritiated thymidine infused into the blastema of the early regenerate in the adult newt, *Triturus*: Jour. Experimental Zoology, v. 144, p. 25–32. AnC, BiC, BiZ, InBi.

Rietz, L. *See* Brues, A. M.

R26 **Riley, C. J., and Brooks, H.,** 1964, Correction for the separation of hydrogen isotopes during distillation in the determination of tritium: Talanta, v. 11, no. 5, p. 897–898. C.A. 60: 15378 g; N.S.A. 18: 25309. An, SeDs, Sy, ThP.

R27 **Ritzl, F.,** 1964, Methods for recording tritium: Elektromedizin, v. 9, p. 207–210. N.S.A. 19: 38552. Ge of: AnC.

Robbins, M. C. *See* Eutsler, B. C.

R28 **Robbins, M. C., Eutsler, B. C., and Mitchell, R. N.,** 1954, The calibration of tritium monitoring devices: U.S. Atomic Energy Comm. Pub., LA–1683 [declassified 1956], 22 p. N.S.A. 11: 2610. AnC.

R29 **Roberts, E. R.,** 1948, Measurement of stable-isotope abundance ratios—A review: Analyst, v. 73, p. 657–660. C.A. 43: 2861 h. Ab, AnDn, AnTh, Ge.

Roberts, J. P. *See* Burns, I.

Roberts, J. P. *See* Drury, T.

Robertson, J. S. *See* James, J. A.

Robertson, J. S. *See* Painter, R. B.

Robinson, C. V. *See* Wang, J. H.

R30 **Robinson, C. V.,** 1955, Improved methane proportional-counting method for tritium assay: Nucleonics, v. 13, no. 11, p. 90. AnC.

R31 **Robinson, C. V.,** 1957, Gas counting of tritium: New York, N.Y. Symposium on Tritium Tracer Applications, p. 17–20 [1958]. C.A. 53: 72 g. AnC.

R32 **Robinson, C. V.,** 1961, Gas counting of tritium, *in* Rothchild, Seymour, ed., Advances in Tracer Methodology, v. 1: New York, Plenum Press, p. 178–182 [1963]. C.A. 58: 9845 d; N.S.A. 17: 18489. Ge of: An (with 40 references).

R33 **Robinson, E. S., Briesmeister, A. C., McInteer, B. B., and Potter, R. M.,** 1960, Separation of tritium from hydrogen by thermal diffusion: U.S. Atomic Energy Comm. Pub., TID–6102, 20 p. Ab_{art}, AnC, MeDf, ThD.

Robinson, J. *See* Sedlet, J.

Rodegker, Waldtrout. *See* Sheppard, Herbert.

Rodgers, A. W. *See* Chamberlain, J.

R34 **Rodriguez, E. R.,** 1964, Colloquium on evaluation of body burden of radioisotopes in man [Internat. Atomic Energy Agency Symposium on Assessment of Radioactive Body Burdens in Man, held at Heidelberg, Federal Republic of Germany, May 11–16, 1964]: Energía Nuclear, v. 8, supp. A, no. 3, p. 3–9 [in Spanish]. N.S.A. 19: 46. BiC, Ha, InBi.

R35 **Roehrig, J. R., and Vanderschmidt, G. F.,** 1959, Advances in the design of vacuum gauges, using radioactive materials, *in* 6th National Symposium on Vacuum Technology Proceedings: New York, Pergamon Press, Inc., p. 82–84. N.S.A. 15: 7586. AnC, In_{atm}.

Roether, W. *See* Ehhalt, D.

Roether, W. *See* Israel, G. W.

Roether, W. *See* Münnich [Muennich], K. O.

Roether, W. *See* Vogel, J. C.

Roether, W. *See* Zimmermann, U.

R36 **Roether, W.,** 1966, Estimating the tritium input to ground water from wine samples, ground water and direct runoff contributions to Central European surface waters: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/7, 22 p. [in English]. Ab_{atm}, Ab_{ocean}, Ab_{gw}, AbO, BiB, In_{Pe}, In_{atm}, In_{gw}, In_{sw}, InA_{gw}, InA_{sw}, InBi, $MeDf_{atm}$.

R37 **Rogers, A. W.,** 1959, Autoradiography of tritium-labeled compounds on paper chromatograms: Nature, v. 184, supp. 10, p. 721. AdC, An.

R38 **Rogers, J. D., and Brickwedde, F. G.,** 1966, Comparison of saturated-liquid viscosities of low-molecular substances according to [the] quantum principle of corresponding states: Physica, v. 32, p. 1001–1018; U.S. Atomic Energy Comm. Pub., LA–DC–7546. C.A. 65: 3027 a; N.S.A. 20: 39940. MeV, ThP, ThSo.

Rogers, J. E. *See* Conway, W. D.

R39 **Rogers, L. R.,** 1963, The development of regulatory standards: Health Physics, v. 9, p. 1–5. N.S.A. 17: 14552. Ha.

Romanov, V. V. *See* Izrael, Yu. A.

R40 **Romanov, V. V., and Soĭfer, V. N.,** 1961, Apparatus for measurement of natural tritium: Yadernaya Geofiz. Sbornik Statei, p. 202–210 [1962]. C.A. 60: 4755 e. AnC, In.

Root, J. W. *See* Lee, J. K.

R41 **Rose, Arthur, and Rose, Elizabeth,** 1961, The condensed chemical dictionary, 6th edition: New York, Reinhold Publishing Corp., 1256 p. (See especially p. 1176–1177.) Ge, No.

Rose, Elizabeth. *See* Rose, Arthur.

Rosen, C.-G. *See* Ahnstroem, G.

R42 **Rosenblum, Charles,** 1959, Chemistry and application of tritium labeling: Nucleonics, v. 17, no. 12, p. 80–83. C.A. 54: 10551 d. Eq, Ge of: Sy; Ki. A summary of preparations and applications of T.

R43 **Rosenblum, Charles, and Meriwether, H. T.,** 1961, Experiences with tritiated compounds prepared by exposure to tritium gas, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 12–17 [1963]. N.S.A. 17: 18470. AdC, AnC, InBi, KiR, SeAd, Sy.

Rosenblum, Cynthia. *See* Myers. L. S., Jr.

Rosenqvist, I. Th. *See* Moum, J.

Ross, D. I. *See* Horton, J. H.

R44 **Rothchild, Seymour,** 1961a, Correlation of efficiency of labeling with chemical constitution, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 42–45 [1963]. N.S.A. 17: 18473. Ge of: An, Is.

R45 **Rothchild, Seymour,** 1961b, Tritium labeling by other methods, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 50–51 [1963]. N.S.A. 17: 18474. Ge of: AnC, IsKi, SeAd, SeEl, Sy.

R46 **Rothchild, Seymour, ed.,** 1963, Advances in tracer methodology, v. 1: 5th Ann. Symposium on Tracer Methodology (Oct. 20, 1961), and selected papers from the first Four Ann. Symposia and from issues of Atomlight, New York, Plenum Press, 340 p. N.S.A. 17: 18469. Ge of: AnC, AnMs, Ha, In, KiR, NuB (with 50 articles).

Rowland, F. S. *See* Fireman, E. L.

Rowland, F. S. *See* Hoff, W. J. Jr.

Rowland, F. S. *See* Kambara, T.

Rowland, F. S. *See* Lee, J. K.

R47 **Rowland, F. S.,** 1959, Ratio of HT/HTO in the atmosphere: Jour. Chem. Physics, v. 30, p. 1098–1099. C.A. 53: 17688 b. AbG_{atm}, Ki, Nu.

R48 **Rowland, F. S.,** 1962a, Syntheses with tritium, *in* Herber, R. H., ed., Inorganic Isotopic Symposium Proceedings: New York, W. A. Benjamin, Inc., p. 54–73. Ge.

R49 **Rowland, F. S.,** 1962b, Chemical states of radioactive atoms formed in the atmosphere: Utrecht, Netherlands, Paper presented at 1st Symposium on Trace Gases and Natural and Artificial Radioactivity. Ab_{atm}, KiR.

R50 **Rowland, F. S., Hathaway, L., and Kambara, T.,** 1960, The chemical effects of nuclear transformations in systems of geochemical interest: Internat. Atomic Energy Agency Symposium on Chemical Effects of Nuclear Transformations, held at Prague, Czechoslovakia, Oct. 1960, Proc., v. 2, p. 255–264 [in English, 1961]. N.S.A. 16: 11764. AbG_{atm}, AbG_{terr}, EqI, IsKi, Ki, ThF.

Rowlands, D. L. G. *See* Jones, J. R.

Roy, L. P. *See* Dyne, P. J.

R51 **Roy, L. P.,** 1962, Influence of temperature on the electrolytic-separation factor of hydrogen isotopes: Canadian Jour. Chemistry, v. 40, p. 1452. AnC, IsTh, SeEl.

Rubin, Meyer. *See* Thatcher, L. L.

Rubini, J. R. *See* Cronkite, E. P.

R52 **Rubini, J. R., Cronkite, E. P., Bond, V. P., and Fliedner, T. M.,** 1960, The metabolism and fate of tritiated thymidine in man: Jour. Clinical Investigation, v. 39, p. 909–918. N.S.A. 14: 15504. BiC, BiZ, Ha, InBi.

R53 **Rubini, J. R., Keller, S., and Cronkite, E. P.,** 1963, *In vitro* DNA labeling of bone marrow and leukemic blood leukocytes with tritiated thymidine: I, Physical and chemical factors which affect autoradiographic cell labeling: U.S. Atomic Energy Comm. Pub., BNL–7916, 46 p. N.S.A. 19: 17398. Ge of: BiC, InBi.

Ruby, P. *See* Guizeriz, J.

Rudran, Kamala. *See* Kamath. P. R.

Rutschmann, J. *See* Kalberer, F.

R54 **Rydberg, Jan,** 1958, Determination of the absolute activity of solid tritium samples: Acta Chemica Scandinavica, v. 12, p. 399–407 [in English]. C.A. 53: 14747 g. AnC, Sy.

R55 **Ryōichi, Itō, Nozaki, Tadashi, Nakamura, Asao, Morikawa, Naotake, and Simamura, Osamu,** 1961, Radioassay of labeled organic compounds using gaseous samples; III, Conversion of tritiated water into butane-1-^{3}H and its gas counting: Tokyo, Japan, Radioisotopes, v. 10, p. 302–309. N.S.A. 16: 8787. AnC, IsKi, SeAd, Sy.

S

Sadarangani, S. H. *See* Iyengar, T. S.

Sadarangani, S. H. *See* Soman, S. D.

Sahama, Th. G. *See* Rankama, Kalvero.

Salamon, Andras. *See* Csanyi, P. F.

S1 **Salmon, O. N.,** 1958, Method of separating hydrogen isotopes: U.S. Patent 2,863,526 (to U.S. Atomic Energy Comm.). N.S.A. 13: 8417. AdL, SeAd.

S2 **Salomon, Mark,** 1966, Isotope effects in mixtures of liquid H_2O and T_2O: Canadian Jour. Chemistry, v. 44, no. 6, p. 689–694. C.A. 64: 11929 d; N.S.A. 20: 16424. AnC, Eq, IsKi, KiI, KiR.

S3 **Samuels, L. D., Kisieleski, W. E., and Baserga, Renato,** 1964, Tritiated thymidine toxicity in mammalian systems: Atompraxis, v. 10, p. 144–148. N.S.A. 18: 17424. Ge of: BiC, BiZ, Ha, InBi.

S4 **Sandalls, J.,** 1961, A method for routine determinations of tritium in urine using a coincidence liquid scintillation counter: Harwell, Berks, England, United Kingdom Atomic Energy Authority, Atomic Energy Research Establishment Pub., AERE–R–3716, 15 p. N.S.A. 15: 29114. AnC, Ha.

Sandoval, Paula. *See* Bainbridge, A. E.

Sangodkar, D. B. *See* Pethe, V. A.

S5 **Sannes, F., and Banville, B.,** 1965, Portable tritium-in-air monitor: U.S. Atomic Energy Comm. Pub., Accession 4235, AECL–2283, 19 p. C.A. 65: 11712 d. AnC, Ha, In_{atm}.

Santoro, Vittoria. *See* Marcuzzi, Giorgio.

S6 **Santoro, Vittoria,** 1959, Determination of tritium by measurement of radioactivity with high precision with a Geiger-Müller counter: Gazz. Chim. Italiana, v. 89, p. 2102–2110 [in Italian]; Saclay, France, Comm. à l'Énergie Atomique Rap., CEA–tr–X–315, 27 p. (includes original 10 p.). C.A. 55: 3217 a; N.S.A. 16: 8686. AnC.

Sasaki, T. *See* Seimiya, T.

Satchell, D. P. N. *See* Gold, V.

Sato, Yoshishige. *See* Yamada, Kiyoteru.

S7 **Scales, B.,** 1963, Liquid scintillation counting—The determination of background counts of samples containing quenching substances: Anal. Biochemistry, v. 5, p. 489–496. N.S.A. 17: 25606. AnC, InBi.

Schaad, L. J. *See* Swain, G. C.

Schachman, H. K. *See* Pace, N.

S8 **Schaeffer, O. A., and Hastings, J. M.,** 1950, Isotope effect on bond rupture by electron impact on hydrogen, deuterium, and tritium: Jour. Chem. Physics, v. 18, p. 1048–1050. Physics Abs. 53: 8800. IsMs, Sr.

S9 **Schafer, K.,** 1947, Physical chemical differences of isotopes: Angew. Chemie, v. A59, p. 42–48. C.A. 41: 5792 e. Eq, Ge, Is, Ki, SeEl, Sp, Th.

S10 **Scharpenseel, H. W.,** 1959, Direct tritium and carbon-14 labeling and liquid-scintillation spectrometry: Angew Chemie, v. 71, p. 640. C.A. 54:8312 e. AnC, Sy.

S11 **Scharpenseel, H. W.,** 1960, Preparation and purification of gray and brown humic acid samples labeled with tritium—Purpurogallin: Zeitschr. Pflanzenernähr., Düngung Bodenkunde, v. 91, p. 131–146. C.A. 55: 11738 bc. Ab_{Pe}, AdC, An, In_{Pe}, KiR, Sy.

S12 **Scharpenseel, M. W.,** 1961a, Combined gas chromatography and radioacticity measurement for the determination of C^{14}– and H^3–labeled substances: Angew. Chemie, v. 73, p. 615–619. C.A. 56:3295 g. AdC, AnC.

S13 **Scharpenseel, H. W.,** 1961b, Effects of various material conditions on measurement yields in liquid-scintillation spectroscopy: Atompraxis, v. 7, p. 178, 181. C.A. 55:26736 cd; N.S.A. 15: 20867. AnC.

S14 **Scharpenseel, H. W., and Gewehr, H.,** 1960, Studies with tritium-labeled water of the water movement in the soil: Zeitschr. Pflanzenernähr., Düngung Bodenkunde, v. 88, p. 35–49. C.A. 55: 10767 b. In_{gw}, In_{Pe}, In_{hy}, InA, InBi.

S15 **Scharpenseel, H. W., and Menke, K. H.,** 1961a. Radio column chromatographic assay of H^3[tritium]-labeled substances, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 281–302 [1962]. N.S.A. 16: 16096. AdC, AnC, Sy.

S16 **Scharpenseel, H. W., and Menke, K. H.,** 1961b, Radiochromatography with weak β rays from S^{35}, C^{14}, and H^3, part II *of* Radio column chromatography with a liquid-scintillation spectrometer: Zeitschr. Anal. Chemie, v. 182, p. 1–10, C.A. 55: 24395 i. AdC, AnC, In.

S17 **Scharpenseel, H. W., and Pietig, F.,** 1965, Inorganic scintillators for measuring carbon–14 and tritium in column radiochromatographic flow cells: Atompraxis, v. 11, p. 98–101 [in German]. N.S.A. 19: 22118. Ge of: AdC, AnC.

Schjetne, K. G. *See* Sigmond, R. S.

Schmalz, B. L. *See* Hawkins, D. B.

S18 **Schmalz, B. L.,** 1962, National reactor testing station waste-disposal practices and programs: U.S. Atomic Energy Comm. Pub., TID–7628, p. 536–537. C.A. 58: 1234 g. Ha, In, MeDf.

S19 **Schmalz, B. L., and Keys, W. S.,** 1962, Retention and migration of radioactive isotopes in the lithosphere at the National Reactor Testing Station, Idaho: Saclay, France, Comm. à l'Énergie Atomique, Centre Nucléaires, Colloque sur la Retention et la Migration Internationale des Ions Radioactifs dans les Sols, p. 243–255 (discussion, p. 255–256) [in English, 1963]. C.A. 61: 436 g; N.S.A. 18: 17349. Ab_{sw}, Ab_{Pe}, Ab_{gw}, In_{sw}, In_{gw}, $MeDf_{gw}$, $SeAd_{Pe}$.

Schmidlin, P. *See* Goebel, K.

S20 **Schmidt, H. L.,** 1963, Determination of ^{14}C and ^{3}H in biological material: Atompraxis, v. 9, p. 349–356 [in German]. N.S.A. 17: 40737. AnC, InBi.

Schnieden, H. *See* Foy, J. M.

Schnös, M. *See* Caro, L. G.

S21 **Schoeller, H.,** 1959, Arid Zone hydrology—Recent developments: Paris, France, UNESCO, Arid Zone Research, part XII of Arid Zone Hydrology 125 p. Ab_{gw}, InA_{gw}, $MeDf_{gw}$.

Schölch, J. *See* Ehhalt, D.

S22 **Schram, Eric, and Lombaert, Robert,** 1962, Determination of tritium and carbon-14 in aqueous solution with anthracene powder: Anal. Biochemistry, v. 3, p. 68–74. C.A. 56: 9043 e: N.S.A. 16: 7490. AdC, AnC.

Schubach, K. *See* Zimmermann, U.

S23 **Schultz, Vincent, and Klement, A. W., Jr., eds.,** 1963, Radioecology: 1st Natl. Symposium on Radioecology, held at Colorado State Univ., Fort Collins, Colo., Sept. 10–15, 1961, Proc., New York, Reinhold Publishing Corp. *and*, Washington, Am. Inst. Biol. Sci., 759 p. N.S.A. 17: 33539. AbO; Ge of: Bi, In_{Pe}, InBi. (About 90 articles, and a total of 2,452 references.)

S24 **Schulze, Janos, and Long, F. A.,** 1962, A method for liquid scintillation counting utilizing ultrasonic extraction: Anal. Biochemistry, v. 4, p. 99–102. N.S.A. 16: 31839. AnC, In, KiH.

Schulze, P. E. *See* Wenzel, Martin.

S25 **Schulze, P. E., and Wenzel, Martin,** 1962, Automatic activity measurements during the separation of radioactive compounds by thin-layer chromatography: Agnew. Chemie Internat., v. 1, p. 580–582. N.S.A. 17: 21779. AdC, AnC, Sy.

Schumacher, Ernst. *See* Oeschger, Hans.

Schumacher, Ernst. *See* Renaud, André.

S26 **Schumacher, Ernst,** 1959, A mass spectrometer for chemical applications: Helvetica Chimica Acta, v. 42, p. 1248–1257 [in German]. C.A. 53: 17684 g. AnC, AnMs.

S27 **Schumacher, Ernst,** 1960, Geochemistry: VIII, Extraction [Recovery] apparatus for tritium in natural water [Treatment plant for tritium in natural water]: Helvetica Chimica Acta, v. 43, p. 1019–1032 [in German]; U.S. Atomic Energy Comm. Pub., NP–tr–607, 32 p. [English trans.]. C.A. 55: 14083 h; N.S.A. 15: 20667, N.S.A. 14: 21788. AbG_{snow}, AnC, SeEl.

Schumann, G. *See* Israel, G. W.

Schwarzer, D. *See* Fireman, E. L.

Schwebel, A. *See* Ziegler, C. A.

Schwendiman, L. W. *See* Healy, J. W.

Scully, N. J. *See* Chorney, W.

S28 **Seaborg, G. T.,** 1947, Artificial radioactive tracers. Applications to chemistry and medicine: Science, v. 105, p. 349–354. C.A. 41:3687 c. BiB, BiC, Ge, Ha, InBi, Nu, NuR.

S29 **Sedlet, J., Robinson, J., and Fairman, W.,** no date, A cobalt and a tritium incident at Argonne National Laboratory: U.S. Atomic Energy Comm. Pub., WASH–1023, p. 101–106. N.S.A. 14:2270. Ha, InBi, BiZ.

S30 **Segel, K.-H.,** 1961, Tritium in industry and technology: Isotopentechnik, v. 1, p. 169–171 [in German]; Saclay, France, Comm. à l'Énergie Atomique, Centre d'Études Nucléaires Rap., CEA–tr–A–1108, 13 p. N.S.A. 15:31087, N.S.A. 16:15048. Ge of: An, In.

S31 **Seimiya, T., Sekine, K., and Sasaki, T.,** 1965, Counting of tritium with a thin-windowed Geiger-Mueller counter tube: Jour. Sci. Instruments, v. 42, no. 12, p. 906–907 [in English]. C.A. 64:257 a. AnC.

Sekine, K. *See* Seimiya, T.

S32 **Seliger, H. H., Mann, W. B., and Cavallo, L. M.,** 1958, Average energy of sulfur-35 β decay: [U.S.] Natl. Bur. Standards Jour. Research, v. 60, Paper 2859, p. 447–450. NuR.

S33 **Seligman, H., Cameron, J. F., Cohen, M., Eriksson, Erik, and Payne, B. R.,** no date, Radioactive nuclides and their radiations as an important tool for the benefit of less developed areas: U.S. Atomic Energy Comm. Pub., NP–12679, 9 p. N.S.A. 17:20279. Ge of: In_{hy}, In_{Pe}, InBi, Is.

Sellschop, J. P. F. *See* Verhagen, B. Th.

Semal, M. *See* Baugnet-Mahieu, L.

Senin, M. D. *See* Popov, M. M.

S34 **Sepall, O., Lang, A. R. G., and Mason, S. G.,** 1961, Counter for measurement of tritium exchange in solids: Canadian Jour. Chemistry, v. 39, p. 827–834. C.A. 55:14096 b; N.S.A. 15:15790. AnC, Nu, SeAd.

S35 **Sepall, O., and Mason, S. G.,** 1960, Vapor-liquid partition of tritium in tritiated water: Canadian Jour. Chemistry, v. 38, p. 2024–2025. C.A. 55:7009 g; N.S.A. 15:1737. Ab_{Art}, MeSt, Se, SeDs, ThP, ThSo.

S36 **Sepall, O., and Mason, S. G.,** 1961, Hydrogen exchange between cellulose and water; I, Measurement of accessibility: Canadian Jour. Chemistry, v. 39, p. 1934–1943. C.A. 56:3691 e. Ad, InBi, SeAd.

Serrel, F. *See* Pellerin, P.

S37 **Setter, L. R., Hagee, G. R., and Straub, C. P.,** 1958, Analysis of radioactivity in surface waters—Practical laboratory methods: Am. Soc. Testing & Materials Spec. Tech. Pub. 235, p. 56–66. C.A. 53:16720 f. AnC.

Shaikh, M. U. *See* Jacobs, D. G.

Shal'nov, M. I. *See* Bogdanov, K. M.

Shalygin, V. A. *See* Zel'venskii, Ya. D.

Shan'gin, N. N. *See* Alekseev, F. A.

S38 **Shapira, Jacob, and Perkins, W. H.,** 1960, Liquid scintillation counting of aqueous solutions of C^{14} and tritium: Science, v. 131, p. 414–415. C.A. 54:23976 a; N.S.A. 14:8463. AnC, SeAd.

Shapiro, E. *See* Cannon, C. V.

Shapiro, E. M. *See* Jenks, G. H.

S39 **Shapiro, I. L., and Kritchevsky, D.,** 1964, The quenching of carbon-14 and tritium by organic solvents in two common liquid-scintillation solutions: Internat. Jour. Appl. Radiation and Isotopes, v. 15, p. 325–330. C.A. 61:7907 h; N.S.A. 18:29682. AnC.

Sharefkin, D. *See* Pichat, L.

S40 **Sharp, R. A., and Ellis, J. G.,** 1965, System design in low-background internal-gas-sample counting of carbon-14 and tritium, *in* Chatters, R. M.,

and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 17–28. An, InA, Ki.

S41 **Sharpe, J., and Stanley, V. A.,** circa 1961, The development of photomultiplier tubes for tritium counting: U.S. Atomic Energy Comm. Pub., CONF–182–22, 29 p. N.S.A. 18: 27806. AnC.

S42 **Sharpe, J., and Stanley, V. A.,** 1961, Photomultipliers for tritium counting, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 211–229 [1962]. C.A. 57: 10738 i; N.S.A. 16: 16092. AnC, KiP.

S43 **Shaw, D. F.,** 1955, An automatic instrument for controlling the tritium content of the air: Jour. Sci. Instruments, v. 32, p. 178–180. C.A. 54: 5177 h. An, Ha.

S44 **Shedlovsky, J. P.,** 1961, Cosmogenic manganese–53, aluminum–26, and beryllium–10 in iron meteorites and a search for terrestrial manganese–53: Princeton, N. J., Princeton Univ. thesis, 142 p. AbG_{atm}, AbG_{met}.

Shefner, D. *See* Powers, E. L.

S45 **Shen, S. P., Korff, S. A., and Neuburg, H. A. C.,** 1963, Tritium content of antarctic snow: Nature, v. 199, p. 60–61. N.S.A. 17: 28614. AbG_{snow}, In, InA_{snow}, $MeDf_{snow}$, $MeDf_{atm}$.

S46 **Sheppard, Herbert, and Rodegker, Waldtrout,** 1962a, Parr bomb combustion of tissues for carbon–14 and tritium analysis: Atomlight, v. 22, p. 1–3. C.A. 58: 10503 e. AnC, InBi, Sy.

S47 **Sheppard, Herbert, and Rodegker, Waldtrout,** 1962b, Determination of H^3 and C^{14} in biological materials using oxygen-bomb combustion: Anal. Biochemistry, v. 4, p. 246–251. C.A. 58: 4805 c; N.S.A. 16: 31552. AnC, InBi.

S48 **Sheppard, P. A.,** 1963, Atmospheric tracers and the study of the general circulation of the atmosphere: Repts. Prog. Physics, v. 26, p. 213–267. N.S.A. 18: 10617. Ge of: In_{atm}, $MeDf_{atm}$.

Sheppard, W. A. *See* Swain, G. C.

S49 **Shoemake, G. R., Fenimore, D. C., and Zlatkis, A.,** 1965, Radiation sources for ionization detectors in gas chromatography: Jour. Gas Chromatography, v. 3, no. 8, p. 285–286. C.A. 64: 8 a. AdC, AnC.

Shorter, R. G. *See* Titus, J. L.

Shtukkenberg, Yu. M. *See* Bogdanov, K. M.

S50 **Shtukkenberg, Yu. M.,** 1960, Primenenie tritiya v biologicheskikh isslodovaniyakah [Use of tritium in biological research]: Akad. Nauk Meditsinskikh SSSR. U.S. Atomic Energy Comm. Pub., A/AC.82/G/L.552, 84 p. N.S.A. 15: 15342. Ge of: AbG, AbO, AnC, Ha, InBi, Nu, SeAd (with 93 references).

S51 **Shushunov, V. A., and Andreev, B. J.,** 1958, The kinetic isotopic effect in the reaction of hydrogen and tritium with some metal oxides: Akad. Nauk SSSR Doklady, v. 121, p. 689–692 [in Russian]. N.S.A. 12: 16258. EqI, KiI, SeAd.

Sidei, Tunahiko. *See* Higashimura, Takenobu.

Siegel, O. *See* Zimmermann, U.

S52 **Sigmond, R. S., and Schjetne, K. G.,** 1961, A simple low-background photon coincidence detector for tritium liquid scintillation counting: Appl.

Sci. Research, Sec. B, v. 9, p. 93–101 [in English]. C.A. 55 : 23099 a ; N.S.A. 15 : 20864. AnC, KiP.

Signer, Peter. *See* Geiss, Johannes.

Simamura, Osamu. *See* Itō, Ryōiche.

Simamura, Osamu. *See* Ryōichi, Itō.

Simmel, E. B. *See* Eidinoff, M. L.

S53 **Simon, Helmut,** 1960, Beiträge zur methodik des arbeitens mit radioactiven isotopen in der organischen chemie und biochemie [Contribution to methods for working with radioactive isotopes in organic chemistry and biochemistry] : Berlin-Charlottenburg, Germany, Tech. Univ., 67 p. N.S.A. 14 : 18895. AnC, BiC, SeAd.

S54 **Simon, Helmut,** 1961, Work with tritium in organic and biochemistry : Angew. Chemie, v. 73, p. 481–487. C.A. 55 : 21183 g. Bi ; Ge (with 198 references).

S55 **Simon, Helmut,** 1963, The utilization of tritium in biochemistry : Deutsche Akad. Wiss. Berlin Abh., Kl. Medizin, v. 1963, no. 4, p. 273–282. C.A. 61 : 2077 a. Ge of : BiB, InBi.

S56 **Simon, Helmut,** 1964, Determination of carbon–14 and tritium in labeled compounds : German Patent 1,209,776 (Cl. G Oln) [1966]. C.A. 64 : 13720 ab. AnC.

S57 **Simon, Helmut, and Berthold, F.,** 1962, Measurement of weak β-emitters in the gas phase : Atomwirtschaft, v. 7, no. 10, p. 498–507. C.A. 60 : 12858 f. Ge of : AnC (with 67 references).

S58 **Simon, Helmut, Daniel H., and Klebe, J. F.,** 1959, Measurement of carbon–14 and hydrogen–3 in the gas phase : Angew. Chemie, v. 71, p. 303–308. C.A. 53 : 16733 c. AnC, Sy.

S59 **Simon, Helmut, Dorrer, H. D., Trebst, Achim,** 1964, Photosynthesis of *Chlorella* in tritiated water : Zeitschr. Naturforschung, v. 19b, no. 8, p. 734–744. C.A. 61 : 13635. BiB, InBi.

S60 **Simon, Helmut, and Trebst, Achim,** 1961, Tritium assimilation in some sugars during photosynthesis : Zeitschr. Naturforschung, v. 16b, p. 285–287. C.A. 55 : 27546 f ; N.S.A. 15 : 21953. AbO, AdC, BiB, InBi, KiP, MeDf, SeAd.

Simonet, Guy. *See* Coulon, André.

S61 **Simpson, J. A.,** 1960, The production of tritons and C^{14} in the terrestrial atmosphere by solar protons : Jour. Geophys. Research, v. 65, p. 1615–1616. $AbG_{atm.}$

Singer, S. F. See Galli, M.

S62 **Singer, S. F.,** 1960, Production of tritium in nuclear spallation : Geochim. et Cosmochim. Acta, v. 19, p. 216–217 [in English]. C.A. 55 : 278 a ; N.S.A. 14 : 24371. AbG, NuP.

S63 **Sirchis, J., ed.,** 1964, Preparation and bio-medical application of labeled molecules : Vienna, Austria, European Atomic Energy Community Symposium, May 23–29, 1964, Proc., EUR–2200.e, 514 p. ; U.S. Atomic Energy Comm. Pub., CONF–774, 514 p. N.S.A. 19 : 32260. AnC, Ha.

Siri, W. *See* Prentice, T. C.

S64 **Siri, W., and Evers, J.,** 1961, Tritium exchange in biological systems, *in* Tritium in the physical and biological sciences, v. 2 : Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 71–84 [1962]. C.A. 57 : 17232 f. AbO, BiC, Ha, InBi, MeDf, NuIn, SeAd.

S65 **Skauen, D. M.,** 1961, Tritium in ecology—A review, *in* Schultz, Vincent, and Klement, A. W., Jr., eds., Radioecology : 1st Natl. Symposium on

Radioecology, held at Colorado State Univ., Fort Collins, Colo., Sept. 10–15, 1961, Proc., New York, Reinhold Publishing Corp. *and*, Washington, Am. Inst. Biol. Sci., p. 603–609 [1963]. N.S.A. 17:33612. AbO. Ge of: Bi, InBi (with 155 references).

S66 **Skauen, D. M.,** 1963, The effects of tritium oxide on aquatic organisms: U.S. Atomic Energy Comm. Pub., TID–18499, 11 p. N.S.A. 17:19791. AbO, BiC, BiZ, MeDf, SeAd.

S67 **Skauen, D. M.,** 1964, The effects of tritium oxide on aquatic organisms—Final report: U.S. Atomic Energy Comm. Pub., NYO–3039–1, 17 p. N.S.A. 19:33. AbO, AnC, BiZ, Ha, In_{sw}, InBi, Sy.

S68 **Skibitzke, H. E.,** 1957, The use of radioactive tracers in hydrologic field studies of ground-water motion: Toronto, Canada, Internat. Union Geodesy and Geophysics, Gen. Assembly, 1957. Internat. Assoc. Sci. Hydrology, v. 2, p. 243–252 [1958]. InA_{gw}, $MeDf_{gw}$.

S69 **Skibitzke, H. E.,** 1960, Radioisotopes in the laboratory for studying ground-water flow: Helsinki, Finland, Gen. Assembly, Internat. Assoc. Sci. Hydrology, Pub. 52, p. 513–523. Ad_{gw}, InA_{gw}, In_{Hy}, $MeDf_{gw}$, $SeAd_{gw}$.

S70 **Skibitzke, H. E.,** 1962, The use of radioisotopes in the study of ground-water motion, *in* Ferrier, M. D., ed., Transactions of the American Nuclear Society, 1962 winter meeting, Washington, D.C., Nov. 26–28, 1962 [Abs.]: Am. Nuclear Soc. Trans., v. 5, no. 2, p. 275. N.S.A. 17:3655. In_{gw}.

Skyring, A. P. *See* Pickworth, J. W.

Smetana, F. See Kisieleski, W. E.

S71 **Smirnov, Yu. N.,** 1964, Formation of hydrogen and ^4He in the universe at the prestellar stage (in the Gamow model): Astron. Zhur., v. 41, no. 6, p. 1084–1089 [in Russian]. C.A. 62:11372 c. AbG.

Smith, C. *See* Yang, J. Y.

S72 **Smith, C. H., and Gevantman, L. H.,** 1964, The effect of selected diluent gases on the self-induced isotopic exchange between tritium and water vapor: San Francisco, Calif. [U.S.] Naval Radiolog. Defense Lab., Pub. AD 601367, 14 p. C.A. 62:3611 d. An, SeAd.

S73 **Smith, C. L.,** 1963, Radioactive substances in biological research: Strahlenschutz Forsch. Praxis, v. 3, p. 15–40 [in German]. C.A. 65:10955 h. Ge of: An; InBi, KiP.

Smith, D. B. *See* Allen, R. A.

Smith, D. B. *See* Clayton, C. G.

S74 **Smith, D. B., and Rawson, D. S.,** 1961, The reconcentration of tritium by distillation, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 105–120 [1962]. C.A. 57:10767 gh; N.S.A. 16:16084, An, SeAd, SeDs.

S75 **Smith, G. N., Emerson, R. J., Temple, L. A., and Galbraith, T. W.,** 1953, The oxidization of molecular tritium in mammals: Archives Biochemistry and Biophysics, v. 46, p. 22–31. C.A. 48:254 d. BiC, InBi.

S76 **Smith, G. N., and Marshall, R. O.,** 1952, Fixation of molecular tritium by bacterial suspensions: Archives Biochemistry and Biophysics, v. 39, p. 395–405. C.A. 47:634 e. AbO, BiC, InBi.

Smith, H. A. *See* Akhtar, Sayeed.

Smith, H. A. *See* Carter, E. H., Jr.

S77 **Smith, H. A., and Carter, E. H., Jr.,** 1961, The separation of hydrogen, tritium and tritium hydride by gas chromatography, *in* Tritium in the

physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 121–133 [1962]. N.S.A. 16: 16085. AnC, EcC, In, SeAd.

Smith, H. H. *See* Prensky, Wolf.

Smith, R. W. *See* Glascock, R. F.

S78 **Smulek, Wiktor,** 1959, Tritium, radioisotope of hydrogen: Nukleonika, v. 4, p. 371–380 [in Polish]. C.A. 54: 19191 d; N.S.A. 14: 4301. Ge of: Ab_{art}, In, Nu.

Smyth, D. G. *See* Banks, T. E.

S79 **Snell, J. F.,** 1961, Liquid scintillation counting of tritium in suspended materials, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 106–112 [1963]. C.A. 58: 10947 a; N.S.A. 17: 18480. AnC, InBi, Sy.

Sniegoski, L. T. *See* Isbell, H. S.

Soĭfer, V. N. *See* Alekseev, F. A.

Soĭfer, V. N. *See* Finkel'shtein, Ya. B.

Soĭfer, V. N. *See* Izrael, Yu. A.

Soĭfer, V. N. *See* Romanov, V. V.

S80 **Soĭfer, V. N.,** 1961, Method for determining natural tritium as a means for solving hydrogeological and hydrotechnical problems: Moscow, U.S.S.R., Radioaktivnye Izotopy i Yadernye Izlucheniya v Narodnom Khozyaistve SSSR Trudy, v. 4, p. 133–138. C.A. 57: 4479 ab. AnC, InA.

Sokolovskii, E. V. *See* Alekseev, F. A.

Sokolovskii, E. V. *See* Vasil'eva, N. A.

Soller, R. *See* Friedman, I.

Solomon, A. K. *See* Paganelli, C. V.

Soman, S. D. *See* Iyengar, T. S.

S81 **Soman, S. D., Iyengar, T. S., Sadarangani, S. H., and Vaze, P. K.,** circa 1963, Estimation of tritium by gas-phase counting technique: U.S. Atomic Energy Comm. Pub., AEET/HP/TM–10, 40 p. N.S.A. 17: 15871. AnC, In_{atm}.

Somasundaram, S. *See* Iyengar, T. S.

S82 **Sommerville, J. L., ed.,** 1959, The isotope index: 4th ed., Indianapolis, Ind., Scientific Equipment Co., 120 p. C.A. 54: 20567 g. Ge.

Soudain, G. *See* Chapius, A. M.

S83 **Soudain, G., Blanchard, P., and Chapius, A. M.,** 1960, Determination of tritium in the atmosphere: Vienna, Austria, Symposium on Selected Topics Radiation Dosimetry Proc., 1960, p. 203–215 [in French, 1961]. C.A. 57: 4263 g. AnC, In.

Spafford, N. R. *See* Kabara, J. J.

Spar, Jerome. *See* Feely, H. W.

Spar, Jerome. *See* Friend, J. P.

Spedding, D. J. *See* Wilson, A. T.

S84 **Spernol, A., and Denecke, B.,** 1964a, High-precision absolute gas counting of tritium; I, Preparation of hydrogen and counting gas: Internat. Jour. Appl. Radiation and Isotopes, v. 15, no. 3, p. 139–149 [in German]. C.A. 60: 12859 d; N.S.A. 18: 15978. AnC, Sy.

S85 **Spernol, A., and Denecke, B.,** 1964b, High-precision absolute gas counting tritium; II, Characteristics and construction of internal gas counters, especially for hydrogen-methane mixtures: Internat. Jour. Appl. Radiation

and Isotopes, v. 15, no. 4, 195–211 [in German]. C.A. 61:264 g; N.S.A. 18:37088. AnC.

S86 **Spernol, A., and Denecke, B.,** 1964c, High-precision absolute gas counting of tritium; III, Absolute counting of tritium in the internal gas counter: Internat. Jour. Appl. Radiation and Isotopes, v. 15, no. 5, p. 241–254 [in German]. C.A. 61:1478 f; N.S.A. 18:37089. AnC, Nu.

Spratt, J. L. *See* Okita, G. T.

Sreekantan, B. V. *See* Daniel, R. R.

Srinivasan, S. *See* Bockris, J. O'M.

Ssissiguina, T. I. *See* Karol, I. L.

Stahl, W. *See* Von Buttlar, Haro.

S87 **Staley, D. O.,** 1963, Atmospheric circulation from fission-product radioactivity in surface air: Science, v. 140, p. 667–670. Ab_{atm}, $MeDf_{atm}$.

Stanley, V. A. *See* Sharpe, J.

S88 **Stanley, V. A.,** 1964, Progress on photomultipliers and image intensifiers at EMI Electronics, Ltd.: Nuclear Sci. Trans., v. 11, no. 3, p. 113–119. C.A. 61:14013 h. AnC.

S89 **Steacie, E. W. R.,** 1954, Atomic and free radical reactions: Am. Chem. Soc. Mon. 125, 2d ed., New York, Reinhold Publishing Corp., 901 p. C.A. 48:11176 h. Eq, Ge (with 48 pages of bibliography), Ki.

S90 **Stead, F. W.,** 1963, Tritium distribution in ground water around large underground fusion explosions: Science, v. 142, no. 3596, p. 1163–1165. C.A. 60:5042 de; N.S.A. 18:1905. AbG_{gw}, In_{gw}, In_{Hy}, $MeDf_{gw}$.

S91 **Stebbins, A. K., 3d,** 1961a, Report on the high-altitude sampling programme: [U.S.] Defense Atomic Support Agency Pub., DASA–1300. Ab_{atm}, $MeDf_{atm}$.

S92 **Stebbins, A. K., 3d.,** 1961b, Second special report on the high-altitude sampling program (HASP): U.S. Atomic Energy Comm. Pub., DASA–539B, 243 p. N.S.A. 15:32379. AbG_{atm}, An, Ha, In_{atm} InA_{atm} $MeDf_{atm}$, Nu, Sa_{atm}.

S93 **Stebbins, A. K., 3d,** 1961c, Report on the high-altitude sampling programme: [U.S.] Defense Atomic Support Agency Pub., DASA–539B. Ab_{atm}, $MeDf_{atm}$.

S94 **Stebbins, A. K., 3d,** 1961d, The high-altitude sampling program: U.S. Dept. Commerce, Office Tech. Service, Publication Board Rept., P.B. 181,066, 245 p. C.A. 58:5236 f. AbG_{atm}, Ha, InA, MeDf.

S95 **Steel, G. G.,** 1960, A simple method of estimating the tritium content of biological samples: Internat. Jour. Appl. Radiation and Isotopes, v. 9, nos. 1–4, p. 94–99. C.A. 62:812 h; N.S.A. 15:8712. AbO, AnC, InBi, Sy.

S96 **Steel, G. G.,** 1961, Use of direct tritium-assay techniques in studies with tritiated thymidine, *in* Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 349–359 [1962]. C.A. 57:10409 b. AnC, InBi, Sy.

Stein, Gabriel. *See* Jortner, Joshua.

Stein, O. L. *See* Wimber, D. E.

S97 **Stein, O. L.,** 1964, Comprehensive final report of research activities: U.S. Atomic Energy Comm. Pub., TID–21604, 43 p. N.S.A. 19:12961. BiB, InBi (with reference list of publications from this study program).

S98 **Stein, O. L., and Quastler, Henry,** 1961, Effect of tritiated thymidine on the morphogenesis of lateral roots, *in* Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat.

Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 149–153 [1962]. C.A. 57: 11498 g; N.S.A. 17: 35444. AbO, AdC, BiB, InBi, MeDf, SeAd.

S99 **Stein, O. L., and Quastler, Henry,** 1964, Effect of tritiated thymidine on the morphogenesis of lateral roots in *Zea mays*: Radiation Research, v. 21, p. 212–222. N.S.A. 18: 11780. AbO, AnC, BiB, InBi, SeAd, SpX.

S100 **Steinberg, Daniel,** 1960, Radioassay of aqueous solutions in the liquid scintillation spectrometer: Anal. Biochemistry, v. 1, p. 23–39. C.A. 54: 19201 h. AnC.

S101 **Steinberg, Daniel,** 1961, A new technique for counting aqueous solutions in the liquid scintillation spectrometer, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 93–105 [1963]. N.S.A. 17: 18479. AnMs.

Stepanenko, V. A. *See* Gorlovoi, G. D.

Stephens, Nelson. *See* Synder, Fred.

Stevens, W. H. *See* Bayly, J. G.

Stewart, G. L. *See* Hoffman, C. M.

S102 (Reference deleted.)

S103 **Stewart, G. L.,** 1965, Experiences using tritium in scientific hydrology, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 643–658. Ab_{gw}, Ab_{sw}, Ab_{atm}, Ab_{Hy}, InA_{gw}, InA_{sw}, InA_{atm}, InA_{Hy}, $MeDf_{gw}$, $MeDf_{sw}$, $MeDf_{atm}$, $MeDf_{Hy}$, $SeAd_{gw}$, $SeAd_{sw}$, $SeAd_{atm}$.

S104 (Reference deleted.)

S105 **Stewart, G. L., and Hoffman, C. M.,** 1966, Tritium rainout over the United States in 1962 and 1963: U.S. Geol. Survey Circ. 520, 11 p. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

S106 **Stewart, N. G., Crooks, R. N., and Fisher, E. H. R.,** 1955, The radiological doses to persons in the United Kingdom due to debris from nuclear explosions: Harwell, Berks, England, United Kingdom Atomic Energy Research Establishment Pub., HP/R 1701, 25 p. AbG, Ha, InBi.

S107 **Stewart, T. D., and Harman, D.,** 1946, Exchange of hydrogen and tritium ions during alkylation, catalyzed by tritium sulfuric acid: Am. Chem. Soc. Jour., v. 68, p. 1135–1136. C.A. 40: 46538. EqL, Sy.

Stich, W. *See* Ehhalt, D.

Stipp, J. J. *See* Noakes, J. E.

Stouls, Léon. *See* Coulon, André.

S108 **Stouls, Leon (to Comm. à l'Énergie Atomique),** 1960, Improvements in methods and apparatus for producing deuterium by distillation of hydrogen: British Patent 932,178 [July 24, 1963]. N.S.A. 17: 36181. An, SeDs.

Stranks, D. R. *See* Carson, A. S.

Straub, C. P. *See* Setter, L. R.

Striganov, A. R. *See* Oganov, M. N.

S109 **Stromnaes, Oistein,** 1962, Mutagenic effect of C^{14}–labeled and H^3–labeled deoxyribonucleic acid precursors injected into *Drosophila melanogaster* males: Canadian Jour. Genetics and Cytology, v. 4, p. 440–446. C.A. 58: 14494 b. BiZ.

Stroud, A. N. *See* Brues, A. M.

Studier, M. H. *See* Horrocks, D. L.

Suess, H. E. *See* Bainbridge, A. E.

Suess, H. E. *See* Barth, C. A.

S110 **Suess, H. E.,** 1958, Low-level counting: U.S. Atomic Energy Comm. Pub., AECU–4164, 23 p. N.S.A. 13:14408. Ab_{atm}, AnC, In_{atm}.

S111 **Suess, H. E.,** 1961, Chemical reactions in the lower and upper atmosphere: Internat. Symposium Proc., held at Stanford Research Inst., San Francisco, Calif., Apr. 18–20, 1961. New York, Interscience Publishers, Inc., p. 236–237. AbG_{atm}, Eq, Ki.

S112 **Sutra, Geneviéve,** 1948, The possible existence of the H_3O^+ ions: Acad. Sci. Comptes Rendus, v. 226, p. 1194–1195. C.A. 42:7137 g. Ab, EcC, EqI, ThSo.

Svoboda, J., *See* Vavrejn, B.

Svobodova, J. *See* Franc, Z.

S113 **Swain, G. C., Kreiter, V. P., and Sheppard, W. A.,** 1956, Procedure for the routine assay of tritium in water: Anal. Chemistry, v. 27, p. 1157–1159. C.A. 50:109 c, C.A. 50:7664 h. AnC.

S114 **Swain, G. C., Kresge, A. J.,** 1958, Exchange reactions between hydrogen gas and hydroxyl groups. A convenient preparation of tritium-labeled water: Am. Chem. Soc. Jour., v. 80, p. 5281–5283. C.A. 53:5835 g. AnC, SeAd, Sy.

S115 **Swain, G. C., and Schaad, L. J.,** 1958, A relation between protium-tritium and protium-deuterium isotope effects: U.S. Atomic Energy Comm. Pub., AECU–3968, 11 p. IsEq.

Sweeton, F. H. *See* Jenks, G. H.

S116 **Symonds, A. E., Jr.,** 1959, Removal of tritium contamination from surfaces of metals: U.S. Atomic Energy Comm. Pub., DP–367, 19 p. N.S.A. 13:15225. Ha, IsKi, IsTh.

S117 **Synder, Fred, and Stephens, Nelson,** 1962. Quantitative carbon-14 and tritium assay of thin-layer chromatography: Anal. Biochemistry, v. 4, p. 128–131. C.A. 58:738 e; N.S.A. 16:31840. AdC, AnC.

Szarvas, T. *See* Mlinko, S.

T

T1 **Taikhert, A. M., Morozov, N. M., and Temkin, M. I.,** 1963, Kinetics of tritium exchange between steam and hydrogen on nickel catalysts: Kinetika i Kataliz, v. 4, p. 904–909 [in Russian]. N.S.A. 18:10081. KiR, SeAd.

Takahashi, Hajime. *See* Hattori, Toshie.

Takahashi, Hajime. *See* Mizuno, Shigeki.

T2 **Takahashi, Hajime, Hattori, Toshie, and Maruo, Bunji,** 1963, Liquid scintillation counting of biological compounds in aqueous solution: Anal. Chemistry, v. 35, p. 1982–1983. N.S.A. 17:40729. AnC, InBi, Sy.

Takahashi, Tan. *See* Kang, Yung-ho.

Takahashi, Tan. *See* Yamazaki [Yamasaki], Fumio.

T3 **Takahashi, Tan,** 1964, Measurement of tritium at natural levels: Genshiryoku Kogyo, v. 10, no. 2, p. 65–68 [in Japanese]. C.A. 63:1587 h. Ab, AnC, In.

T4 **Takahashi, Tan, Hamada, Tatsuji, and Yamasaki [Yamazaki], Fumio,** 1965a, An externally quenched hydrogen counter for low-level tritium measurements: Nuclear Instruments and Methods, v. 35, no. 1, p. 120–

124 [in English]. C.A. 63:3856 g; N.S.A. 19:34500. Ab_{atm}, Ab_{gw}, AnC, In_{atm}, In_{gw}.

T5 **Takahashi, Tan, Hamada, Tatsuji, and Yamasaki [Yamazaki], Fumio,** 1965b, Measurement of tritium in rain, city water, ground water, and hot spring: Tokyo, Japan, Inst. Phys. and Chem. Research Sci. Papers, v. 59, p. 49–51. N.S.A. 19:30414. Ab_{atm}, Ab_{sw}, Ab_{gw}, In_{atm}, In_{sw}, In_{gw}, SeEl.

T6 **Takahashi, Tan, Ohno, S., and Hamada, Tatsuji,** 1963, Measurement of low-level tritium: 5th Japan Conf. on Radioisotopes Proc., no. 3, p. 75–77 [in Japanese]. N.S.A. 17:30083. AnC, In_{atm}, In_{sw}, $MeDf_{sw}$, SeEl.

T7 **Tamers, M. A.,** 1963a, Low concentration of tritium in iron meteorites: Nature, v. 197, p. 276–277. C.A. 58:8813 d; N.S.A. 17:14495. AbG_{met}, InA, Nu.

T8 **Tamers, M. A.,** 1963b, Tritium retention in iron meteorites: Nature, v. 200, no. 4906, p. 564–565. C.A. 60:5232 d. AbG_{met}.

T9 **Tamers, M. A.,** 1965, Routine carbon-14 dating using liquid-scintillation techniques, *in* Chatters, R. M., and Olson, E. A., **Radiocarbon and tritium** dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 53–60. AnC.

T10 **Tamers, M. A., and Bibron, Roland,** 1963, Benzene method measures tritium in rain without isotope enrichment: Nucleonics, v. 21, no. 6, p. 90, 92–94. C.A. 59:7134 c; N.S.A. 17:27292. AbG_{gw}, AbG_{atm}, AnC, AnMs, In_{gw}, InA_{gw}, SeAd.

T11 **Tamers, M. A., Bibron, Roland, and Delibrias, Georgette,** 1961, Measuring low tritium levels by using a benzene liquid scintillator, *in* **Tritium** in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 303–312 [1962]. C.A. 57:10739 d; N.S.A. 16:16097. Ab_{atm}, AnC, Is, SeAd, Sy.

T12 **Tamers, M. A., and Diez, M.,** 1964, Determination of ^{14}C and tritium in blood and other biological materials: Internat. Jour. Appl. Radiation and Isotopes, v. 15, no. 12, p. 697–702. C.A. 62:8111 h, C.A. 55:18206 c; N.S.A. 19:13238. AnC, BiZ, Ha, InBi.

Tanaka, Yoshimasa. *See* Kitahara, Kazuta.

Tang, Yi-noo. *See* Lee, J. K.

Tatarinskii, V. S. *See* Zel'venskii, Ya. D.

T13 **Taub, H., and Kusch, P.,** 1949, The magnetic moment of the proton: Phys. Rev., v. 75, p. 1481–1492. C.A. 43:5303 f. ElMn, Ge.

Tayler, K. J. *See* Boyce, I. S.

Taylor, B. T. *See* Bainbridge, A. E.

Taylor, B. T. *See* Bishop, K. F.

Taylor, C. B. *See* Grant-Taylor, T. L.

T14 **Taylor, C. B.,** 1963, Accuracy in the determination of the tritium concentrations of natural waters in the South Pacific Ocean area, 1959–1963, at the tritium laboratory, Institute of Nuclear Sciences, Lower Hutt, New Zealand: Inst. Nuclear Sci., Lower Hutt, New Zealand, Rept. INS–R–27, 69 p. N.S.A. 18:31370. Ab_{atm}, Ab_{ocean}, Ab_{sw}, Ab_{gw}, AnC, InA_{atm}, InA_{ocean}, InA_{sw}, InA_{gw}, $MeDf_{atm}$, $MeDf_{ocean}$, $MeDf_{sw}$, $MeDf_{gw}$, SeEl.

T15 **Taylor, C. B.,** 1964, Tritium content of antarctic snow: Nature, v. 201, no. 4915, p. 146–147. C.A. 60:10167 f; N.S.A. 18:12353. Ab_{snow}, AbG_{snow}, Anc, InA_{snow}, $MeDf_{atm}$, $MeDf_{snow}$.

T16 **Taylor, C. B.** 1966, Tritium in southern hemisphere precipitation, 1953–1964: Tellus, v. 18, no. 1, p. 105–131; U.S. Atomic Energy Comm. Pub., INS–R–32, 70 p. N.S.A. 19:7698. Ab_{atm}, Ab_{ocean}, In_{atm}, In_{Hy}, InA_{atm}, InA_{ocean}, $MeDf_{atm}$, $MeDf_{ocean}$, Sa, Sy.

T17 **Taylor, C. B., Polach, H. A., and Rafter, T. A.,** 1963, Tritium measurements in nature: Inst. Nuclear Sci., Lower Hutt, New Zealand, Rept. INS–R–24, 62 p.; U.S. Atomic Energy Comm. Pub., INS–R–24, 64 p. N.S.A. 19:6093. Ab_{atm}, Ab_{sw}, Ab_{gw}, Ab_{ocean}, AbG_{atm}, AbG_{sw}, AbG_{gw}, AbG_{ocean}, AnC, In_{atm}, In_{sw}, In_{gw}, In_{ocean}, In_{hy}, $MeDf_{atm}$, Sa, SeEl.

Taylor, H. S. *See* Black, C.

T18 **Taylor, J. H.,** 1961a, Tritium and autoradiography in cell biology, *in* Tritium in the physical and biological sciences, v. 2, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 221–228 [1962]. C.A. 57:15660 h. BiB, InBi.

T19 **Taylor, J. H.,** 1961b, Some uses of tritium in autoradiography, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 295–301 [1963]. N.S.A. 17:18505. An, BiC, KiP.

Taylor, N. A. *See* Jackson, S.

Taylor, R. *See* Eaborn, C.

Telegadas, K. *See* Machta, Lester.

Temkin, M. I. *See* Taikhert, A. M.

Temple, L. A. *See* Smith, G. N.

Terrill, J. G., Jr., *See* Drobinski, J. C.

Thatcher, L. L. *See* Carlston, C. W.

Thatcher, L. L. *See* Payne, B. R.

T20 **Thatcher, L. L.,** 1957, Tritium as a tracer for measuring ground-water movement: U.S. Geol. Survey, Water Resources Bull., Nov. 1957, p. 75–78. In_{gw}, $MeDf_{gw}$.

T21 **Thatcher, L. L.,** 1958, Notes on tritium: U.S. Geol. Survey, Water Resources Bull., May 1958, p. 34–36. Ab_{gw}, AnC, Ge, In_{gw}, $SeAd_{gw}$.

T22 **Thatcher, L. L.,** 1961a, Radioisotopes in the study of the hydrologic cycle, *in* Application of radioisotopes and radiation in the life sciences—Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy: U.S. 87th Cong., 1st sess., Mar. 27–30, 1961, U.S. Joint Comm. Atomic Energy, p. 252–265, AbG_{Hy}, AbG_{atm}, AnC, In_{atm}, In_{hy}, In_{sw}, In_{gw}, In_{Pc}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{Pc}$.

T23 **Thatcher, L. L.,** 1961b, Pre-1954 tritium levels in the United States: U.S. Geol. Survey, Water Resources Bull., Aug. 1961, p. 112–114. Ab_{atm}, Ab_{gw}, Ab_{sw}, InA_{atm}, InA_{gw} InA_{sw}.

T24 **Thatcher, L. L.,** 1961c, Evaluation of hydrologic tracers: U.S. Geol. Survey Prof. Paper 424–D, p. D396. InA_{gw}.

T25 **Thatcher, L. L.,** 1962a, The distribution of tritium fallout in precipitation over North America: Internat. Assoc. Sci. Hydrology Bull., v. 7, no. 2, p. 48–58. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

T26 **Thatcher, L. L.,** 1962b, Determining the age of underground waters, *in* Ferrier, M. D., ed., Transactions of the American Nuclear Society, 1962 winter meeting, Washington, D.C., Nov. 26–28, 1962 [abs.]: Am. Nuclear Soc. Trans., v. 5, no. 2, p. 284. N.S.A. 17:3672. InA_{gw}.

T27 **Thatcher, L. L.,** 1963, Laboratory aspects of tracer selection and tritium detection, *in* Reeder, H. O., Tritium used as a ground-water tracer between Lake McMillan and Major Johnson Springs, Eddy County, New Mexico:

U.S. Atomic Energy Comm. Pub., TEI–839, 135 p. N.S.A. 18:25684. AnC, In.

T28 **Thatcher, L. L., and Hoffman, C. C.,** 1963, Tritium fallout over North America from the Soviet tests in 1961: Jour. Geophys. Research, v. 68, no. 20, p. 5899–5901. N.S.A. 17:41059. AbG_{atm}, In_{atm}, In_{sw}, InA_{atm}, $MeDf_{atm}$, Sy.

T29 **Thatcher, L. L., and Payne, B. R.,** 1965, The distribution of tritium in precipitation over continents and its significance to ground-water dating, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 604–629. AbG_{atm}, AbG_{gw}, AbG_{Hy}, InA_{atm}, InA_{gw}, InA_{Hy}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{Pe}$, $SeAd_{atm}$, $SeAd_{Pe}$, $SeAd_{gw}$.

T30 **Thatcher, L. L., Rubin, Meyer, and Brown, G. F.,** 1961, Dating desert ground water: Science, v. 134, p. 105–106. N.S.A. 15:22550. Ab_{atm}, Ab_{gw}, In_{atm}, In_{gw}, InA_{gw}.

T31 **Theis, C. V.,** 1959, The disposal of low and intermediate level radioactive wastes to the ground, *in* Industrial Radioactive Waste Disposal; Hearings before the Special Subcommittee on Radiation, Joint Committee on Atomic Energy: U.S. 86th Cong., 1st sess., Joint Comm. on Atomic Energy, v. 2, p. 1116–1123; duplicated as U.S. Geol. Survey, Water Resources Div., Ground Water Notes, no. 40, 13 p., June, 1960. In_{gw}, MeDf, SeAd.

T32 **Theis, C. V.,** 1963, Hydrologic phenomena affecting the use of tracers in timing groundwater flow, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 193–206. N.S.A. 18:1921. In_{gw}, In_{Hy}, In_{hy}, InA_{gw}.

T33 **Theodorsson, P.,** 1966, The use of natural tritium for groundwater studies: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Preprint, SM–83/26, 20 p. [in English]. Ab_{atm}, Ab_{art}, Ab_{gw}, Ab_{ju}, Ab_{sw}, In_{atm}, In_{sw}, In_{gw}.

Thilo, L. *See* Münnich, K. O.

T34 **Thode, H. G.,** 1947, Variations in abundances of isotopes in nature: Research, v. 2, p. 155–161. Physics Abs. 52:3399; C.A. 43:4553 g. Ge of: AbG (with 49 references).

Thodos, G. *See* Mittehauser, H. M.

T35 **Thomas, C. W., Kirby, L. J., and others,** 1962, Radiological chemistry, *in* Junkins, R. L., and Brown, J. E., eds., Research and development activities in the radiological sciences—Physical sciences portion, January through December 1961: U.S. Atomic Energy Comm. Pub., HW–73337, p. 77–157. N.S.A. 17:10850. AnC, In_{sw}.

Thomas, G. *See* Ciccarone, P. A.

Thomas, G. See Verly, W. G.

Thomas, G. H. *See* Chamberlain, J.

Thompson, R. C. *See* DeLong, C. W.

T36 **Thompson, R. C.,** 1952, Metabolic turnover with tritium as a tracer; I, Gross studies on the mouse: Jour. Biol. Chemistry, v. 197, p. 81–87. C.A. 47:189 e. BiZ, InBi.

T37 **Thompson, R. C.,** 1953, Metabolic turnover with tritium as a tracer: II, Gross studies on the rat: Jour. Biol. Chemistry, v. 200, p. 731–743. C.A. 47:8214 a. BiZ, InBi.

T38 **Thompson, R. C., and Ballou, J. E.,** 1953, The metabolic equivalence

of deuterium and tritium in animal experimentation: Archives Biochemistry and Biophysics, v. 42, p. 219–220. C.A. 47:189 f, C.A. 47:8877 f. BiZ, InBi.

T39 **Thompson, R. C., and Ballou, J. E.,** 1954a, Metabolic turnover with tritium as tracer; III, Comparative studies with tritium and deuterium: Jour. Biol. Chemistry, v. 206, p. 101–107. C.A. 48:3520 c. BiZ, InBi.

T40 **Thompson, R. C., and Ballou, J. E.,** 1954b, Studies of metabolic turnover with tritium as a tracer; IV, Metabolically inert lipide and protein fractions from the rat: Jour. Biol. Chemistry, v. 208, p. 883–888. C.A. 48:10187 i. BiZ, InBi.

T41 **Thompson, R. C., and Ballou, J. E.,** 1956, Metabolic turnover with tritium as a tracer; V, The predominantly nondynamic state of body constituents in the rat: U.S. Atomic Energy Comm. Pub., HW–42200, 27 p. C.A. 50:15793 d. BiZ, InBi.

T42 **Thompson, R. C., and Kornberg, H. A.,** 1954, Hazards of exposure to tritium and tritium oxide: U.S. Atomic Energy Comm. Pub., HW–29615 (Rev.), 41 p. [declassified with deletions, 1960]. N.S.A. 15:17150. Ha.

T43 **Threefoot, S. A.,** 1962, Some factors influencing interpretation of studies of body water and electrolytes with isotopic tracers: Prog. in Cardiovascular Diseases, v. 5, p. 32–54. N.S.A. 19:58. AbO, Ge of: BiC, BiZ, Ha, InBi. KiB, MeDf, SeAd.

Till, A. R. *See* Downes, A. M.

Tilles, David. *See* DeFelice, Joseph.

Tilles, David. *See* Fireman, E. L.

T44 **Tilles, David,** 1963, Tritium retention in iron meteorites: Nature, v. 200, no. 4906, p. 563–564, C.A. 60:5232 c. AbG_{atm}, AbG_{met}, In_{met}, InA_{met}.

T45 **Tilles, David,** 1964, Meteoritic tritium and diffusion in α–and γ–iron: Nature, v. 201, no. 4921, p. 808–809. C.A. 60:11795 c; N.S.A. 18:16210. AbG_{atm}, AbG_{met}.

Tinderholt, V. E. *See* Kaplan, W. D.

Tishkin, P. A. *See* Gavrilov, V. M.

T46 **Titus, J. L., and Shorter, R. G.,** 1965, Labeling of human tumors with tritiated thymidine: Archives Pathology, v. 79, p. 324–328. N.S.A. 19:38338. AnC, BiC, Ha, InBi, KiB.

Todd, D. K. *See* Kaufman, W. J.

T47 **Todd, D. K.,** 1964, Groundwater, sec. 13, *in* Chow, V. T., ed., Handbook of applied hydrology: New York, McGraw-Hill Book Co., p. 13–1 to 13–55. Ge, In_{gw}, $MeDf_{gw}$.

T48 **Tolbert, B. M.,** 1956, Ionization chamber assay of radioactive gases: U.S. Atomic Energy Comm. Pub., UCRL–3499, 47 p. N.S.A. 11:3701. AnC, Sy.

T49 **Tolbert, B. M.,** 1961, Tritium measurement using ionization chambers, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 167–177 [1963]. C.A. 58:9845 e. AdC, Ge of: AnC: InBi.

Tomikura, Yoshi. *See* Kigoshi, Kunihiko.

Tonna, E. A. *See* Cottier, H.

Toratani, Hirokazu. *See* Ojima, Tsutomu.

T50 **Traeger, L.,** 1964, Simultaneous measurement of tritium and ^{14}C in aqueous solution with the liquid scintillation counter: Atompraxis, v. 10, p. 472–475. N.S.A. 19:7287. AnC.

Trebst, Achim. *See* Simon, Helmut.

Trujillo, T. T. *See* Richmond, C. R.

T51 **Trujillo, T. T., Anderson, E. C., and Langham, W. H.,** 1955, Biological effects of inhalation of high concentrations of tritium gas: U.S. Atomic Energy Comm. Pub., LA–1986, 37 p. N.S.A. 11:19. BiC, Ha, InBi.

T52 **Trusov, G. N., and Aladzhaleva, N. A.,** 1960, Determination of tritium: Zhur. Anal. Khimii, v. 15, p. 238–239. C.A. 54:20546 c; N.S.A. 14:17834. AnC.

Tucker, G. E., Jr. *See* Rarrick, H. L.

Tullis, J. L. *See* Furth, Jacob.

T53 **Tupitsyn, I. F.,** 1961, Tyazhelye izotopy-vodoroda-deĭterii i tritiĭ [Heavy hydrogen isotopes deuterium and tritium]: Moscow, U.S.S.R., Gosatomizdat, 38 p. C.A. 55:21780 g; N.S.A. 17:23423. Ge of: Ha, In, Is, Ki, Nu, Sy.

Turek, S. *See* Vavrejn, B.

Turkevich, Anthony. *See* Begemann, Friedrich.

Turkevich, Anthony. *See* Hagemann, F. T.

T54 **Tykva, R.,** 1961, Rapid assay of tritium-labelled substances inside G-M gas counting tubes: Colln. Czech. Chem. Commun., v. 26, p. 2463–2472. N.S.A. 16:6375. AnC.

T55 **Tykva, R.,** 1965, The simultaneous determination of hydrogen-3 and carbon-14 radioactivity in biological material by means of an internal proportional gas counting tube: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Radioisotope Sample Measurement Techniques in Medicine and Biology, May 24–28, 1965, Proc., p. 329–343. C.A. 65:4255 ab: N.S.A. 19:32113. AnC, InBi, Sy.

T56 **Tykva, R., and Gruenberger, D.,** 1961, Rapid assay of T-labeled substances in G-M gas counting tubes, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 353–359 [1962]. C.A. 57:10739 h. AnC.

U

U1 **Ueno, Kaoru,** 1961, Determination of tritium in human urine: Jour. Atomic Energy Soc. Japan, v. 3, p. 688–690. N.S.A. 16:2980. AnC, Ha, In.

U2 **United Kingdom Atomic Energy Authority,** 1958, The determination of tritium in urine: Sellafield, Cumberland, England, United Kingdom Atomic Energy Authority, Indus. Group, Windscale Works. U.S. Atomic Energy Comm. Pub., IGO–AM/W–112, 6 p. N.S.A. 12:11309. AnC, Kil.

U3 **United Kingdom Atomic Energy Authority,** 1960, Analytical method for the determination of tritium in urine (liquid scintillation method): Sellafield, Cumberland, England, United Kingdom Atomic Energy Authority, Indus. Group, Windscale Works, PG–Report–162, 6 p. N.S.A. 15:12844. AnC, Ha, InBi.

U4 **United Nations,** 1955a, United Nations International Conference on the peaceful uses of atomic energy, Geneva, Switzerland, Aug. 8–20, 1955, Proceedings—Radioactive isotopes and ionizing radiations in agriculture and biochemistry: New York, United Nations Pub., v. 12, 553 p. [1956]. N.S.A. 11:17. BiC, In_{Pe}, InBi.

U5 **United Nations,** 1955b, United Nations International Conference on the peaceful uses of atomic energy, Geneva, Switzerland, Aug. 8–20, 1955,

Proceedings—Applications of radioactive isotopes and fission products in research and industry: New York, United Nations Pub., v. 15, 327 p. [1956]. N.S.A. 11:210. Ge.

U6 **United Nations,** 1958, Second United Nations International Conference on the peaceful uses of atomic energy, Geneva, Switzerland, September 1–3, 1958, Proceedings—Isotopes in biochemistry and physiology: New York, United Nations Pub., v. 25, pt. 2, 306 p. N.S.A. 13:14212. BiC, Ha, In.

U7 **United Nations Secretariat,** 1960, Tritium from nuclear tests: U.S. Atomic Energy Comm. Pub., A/AC.82/R.105 (Add. 1), 6 p. Ge of: Ab_{art}, AbG, BiC, Ha (with 17 references).

U8 **U.S. Atomic Energy Commission,** 1949a, Chemistry Division, Section C–1 summary report for January, February, and March 1949: U.S. Atomic Energy Comm. Pub., ANL–4286 (Del.) [Declassified with deletions], 45 p. [1957]. N.S.A. 12:1821. BiC, InBi.

U9 **U.S. Atomic Energy Commission,** 1949b, Report of the papers presented at the 3d meeting of the Stack Gas Decontamination Working Group, held January 12, 1949, at the Academy of Science Building [Washington, D.C.]: U.S. Atomic Energy Comm. Pub., M–4400 (Del.) [Declassified with deletions], 86 p. [1957]. N.S.A. 12:5287. BiB, InBi, MeDf.

U10 **Atomic Energy Commission,** 1950, Chemistry Division, Section C–1 summary report for April, May, and June 1950: U.S. Atomic Energy Comm. Pub., ANL–4490 (Del.) [Declassified with deletions], 79 p. [1957]. N.S.A. 12:1822. AnC.

U11 **U.S. Atomic Energy Commission,** 1952, Radiological Sciences, Department research and development activities for October-December 1951: Quart. Prog. Rept., Hanford Works, Richland, Wash., U.S. Atomic Energy Comm. Pub., HW–23332 [Declassified 1957], 30 p. N.S.A. 11:8261. BiC, Ha, In_{sw}, SeAd.

U12 **U.S. Atomic Energy Commission,** 1957, Biological and Medical Research Division semiannual report [for] January through June 1957: U.S. Atomic Energy Comm. Pub., ANL–5732, 203 p. N.S.A. 11:12642. AdC, An.

U13 **U.S. Atomic Energy Commission,** 1959, Literature survey on production of tritium: U.S. Atomic Energy Comm. Pub., LS–58, 4 p. N.S.A. 14:13056. Ge of Ab_{art} (with 29 references).

U14 **U.S. Atomic Energy Commission,** 1960, Bio-organic chemistry quarterly report, June, July, and August 1960: U.S. Atomic Energy Comm. Pub., UCRL–9408, 51 p. N.S.A. 15:3966. AbO, AdC, AnC, BiC, BiZ, InBi, NuIn.

U15 **U.S. Atomic Energy Commission,** circa 1960, Chemical applications of nuclear explosions: U.S. Atomic Energy Comm. Pub., ORNL–2993, p. 204–206. N.S.A. 14:25450. Ab_{gw}, IsEq, IsTh, SeAd, Th.

U16 **Atomic Energy Commission,** 1962a, Special sources of information on isotopes: U.S. Atomic Energy Comm., Div. Isotopes Development, Pub., TID—4563 (3d rev), 83 p. Ge of: AnC, Ha, In_{art}, In_{Pe}, InBi, InG, Is, Nu (with 648 references).

U17 **U.S. Atomic Energy Commission,** 1962b, Cane program: U.S. Atomic Energy Comm. Pub., ORNL–3314, p. 207–208. N.S.A. 16:32904. Ab_{gw}, In_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

U18 **U.S. Atomic Energy Commission,** 1962c, National Reactor Testing Station, 1962—Hydrology of waste disposal: U.S. Geol. Survey Ann. Prog.

Rept. [to the U.S. Dept. of the Interior], IDO–22044, p. 11–27. Ab_{Hy}, In_{Hy}, $MeDf_{Hy}$.

U19 **U.S. Atomic Energy Commission,** circa 1963, Radiological chemistry: U.S. Atomic Energy Comm. Pub., HW–77609, sec. 3, 106 p. N.S.A. 18: 1487. AnC.

U20 **Atomic Energy Commission,** 1963, The digestion, absorption, transport, and metabolism of fats in the ruminant: U.S. Atomic Energy Comm. Pub., TID–20028, 4 p. N.S.A. 18: 9783. AnC, BiZ, InBi.

U21 **U.S. Atomic Energy Commission,** 1964a, Biological and Medical Research Division annual report, 1964: U.S. Atomic Energy Comm. Pub., ANL–6971, 230 p. N.S.A. 19: 29828. Ge of: AdC, BiC, InBi (with 15 articles).

U22 **U.S. Atomic Energy Commission,** 1964b, Biochemistry: U.S. Atomic Energy Comm. Pub., ANL–6971, p. 1–28. N.S.A. 19: 29849. AdC, BiC, InBi.

U23 **U.S. Atomic Energy Commission,** 1964c, Progress report on tumor induction by radioactive thymidine: U.S. Atomic Energy Comm. Pub., TID–21125, 7 p. BiC, BiZ, Ha, InBi.

U24 **U.S. Atomic Energy Commission,** 1964d, Health Physics Division annual progress report for period ending July 31, 1964: U.S. Atomic Energy Comm. Pub., ONRL–3697, 266 p. N.S.A. 19: 7733. Ge of: Ha, InBi (with 27 articles).

U25 **U.S. Atomic Energy Commission,** 1964e, Internal dose estimation: U.S. Atomic Energy Comm. Pub., ONRL–3697, p. 173–177. N.S.A. 19: 7206. AbO, Ha.

U26 **U.S. Atomic Energy Commission,** 1965, Biological effects of radiation and related biochemical and physical studies—Summary progress report, July 1, 1950–March 15, 1965: U.S. Atomic Energy Comm. Pub., NYO–910–23, 196 p. Ge of: AbO, BiC, Ha, InBi.

U27 **U.S. Congress,** 1957, The nature of radioactive fallout and its effects on man—Hearings before the Special Subcommittee on radiation of the Joint Committee on Atomic Energy: U.S. 85th Cong., 1st sess., Joint Comm. on Atomic Energy. BiC, Ha, InA, MeDf.

U28 **U.S. Congress,** 1959, Fallout from nuclear weapons tests—Hearings before the Special Subcommittee on radiation of the Joint Committee on Atomic Energy: U.S. 86th Cong., 1st sess., Fallout from Nuclear Weapons Tests, May 5, 6, 7, and 8, 1959, v. 1. Washington, D. C., Joint Comm. on Atomic Energy, 1959, 953 p. N.S.A. 14: 6109. Ge of: Ab, BiC, Ha, InA, MeDf.

U29 **U.S. Congress,** 1961, Application of radioisotopes and radiation in the life sciences—Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy: U.S. 87th Cong., 1st sess., Joint Comm. on Atomic Energy., 519 p. N.S.A. 15: 27309. AbG_{atm}, AbG_{Hy}, AnC, In_{atm}, In_{Pe}, In_{sw}, In_{gw}, In_{hy}, $MeDf_{atm}$, $MeDf_{gw}$, $MeDf_{Pe}$.

U30 **U.S. Congress,** 1962, Radiation standards, including fallout—Hearings before the Special Subcommittee on radiation of the Joint Committee on Atomic Energy: U.S. 87th Cong., 2d sess., Joint Comm. on Atomic Energy. Ab, Ha, MeDf.

U31 **U.S. Congress,** 1963, Fallout, radiation standards, and countermeasures—Hearings before the Special Subcommittee on radiation of the Joint Committee on Atomic Energy: U.S. 88th Cong., 1st sess., Joint Comm. on Atomic Energy. Ab, Ha, MeDf.

U32 **U.S. Department of Commerce,** 1959, Maximum permissible body bur-

dens and maximum permissible concentrations of radionuclides in air and in water for occupational exposure: [U.S.] Natl. Bur. Standards Handb. 69. AbO, Ha.

U33 **U.S. Geological Survey,** 1959, Geologic investigations of radioactive deposits: U.S. Geol. Survey Semiann. Prog. Rept. [for] June 1 to Nov. 30, 1959, 123 p.: U.S. Atomic Energy Comm. Pub., TEI–752. N.S.A. 14: 13921. AbG_{atm}.

U34 **University of California at Los Angeles,** 1962, Semiannual progress report [on biology and medicine] for the period ending June 30, 1962: California Univ. Los Angeles, Sch. Medicine, Lab. Nuclear Medicine and Radiation Biology. U.S. Atomic Energy Comm. Pub., UCLA–507, 91 p. N.S.A. 16: 28670. AnC, Ha.

Urso, Paul. *See* Grillo, R. S.

V

V1 **Vacca, G., Garnier, A., and Jammet, H.,** 1962, Attempted unified classification of radioelements according to their radiation toxicity: Jour. Radiologie, Électrologie, et Médecine Nucléaire, v. 43, no. 5, p. 303–304. C.A. 61: 4669 e. Ha.

Vaccarezza, Jacques. *See* Amavis, René.

Vaisberg, S. E. *See* Varshavskii, Ya. M.

Valee, R. E. *See* Grove, G. R.

Vanderschmidt, G. F. *See* Roehrig, J. R.

Van Dyken, A. R. *See* Braun, V. G.

Van Dyken, A. R. *See* Brown, W. G.

Van Dyken, A. R. *See* Wilzbach, K. E.

V2 **Van't Hof, J.,** 1963, Discrepancies in mitotic cycle time when measured by tritiated thymidine and colchicine—The effect of tritiated thymidine on the G_1–period duration: U.S. Atomic Energy Comm. Pub., BNL–7898, 17 p. N.S.A. 19: 15012. BiB, InBi, KiB.

V3 **Van't Hof, J., and Ying, Huei-Kuen,** 1963, The simultaneous labeling of cells in different segments of the mitotic cycle with tritiated thymidine and colchicine and the effect of colchicine on thymidine uptake: U.S. Atomic Energy Comm. Pub., BNL–7317, 28 p. N.S.A. 18: 13413. BiB, BiC, InBi, KiB.

Van Wyck, R. W. *See* Butler, H. L.

V4 **Van Wyck, R. W., and Butler, H. L.,** 1957, Integrity of a plastic suit in tritium atmospheres: U.S. Atomic Energy Comm. Pub., AECU–3516. 11 p. N.S.A. 11: 11035. Ha, MeDf.

V5 **Varshavskii, Ya. M.,** 1961, General rules governing thermodynamic isotope effects in tritium/protium exchange. *in* Tritium in the physical and biological sciences, v. 1. Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 169–177 [1962]. U.S. Atomic Energy Comm. Pub., AEC–tr–5229. 12 p. N.S.A. 16: 16088. N.S.A. 16: 28984. IsTh, SeAd, ThS.

V6 **Varshavskii, Ya. M., and Oglobin, A. A.,** 1961, The use of tritium in physical and biological research: Atomnaya Energiya, v. 11, p. 264–267. C.A. 56: 2123 h. Ge, In.

V7 **Varshavskii, Ya. M., and Vaisberg, S. E.,** 1961, The equilibrium distribution of tritium in hydrogen isotope exchange: Akad. Nauk SSSR Doklady, v. 140, p. 1361–1363 [in Russian]. N.S.A. 16: 5635. Nu, SeAd.

Vasil'eva, N. A. *See* Alekseev, F. A.

V8 **Vasil'eva, N. A., Sokolovskii, E. V., and Maidebor, V. N., 1960,** Application of the radioactive hydrogen isotope tritium to the investigation of the movement of water pumped into [oil-well] strata: Geologiya Nefti i Gaza, v. 4, no. 7. p. 55–59. C.A. 61: 5418 gh. Ab, In_{gw}, In_{hy}, MeDf.

Vasilevich, A. O. *See* Boreskov, G. K.

Vaughan, B. E. *See* Hutchin, M. E.

V9 **Vaughan, B. E., and Boling, E. A., 1961,** Rapid assay procedures for tritium-labeled water in body fluids: Jour. Lab. and Clinical Medicine, v. 57, p. 159–164. C.A. 55: 9537 g. An, BiZ, Ha, InBi.

V10 **Vaughan, B. E., and Davis, A. K., 1961,** Some critical observations concerning the handling of high levels of tritium radioactivity: U.S. Atomic Energy Comm. Pub., USN–RDL–tr–505, 18 p. N.S.A. 15: 19672. AnC, Ha.

V11 **Vavrejn, B., Franc, Z., Svoboda, J., Turek, S., Lipovska, M., Francova, V., and Hondlik, J., 1965,** Preparation of samples of biological material for liquid scintillation measurement of low-energy β-emitters: Colln. Czech. Chem. Commun., v. 30, no. 6, p. 2084–2090 [in English]. C.A. 63: 3304 e; N.S.A. 19: 40425. AnC, Sy.

Vaze, P. K. *See* Iyengar, T. S.

Vaze, P. K. *See* Soman, S. D.

Venkatavaradan, V. S. *See* Lal, Devendra.

V12 **Veres, Arpad, 1963,** Tritium determinations by means of a liquid scintillation counter: Fizikai Szemle, v. 13, no. 12, p. 375–379 [in Hungarian]. C.A. 60: 15396 d, C.A. 61: 15631; N.S.A. 18: 19887. AnC, Ha.

V13 **Verhagen, B. Th., and Sellschop, J. P. F., 1963,** Enrichment and assay of naturally occurring tritium, *in* National conference on nuclear energy—Application of isotopes and radiation: Pelindaba, South Africa, Atomic Energy Board (South Africa), p. 109–119. N.S.A. 19: 11033. Ge of: AnC; SeAd, SeDf.

V14 **Verhagen, B. Th., and Sellschop, J. P. F., 1964,** Enrichment of low-level tritium by thermal diffusion for hydrological applications: Geneva, Switzerland, United Nations 3d Internat. Conf. on Peaceful Uses of Atomic Energy Proc., no. 12, p. 398–405 [in English, 1965]. U.S. Atomic Energy Comm. Pub., A/CONF.28/P/465, 16 p., 1964. C.A. 65: 4961 gh; N.S.A. 18: 37582. AnC, In, InA, SeAd, SeDf, Sy.

V15 **Verhagen, B. Th., and Sellschop, J. P. F., 1965a,** Problems in the enrichment of tritium by the thermal diffusion technique, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 505–514. SeDf.

V16 **Verhagen, B. Th., and Sellschop, J. P. F., 1965b,** Tritium measurements of subterranean waters in some South African sites, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 659–670. AnC, In_{gw}.

Verly, W. G. *See* Ciccarone, P. A.

Verly, W. G. *See* Dulcino, J.

V17 **Verly, W. G., 1956,** Tritium: Rev. Fermentations Industries Alimentaires, v. 11, p. 165–172. C.A. 51: 1668 i. Ge (with 22 references).

V18 **Verly, W. [G.], 1958,** Tritium in biology: U.S. Atomic Energy Comm. Pub., NP–7148, 47 p. N.S.A. 13: 3520. AbG, AbO, Ge of: An, BiC, InBi (with 36 references).

V19 **Verly, W. G.,** 1960a, Tritium—Dosage, préparation de molécules marquées et applications biologiques [Tritium—Determination, preparation of labeled molecules and biological applications]: Internat. Atomic Energy Agency, Rev. Ser. 2, 56 p. [in French, with English summaries]. Distributed by Natl. Agency for Internat. Publications, 801 Third Ave., New York, N.Y. C.A. 55: 2266 b; N.S.A. 14: 15594. Ge of: An, AnC, BiB, InBi, Sy.

V20 **Verly, W. G.,** 1960b, The use of tritium in biology: Inst. Agronomie et Stations Recherches de Gembloux Extra, v. 2, p. 720–723 [in French]. C.A. 56: 2676 i. AbO, BiZ.

V21 **Verly, W. G.,** 1961, Measurement of radioisotopes with the aid of a scintillation solution: Archives Internat. Physiologie et Biochimie, v. 69, p. 389 [in French]. N.S.A. 17: 1185. AnC, AnSp.

V22 **Verly, W. G., Humbelle, G., and Thomas, G,** 1959, Determination of tritium in a proportional counter: Nukleonik, v. 1, p. 325–329 [in French]. N.S.A. 14: 6268. AnC.

V23 **Verly, W. G., Rachele, J. R., Vigneaud, V. du, Eidinoff, M. L., and Knoll, J. E.,** 1952, A test of tritium as a labeling device in a biological study: Am. Chem. Soc. Jour., v. 74, p. 5941–5943. C.A. 47: 11283 i. BiC, InBi.

Viallard, Rodolphe. *See* Grenon, Michel.

V24 **Viallard, Rodolphe, Corval, M., Dreyfus-Alain, B., Grenon, Michel, and Hermann, J.,** 1954, Determination of tritium in tritiated organic compounds: Chimie Anal., v. 36, p. 102–104. C.A. 48: 6920 a. AnC, InBi.

V25 **Vickers, W. W.,** 1963, Geochemical dating techniques applied to antarctic snow samples: Berkeley, Calif., Gen. Assembly, Comm. of Snow and Ice, Assoc. Internat. Hydrol. Sci. Pub. 61, p. 199–215. AbG_{snow}, InA_{snow}.

Vielstich, W. *See* Von Buttlar, Haro.

Vigneaud, V. du. *See* Verly, W. G.

Vigneaux, Michel. *See* Alvinerie, Jacques.

Vigneaux, Michel. *See* Lévêque, Paul.

V26 **Viktorov, S. V., Kocharov, G. E., and Naidenov, V. O.,** 1966, Possible method of determining trace amounts of ^{37}Ar and ^{3}H: Zhur. Tech. Fiziki [Jour. of Technical Physics], v. 36, no. 1, p. 199–201 [in Russian]. C.A. 64: 10696 cd. AnC.

Vilenskii, V. D. *See* Karol, I. L.

Vil'tsbakh, K. Ye. *See* Braun, V. G.

V27 **Vinogradov, A. P.,** 1954, Geochemistry of isotopes: Akad. Nauk Vestnik SSSR, v. 24, no. 5, p. 26–43. C.A. 48: 13571 c. AbG_{atm}.

Vishniac, Wolf. *See* Colman, Brian.

Vogel, J. C. *See* Ehhalt, D.

V28 **Vogel, J. C., Ehhalt, D., and Roether, W.,** 1963, A survey of the natural isotopes of water in South Africa, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 407–415. N.S.A. 18: 1907. Ab_{atm}, Ab_{gw}, Ab_{sw}, In_{atm}, In_{gw}, In_{sw}, InA_{gw}, $SeAd_{atm}$.

V29 **Volarovich, M. P., and Churaev, N. V.,** 1960, Use of the radioactive tracer method to study problems of the translocation of water in the peat stratum during drainage: Akad. Nauk Uzbek. SSR, Tr. Tashkentsk. Konf. po Mirnomu Ispol'z. At. Energii, v. 2, p. 230–?; U.S. Atomic Energy Comm. Pub., AEC–tr–6390, p. 304–321. N.S.A. 18: 39514. In_{gw}, In_{atm}, $MeDf_{gw}$.

V30 **Von Buttlar, Haro,** 1958a, Investigating ground water by analysis of atmospheric tritium: Am. Water Works Assoc. Jour., v. 50, p. 1533–1538.

C.A. 53:5554 i; N.S.A. 13:19022. Ab_{atm}, Ab_{gw}, AnC, Ha, In_{atm}, In_{gw}, In_{hy}, InA_{gw}.

V31 **Von Buttlar, Haro,** 1958b, Hydrogen-bomb tritium as indicator for injection water in secondary recovery: Erdöl u. Kohle, v. 11, p. 376–378. C.A. 52:16729 c. AbG, In_{gw}, InA.

V32 **Von Buttlar, Haro,** 1959, Ground-water studies in New Mexico using tritium as a tracer, II: Jour. Geophys. Research, v. 64, no. 8, p. 1031–1038. N.S.A. 13:21069. Ab_{atm}, Ab_{gw}, In_{gw}, In_{atm}, InA_{gw}, InA_{hy}.

V33 **Von Buttlar, Haro,** 1963a, Stratospheric tritium: Geochim. et Cosmochim. Acta, v. 27, no. 7, p. 741–751 [in German]. C.A. 59:13729 e; N.S.A. 17:34124. AbG_{atm}, InA_{atm}, $MeDf_{atm}$.

V34 **Von Buttlar, Haro,** 1963b, Tritium in rainwater, *in* Geiss, Johannes, and Goldberg, E. D., eds., Earth science and meteoritics: Amsterdam, Netherlands, North-Holland Publishing Co., p. 188–206. C.A. 61:482 d. Ab_{atm}, AbG_{atm}, An, Ge of: $MeDf_{atm}$, In_{atm} In_{hy}.

V35 **Von Buttlar, Haro, Farzone, K., and Wohlfahrt, D.,** 1965, Tritium concentration of German river waters measured with the proportional-counting technique, *in* Chatters, R. M., and Olson, A. E., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7-11, 1965, Proc., p. 471–487. AbG_{sw}, AnC, $MeDf_{sw}$.

V36 **Von Buttlar, Haro, and Libby, W. F.,** 1955, Natural distribution of cosmic-ray-produced tritium, II: Jour. Inorganic and Nuclear Chemistry, v. 1, no. 1, p. 75–91. AbG_{atm}, AbG_{sw}, In_{atm}, In_{sw}, $MeDf_{atm}$, $MeDf_{sw}$.

V37 **Von Buttlar, Haro, and Stahl, W.,** 1961, A low-level Geiger counter for tritium, *in* Tritium in the physical and biological sciences, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Detection and Use of Tritium in the Phys. and Biol. Sci., May 3–10, 1961, Proc., p. 325–331 [1962]. C.A. 57:9427 fg; N.S.A. 16:16099. AnC, SeAd. SeDf.

V38 **Von Buttlar, Haro, Stahl, W., and Wiik, B.,** 1962, Tritium measurements in rainwater without isotope enrichment: Zeitschr. Naturforschung, v. 17a, p. 91–92. N.S.A. 16:19205. Ab_{atm}, AnC, In_{atm}, InA_{atm}, $MeDf_{atm}$, $SeAd_{atm}$.

V39 **Von Buttlar, Haro, Vielstich, W., and Barth, H.,** 1963, Deuterium and tritium separation factors from electrolytic evolution of hydrogen: Ber. Bunsenges. Physik. Chemie, v. 67, p. 630–637; U.S. Atomic Energy Comm. Pub., NP–tr–1155, 25 p. N.S.A. 18:31998. An, SeAd, SeEl.

V40 **Von Buttlar, Haro, and Wendt, Immo,** 1958, Ground-water studies in New Mexico using tritium as a tracer: Am. Geophys. Union Trans., v. 39, p. 660–668; U.S. Atomic Energy Comm. Pub., A/CONF.15/1954, 27 p. N.S.A. 13:6656. AbG_{atm}, AnC, In_{gw}, In_{atm}, In_{hy}, InA_{gw}, InA_{atm}, $MeDf_{gw}$, SeEl.

V41 **Von Buttlar, Haro, and Wiik, B.,** 1965a, Enrichment of tritium by thermal diffusion and measurement of dated antarctic snow samples: Science, v. 149, no. 3690, p. 1371–1373. N.S.A. 19:46613. AbG_{snow}, AnC, In_{snow}, InA_{snow}, IsKi, KiR, SeAd, SeDf, SeEl, ThF.

V42 **Von Buttlar, Haro, and Wiik, B.,** 1965b, Enrichment of tritium by thermal diffusion and measurement of some well-dated antarctic snow samples, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 515–524. AbG_{snow}, InA_{snow}, SeDf.

von Faultings [Faltings], Volkert. *See* Harteck, Paul.

V43 **von Faltings, Volkert, and Harteck, Paul.** 1950a, Der tritiumgehalt der atmosphäre: Nature, v. 166, p. 1109. C.A. 45:5533 b. AbG_{atm}, InA_{atm}.

V44 **von Faltings, Volkert, and Harteck, Paul,** 1950b, Der tritiumgehalt der atmosphäre: Zeitschr. Naturforschung, v. 5a, p. 438–439. C.A. 45:2330 i; N.S.A. 15:20949. AbG_{atm}, AnC, InA_{atm}, NuB, NuR, SeEl.

V45 **von Faltings, Volkert, and Harteck, Paul,** 1950c, La teneur en tritium de l'atmosphère [The content of tritium in the atmosphere]: Translated into French from Zeitschr. Naturforschung, v. 5a, p. 438–439; Saclay, France, Comm. à l'Énergie Atomique Rap., CEA-tr-A-821. N.S.A. 15:20949. AbG_{atm}, AnC, InA_{atm}, NuB, NuR, SeEl.

V46 **Von Grosse, A. V., Johnston, W. M., Wolfgang, R. L., and Libby, W. F.,** 1951, Tritium in nature: Science, v. 113, p. 1–2, C.A. 45:2331 b. AbG_{atm}, AbG_{sw}, An, AnMs, InA_{atm}, InA_{sw}, Nu.

V47 **Von Grosse, A. V., Kirschenbaum, A. D., Kulp, J. L., and Broecker, W. S.,** 1954, The natural tritium content of atmospheric hydrogen: Phys. Rev., v. 93, p. 250–251. AbG_{atm}, InA_{atm}.

V48 **von Jensen, Elwood,** 1961, Determination of tritium in biological material, *in* Radioactive isotopes in physiology, diagnostics, and therapy, v. 1: Berlin, Germany, Springer-Verlag, p. 305–310. N.S.A. 16:1350. An, Ha.

V49 **von Ubisch, Hans,** 1953, Age determination by means of tritium: Fra Fysikkens Verden, v. 15, p. 174–177. C.A. 48:9209 e. BiB, InA_{atm}, InA_{gw}, InBi.

Vousden, J. E. *See* Pittendrigh, L. W. D.

V50 **Vul'fson, V. I.,** 1957, Use of radioactive atoms in hydrometeorological and hydrochemical investigations: Uchenye Zapiski, Leningrad. Vysshee Inzh. Morskae Uchilische. 1957, no. 6, p. 9–18; Referat. Zhur. Geofiz. [Abs.], no. 2660 [1958]. C.A. 52:15274 a. Ge (with 22 references), In, Is, Nu.

W

Wachberger, Eugen. *See* Kainz, Gerald.

W1 **Waechter, K. H.,** 1961a, On the measurement of tritium in room air: Mitteilungsbl. Strahlungsmessgeraete, no. 6, p. 11 [in German]. N.S.A. 18:13674. AnC, In_{atm}.

W2 **Waechter, K. H.,** 1961b, The measurement of tritium and C^{14} [carbon-14]: Kerntechnik, v. 3, p. 527–529. N.S.A. 16:11728. Ge of: An (with comparative tables).

W3 **Waechter, K. H.,** 1962, Determination of tritium and carbon-14: Dechema Mon. 44, no. 709–733, p. 267, 278. C.A. 59:1092 d; N.S.A. 16:11728. Ge of: AnC (with 13 references).

Wagner, C. D. *See* Guinn, V. P.

Waingankar, U. S. *See* Kamath, P. R.

Walker, B. E. *See* O'Steen, W. K.

Walton, Alan. *See* Feely, H. W.

Walton, Alan. *See* Friend, J. P.

W4 **Walton, Alan, Fisher, E. L., and Krey, P. W.,** 1962, Studies of nuclear debris in precipitation: U.S. Atomic Energy Comm. Pub., NYO-9532. 54 p. N.S.A. 16:23985. Ab_{atm}, $MeDf_{atm}$.

W5 **Wang, C. H., and Willis, D. L.,** 1965, Radiotracer methodology in biological science: Englewood Cliffs, N.J., Prentice-Hall, Inc., 399 p. C.A. 65: 5863 f. Ge of: InBi.

W6 **Wang, J. H., Robinson, C. V., and Edelman, I. S.,** 1952, Self diffusion and structure of liquid water: III, Measurement of the self diffusion of liquid water with hydrogen^2, hydrogen^3, and oxygen^{18} as tracers: Am. Chem. Soc. Jour., v. 75, p. 466–470. C.A. 47: 5198 i. In, MeDf.

Wänke, H. *See* Bainbridge, A. E.

Warin, R. *See* Guillaume, M.

W7 **Washburn, H. W., Berry, C. E., and Hall, L. G.,** 1953, Instrumental problems encountered in mass-spectrometer isotope analysis of water samples: [U.S.] Natl. Bur. Standards Circ. 522, p. 141–149. C.A. 47: 10342 b. AnMs.

W8 **Watanabe, S.,** 1962, Researches on gas tritium fixation—Part 1: Meidensha Jibo, v. 44, p. 67–70 [in Japanese]. N.S.A. 19: 11251. Ge of: In; Is, Nu, Se.

Watkins, J. W. *See* Heemstra, R. J.

Watson, M. S. *See* Porter, J. W.

Watts, R. J. *See* Eutsler, B. C.

Watts, R. J. *See* McClelland, Jean.

W9 **Weinberger, D., and Porter, J. W.,** 1953, Incorporation of tritium oxide in growing *Chlorella pyrenoidosa* cells: Science, v. 117, p. 636–638. C.A. 47: 8191 c. AbO, BiB, Is.

W10 **Weinberger, D., and Porter, J. W.,** 1954, Metabolism of hydrogen isotopes by rapidly growing *Chlorella pyrenoidosa* cells: Archives Biochemistry and Biophysics, v. 50, p. 160–168. C.A. 48: 8870 d. AbO, BiC.

W11 **Weizmann Institute of Science, Isotope Department, Rehovot Laboratory,** no date, Unpublished results on tritium investigations: (See Contract 136/R2/Rb from the Internat. Atomic Energy Agency, Vienna, Austria.) Ab_{atm}, $MeDf_{atm}$, $SeAd_{gw}$.

W12 **Welge, H. J.,** 1955, New use for radioactive tracers; Super sleuths trace flow of injected gas—Field tests in southern Oklahoma provide useful data on this new tool: Oil and Gas Jour., v. 54, no. 17, p. 77–79. C.A. 49: 15215 h. In.

Wells, E. J., Jr. *See* Dibeler, V. H.

Wells, E. J., Jr. *See* Mohler F. L.

Wendt, Immo. *See* Geyh, M. A.

Wendt, Immo. *See* Von Buttlar, Haro.

Wenzel, Martin. *See* Maurer, Rainer.

Wenzel, Martin. *See* Schulze, P. E.

W13 **Wenzel, Martin,** 1965, Simple activity determinations of double-labeled compounds on chromatograms: Naturwissenschaften, v. 52, no 6, p. 129 [in German]. N.S.A. 19: 38561. AdC, AnC.

W14 **Wenzel, Martin, and Schulze, P. E.,** 1962, Tritium-markierung—Darstellung messung und anwendung nach Wilzbach, ^{3}H-markierter verbindungen in medizin, chemie, landwirtschaft, industrie [Tritium labeling—Preparation, measurement, and application of compounds labeled by the Wilzbach method in medicine, chemistry, agriculture, industry]: Berlin, Germany, W. de Gruyter & Co., 176 p.: U.S. Atomic Energy Comm. Pub., DM–26, N.S.A. 17: 21771. Ge of: AnC, BiC, In, InBi.

W15 **Werbin, Harold, Chaikoff, I. L., Imada, M. R.,** 1959, A rapid and sensitive method for determining H^3–water in body fluids by liquid scintillation

spectrometry: Soc. Experimental Biology Medicine Proc., v. 102, p. 8. AnC, InBi.

Werner, O. E. *See* Östlund [Oestlund], H. G.

W16 **West, D. L.,** 1965, Process scale separation of hydrogen isotopes by gas chromatography: U.S. Atomic Energy Comm. Pub., DP–979, 24 p. N.S.A. 20:1733. Ab_{art}, AdC, An.

W17 **West, D. L., and Marston, A. L.,** 1964, Gas chromatographic separation of the hydrogen isotopes: Am. Chem. Soc. Jour., v. 86, p. 4731. N.S.A. 19:2230. AdC, SeAd.

Westbrook, H. L. *See* Eastham, J. F.

W18 **Westermark, Torbjorn, Devill, L., and Ghanem, N. A.,** 1960, The use of bremsstrahlung for the determination of tritium in aqueous and organic systems: Nuclear Instruments and Methods, v. 9, p. 141–144. C.A. 61:6605 fg; N.S.A. 15:8719. AnC, MeDf, SeAd.

W19 **Westermark, Torbjorn, Grapengiesser, Björn, Lindroth, Hans, and Ghanem, N. A.,** 1960, Note on the determination of tritium by means of liquid scintillators and DC–measurements of photomultiplier currents: Nuclear Instruments and Methods, v. 9, p. 357–359 [in English]. N.S.A. 15:8720. AnC, In, InBi.

W20 **Westin, Sverre,** 1958, Radiological dating, methods, and possibilities: Kgl. Norske Vidensk. Selsk. Forh., v. 31, p. 27–44. C. A. 53:15789 i. Ab, Ge, In.

W21 **Wexler, S.,** 1963, On the mechanism of the isotopic exchange of tritium with methane: Am. Chem. Soc. Jour., v. 85, p. 272–277. C.A. 58:6672 g; N.S.A. 17:12251. AnMs, KiI, Nu, Se.

W22 **Wexler, S.,** 1965, Mass spectrometric investigations of isotopic exchange reactions of gaseous hydrocarbon ions: Upton, N.Y., Symposium on Exchange Reactions, 1965, Proc., p. 301–324. AnC, AnMs, IsKi, SeAd.

Whalley, B. E. *See* Frenkel, E. P.

Wheat, J. A. *See* Foster, R. R.

W23 **Whisman, M. L., and Eccleston, B. H.,** 1962, Gas-exposure labeling of organics with tritium: Nucleonics, v. 20, no. 6, p. 98–102. N.S.A. 16:18968. Ge of: AnC, Sy.

W24 **Whisman, M. L., Eccleston, B. H., and Armstrong, F. E.,** 1960, Reproducibility of tritium analysis of organic compounds, using [a] liquid scintillation spectrometer: U.S. Atomic Energy Comm. Pub., BM–R1–5801, 17 p. N.S.A. 15:20655. Ge of: AnC, AnMs, Sy.

White, D. E. *See* Craig, Harmon.

W25 **White, D. E., Craig, Harmon, and Begemann, Friedrich,** (no date shown), Isotope geology of the Steamboat Springs area, **Nevada,** ***in*** Tongiorgi, Ezio, ed., Nuclear geology on geothermal areas: Pisa, Italy, Consiglio Nazionale delle Ricerche, Laboratorio di Geologia Nucleare, paper presented at conference, 1963, Spoleto, Italy, p. 9–16 [pub. distribution, 1967]. In_{gw}, InA_{gw}.

White, D. F. *See* Campbell, I. G.

White, D. F. *See* Payne, P. R.

W26 **White, D. F., Campbell, I. G., and Payne, P. R.,** 1950, Estimation of radioactive hydrogen [tritium]: Nature, v. 166, p. 628–630. C.A. 45:2050 g. AnC, InBi.

White, R. M. *See* Kambara, T.

Wiik, B. *See* Von Buttlar, Haro.

Wilgain, S. *See* Picciotto, Edgard.

Wilkinson, Geoffrey. *See* Cotton, A. F.

W27 **Wilkniss, P., and Moghissi, A.,** 1965, Nucleonics in rocketry and space: Atompraxis, v. 11, p. 13–20. N.S.A. 19: 17440. Ge of: AbG_{atm}, AbG_{met}, AbG_{sat}, In_{atm}, In_{met}, In_{sat} (with 259 references).

Williams, A. *See* Goodier, I. W.

Willis, D. L. *See* Wang, C. H.

W28 **Wilson, A. T.,** circa 1959, Technique for the use of tritium as a tracer in *in vivo* biological systems: U.S. Atomic Energy Comm. Pub., A/CONF.15/P/1506, 3 p. N.S.A. 13: 6216. AdC, BiC, InBi.

W29 **Wilson, A. T., and Fergusson, G. J.,** 1960, Origin of terrestrial tritium: Geochim. et Cosmochim. Acta, v. 18, p. 273–277. C.A. 54: 16952 g; N.S.A. 14: 19671. AbG_{atm}.

W30 **Wilson, A. T., and Spedding, D. J.,** 1965, Detection of tritium on paper and thin-layer chromatograms: Jour. Chromatography, v. 18, no. 1, p. 76–80. C.A. 63: 3600 g. Ge of: AdC, An (a review).

W31 **Wilson, E. J.,** 1957, Manipulation of radioactive gas in high vacuum apparatus: Vacuum, v. 4, p. 303–325. C.A. 51: 7885 a. AnC, Sy (with 64 references).

Wilson, J. E. *See* Khan, A. A.

W32 **Wilson, S. H.,** 1963, Tritium determinations on bore waters in the light of chloride-enthalpy relations: Inst. Nuclear Sci., Lower Hutt, New Zealand, Rept. INS–R–29, 15 p. N.S.A. 18: 43788. Ab_{gw}, AbG_{terr}, In_{gw}, InA_{gw}, $MeDf_{gw}$, ThD.

W33 **Wilson, S. H.,** 1966, Origin of tritium in hydrothermal solutions: Nature, v. 211, no. 5046, p. 272–273. C.A. 65: 11978 a. Ab_{gw}, In_{gw}, InA_{gw}, $MeDf_{gw}$.

Wilson, W. E. *See* McClelland, Jean.

Wilzbach, K. E. *See* Brown, W. G.

W34 **Wilzbach, K. E.,** 1957, Tritium-labeling by exposure of organic compounds to tritium gas: Am. Chem. Soc. Jour., v. 79, p. 1013. C.A. 51: 10359 a. An, InBi, NuIn, SeAd, Sy.

W35 **Wilzbach, K. E., and Dorfman, L. M.,** 1960, Labelling of organic compounds by electric discharge in tritium gas, *in* Radioisotopes in the physical sciences and industry, v. 3, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Conf. on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept, 6–17, 1960, Proc., p. 3–11 [1962]. N.S.A. 16: 23548. AnC, SeEl.

W36 **Wilzbach, K. E., Kaplan, Louis, and Brown, W. G.,** 1953, Preparation of gas for the assay of tritium in organic compounds: Science, v. 118, p. 522–523. C.A. 48: 3156 h. AnC, Sy.

W37 **Wilzbach, K. E., Van Dyken, A. R., and Kaplan, Louis,** 1954, Determination of tritium by ion-current measurement: Anal. Chemistry, v. 26, p. 880–883. C.A. 48: 11205 i. AnC, KiI.

W38 **Wimber, D. E.,** 1959, Chromosome breakage produced by tritium-labeled thymidine in *Tradescantia paludosa*: [U.S.] Natl. Acad. Sci. Proc., v. 45, p. 839–846. C.A. 53: 20323 de; N.S.A. 13: 15898. BiB, InBi, KiB, KiP.

W39 **Wimber, D. E.,** 1964, Effects of intracellular irradiation with tritium: Advances in Radiation Biology, v. 1, p. 85–115, N.S.A. 19: 19515. Ha, Ge of: BiB, BiC, Ki, KiB, Nu (with 87 references).

W40 **Wimber, D. E., Quastler, Henry, Stein, O. L., and Wimber, D. R.,** 1960, Analysis of tritium incorporation into individual cells by autoradiography of squash preparations: Jour. Biophys. and Biochem. Cytology, v. 8,

p. 327–331; U.S. Atomic Energy Comm. Pub., BNL–4718. N.S.A. 15: 10625. AbO, BiC, InBi, KiR, SeAd.

Wimber, D. R. *See* Wimber, D. E.

W41 **Wing, James,** 1957, Solubility of water in aromatic solvents using tritium as a tracer: Ann Arbor, Mich., Michigan Univ. Microfilms, no. 19404, 144 p. Dissert. Abs., v. 17, p. 760–761. C.A. 51: 11816 de. InSo, SeSo, SoO.

W42 **Wing, James, and Johnston, W. H.,** 1955, Method for counting tritium in tritiated water: Science, v. 121, p. 674–675. C.A. 49: 11438 f. AnC.

Winkelman, J. W. *See* Karmen, Arthur.

W43 **Winkelman, J. W., and Karmen, Arthur,** 1962, Use of an ionization chamber for measuring radioactivity in gas chromatography effluents: Anal. Chemistry, v. 34, p. 1067–1071. N.S.A. 16: 25428. AdC, AnC.

Winter, E. R. S. *See* Graupner, K.

W44 **Wittemore, I. M. and Lehman, R. L.,** 1957, Synthesis and storage of small quantities of tritiated water: U.S. Atomic Energy Comm. Pub., UCRL–8056, 9 p. C.A. 52: 9798 e. Ha, Sy.

Wohlfahrt, D. *See* Von Buttlar, Haro.

Wolfgang, R. L. *See* Currie, L. A.

Wolfgang, R. L. *See* Von Grosse, A. V.

W45 **Wolfgang, R. L.,** 1961, Vapor-phase proportional counting, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 183–184 [1963]. C.A. 58: 9845 h; N.S.A. 17: 18489. AdC; Ge of: AnC.

W46 **Wolfgang, R. L., and MacKay, C. F.,** 1958, New proportional counters for gases and vapors: Nucleonics, v. 16, no. 10, p. 69–73. C.A. 53: 891 a. AnC.

Wolfgang, Richard. *See* El-Sayed, M. A.

Wolfgang, Richard. *See* Pratt, T. H.

W47 **Wolfgang, Richard,** 1961, On the origin of high tritium content of atmospheric methane, hydrogen, and stratospheric water: Nature, v. 192, p. 1279–1280. N.S.A. 16: 7763. Ab_{atm}, Ab_{art}, In_{atm}, SeAd.

W48 **Wood, F. W., and O'Neal, Denny,** 1965, Tritiated water as a tool for ecological field studies: Science, v. 147, no. 3654, p. 148. N.S.A. 19: 8736. AbO, BiB, BiC, In_{Pe}, InBi, MeDf, $SeAd_{Pe}$.

W49 **World Health Organization,** 1959, Methods of radiochemical analysis: Geneva, Switzerland, Rept. of a Joint WHO/FAO Expert Comm., World Health Organization Tech. Rept., ser. 173, 116 p. N.S.A. 15: 7308. AnC, Ha, In_{atm}, In_{gw}, In_{sw}, In_{ocean}, In_{terr}, InBi, KiR, Sy.

Wormall, A. *See* Francis, G. E.

W50 **Wylie, K. F., Bigler, W. A., and Grove, G. R.,** 1963, Biological half-life of tritium: Health Physics, v. 9, p. 911–914. C.A. 60: 5860 g: N.S.A. 18: 1351. AbO, AnC, BiB, Ha, InBi.

Wyttenbach, A. *See* Feitknecht, W.

Y

Y1 **Yakushin, F. S.,** 1962, The use of kinetic isotopic effect of tritium in determining the reaction mechanism of the replacement and transfer of a hydrogen atom: Uspekhi Khim., v. 31, p. 241–256 [in Russian]. N.S.A. 16: 14621. Eq, In. Ge of: IsEq, IsKi, KiI, KiL (with 77 references).

Y2 **Yamada, Kiyoteru, and Sato, Yoshishige,** 1961, Techniques for using tritium gas: Dôitai To Hôshasen, v. 4, p. 64–66. N.S.A. 16: 30457. Ha, MeDf, SeAd, SeDs, SeEl.

Yamasaki [Yamazaki], Fumio. *See* Takahashi, Tan.

Y3 **Yamazaki [Yamasaki], Fumio, Hamada, Tatsuji, Okano, Masaharu, and Takahashi, Tan,** 1961, Measurement of tritium using ionization chambers: Tokyo, Japan, 4th Japan Conf. on Radioisotopes, Oct. 10–12, 1961, Proc., p. 716–720 [in Japanese]. C. A. 61: 11577 c; N.S.A. 17: 29987. AnC.

Yamazaki, Mikio. *See* Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)].

Y4 **Yamazaki, Mikio, Ishihama, H., and Kashida, Yoshihiko [Kasida, Yosihiko (or Yoshiko)],** 1966, Tritium measurement with a liquid scintillation counter—The application of the oxygen-flask combustion method to a strong coloured sample: Internat. Jour. Appl. Radiation and Isotopes, v. 17, no. 2, p. 134–136 [in English]. C. A. 64: 15331 d. AnC, AnCl.

Y5 **Yang, J. Y., and Gevantman, L. H.,** 1964, Tritium β–radiation-induced isotopic exchange with water vapor: Jour. Phys. Chemistry, v. 68, no. 11, p. 3115–3119. C.A. 61: 15614 b; N.S.A. 18: 3862, N.S.A. 19: 4214. IsTh, KiR, NuB, NuR, SeAd, ThSo.

Y6 **Yang, J. Y., Smith, C., and Gevantman, L. H.,** 1963, Tritium β–decay-induced isotopic exchange with water vapor: Am Chem. Soc., 145th Natl. Mtg., New York, Sept. 1963. U.S. Atomic Energy Comm. Pub., CONF–117–19, 20 p. N.S.A. 18: 3862. IsTh, KiR, NuB, NuR, SeAd, ThSo.

Yang, Kang. *See* Gant, P. L.

Yasushi, Nishiwaki. *See* Nishiwaki, Yasushi.

Y7 (Reference deleted.)

Ying, Huei-Kuen. *See* Van't Hof, J.

Yoash, Vaadia. *See* Raney, Franklin

Yost, D. M. *See* Jenkins, W. A.

Y8 **Youmans, A. H. (to Dresser Industries, Inc.)** 1960, Method and apparatus for identifying the elements in the formations penetrated by a drill hole: U.S. Patent 3,257,557, June 21, 1966. N.S.A. 20: 39137. An, In_{gw}, NuB.

Yura, Osuma. *See* Mann, W. B.

Y9 **Yura, Osuma, and Kimura, Miwako,** 1964, Activity measurement of tritium with microcalorimeter: Oyo Butsuri, v. 33, p. 342–347 [in Japanese]. N.S.A. 19: 11586. AnC, AnCl, NuB, Sy.

Z

Zaehringer, J. *See* Fireman, E. L.

Z1 **Zajicek, G., and Gross, J.,** 1964, Studies on the radiobiological effect of ^{3}H–thymidine on the DNA turnover in Landschuetz ascites tumor cells: Experimental Cell Research, v. 34, p. 138–143. N.S.A. 18: 23215. BiC, BiZ, InBi.

Zaoralek, Peter. *See* Zuppinger, Adolph.

Z2 **Zav'yalov, A. P., Istomina, A. G., and Markelov, V. V.,** 1960, Device for measuring tritium oxides: Meditsinskaya Radiologiya, v. 5, no. 12, p. 57–60. C.A. 55: 14096 a. AnC.

Z3 **Zel'venskii, Ya. D., Efremov, A. A., and Larin, G. M.,** 1965, Study of the liquid-vapor equilibrium in hydrocarbon-water systems using tritium: Khimiya i Tekhnologiya Topliv i Masel, v. 10, no. 7, p. 3–7 [in Russian]. C.A. 63: 10745 fg. In, Is, MeSt, SoO, Th.

Z4 **Zel'venskii, Ya. D., Nikolaev, D. A., Tatarinskii, V. S., and Shalygin, V. A.,** 1965, Concentration of water samples for the determination of the tritium content: Atomnaya Energiya, v. 18, no. 4, p. 367–372 [in Russian]. C.A. 63: 5373 c: N.S.A. 19: 30407. AnC. IsTh, SeAd, SeDs.

Z5 **Zhuravlev, V. F.,** 1964a, Tritium in biology and medicine: Meditsinskaya Radiologiya, v. 9, no. 12, p. 63–70 [in Russian]. C.A. 62: 9369 e; N.S.A. 19: 15967. AbO, Ge of: BiB, InBi (with numerous references from 66 articles).

Z6 **Zhuravlev, V. F.,** 1964b, Experimental toxicity of tritium, *in* Moskalev, Yu. I., ed., Raspredelenie Biologicheskoe Deistvie Uskorenie Vyvedeleniya Radioaktivnye Izotopov [Distribution, biological effects, and rapid excretion of radioactive isotopes]: Moscow, U.S.S.R., Sbornik Rabot, p. 202–208 [in Russian]. C.A. 62: 13482 b; N.S.A. 19: 40337. AbO, BiZ, Ha.

Z7 **Zhuravlev, V. F.,** 1964c, Experimental therapy of rabbits poisoned by tritium oxide, *in* Moskalev, Yu. I., ed., Raspredelenie Biologicheskoe Deistvie Uskorenie Vyvedeleniya Radioaktivnye Izotopov [Distribution, biological effects, and rapid excretion of radioactive isotopes]: Moscow, U.S.S.R., Meditsina, p. 299–310 [in Russian]. N.S.A. 19: 40340. BiZ, InBi.

Z8 **Ziegler, Albert, and Peter-Juergen, Meyer (to Siemens-Schuckertwerke AG),** 1962, Method for the recovery of deuterium oxide and tritium from the air of closed rooms of nuclear reactor installations and device for its accomplishments: German Patent 1,194,995 [June 16, 1965]. N.S.A. 19: 38907. Ha.

Ziegler, C. A. *See* Brinkerhoff, J. M.

Z9 **Ziegler, C. A., Chleck, D. J., and Brinkerhoff, J. M.,** 1957, Radioassay of low-specific-activity tritiated water by improved liquid scintillation techniques: Chicago, Ill., Northwestern Univ., Conf. on Liquid Scintillation Counting Proc., p. 185–190 [1958]. C.A. 53: 5899 e. AnC.

Z10 **Ziegler, C. A., and Schwebel, A.,** 1957, Technique for monitoring tritiated-water vapor in air: Nucleonics, v. 15, no. 1, p. 64. N.S.A. 11: 3488. AnC.

Z11 **Zilversmit, D. B.,** 1961, Design and analysis of tracer experiments, *in* Rothchild, Seymour, ed., Advances in tracer methodology, v. 1: New York, Plenum Press, p. 203–204 [1963]. N.S.A. 16: 18493. Ge of: An, In, No, Sa.

Z12 **Zimmermann, U., Ehhalt, D. and Münnich, K. O.,** 1966, Soil-water movement and evapotranspiration—Changes in the isotopic composition of the water: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Isotopes in Hydrology, Nov. 14–18, 1966, Proc., Symposium preprint, SM83/38, 26 p. BiB, In_{Hy}, In_{gw}, In_{Pe}, MeDf, SeDf.

Z13 **Zimmermann, U., Münnich, K. O., and Roether, W. K.,** 1966, Tracers determine movement of soil moisture and evapotranspiration: Science, v. 152, no. 3720, p. 346–347. In_{Hy}, In_{gw}, In_{hy}, MeDf.

Z14 **Zimmermann, U., Münnich, K. O., Roether, W. K., Schubach, K., and Siegel, O.,** 1965, Downward movement of soil moisture traced by means of hydrogen isotopes—Evaluation of evapotranspiration, *in* Chatters, R. M., and Olson, E. A., Radiocarbon and tritium dating: Pullman, Wash., Washington State Univ., 6th Internat. Conf. on Radiocarbon and Tritium Dating, June 7–11, 1965, Proc., p. 577–588. Ab_{Pe}, In_{Pe}, InA_{Pe}, $MeDf_{Pe}$.

Zlatkis, A. *See* Shoemake, G. R.

Z15 **Zodtner, H. H.,** 1965, Ground-water resources using nuclear techniques, *in* Schiff, Leonard, ed., Biennial Conference on ground-water recharge, development, and management: Los Angeles, Calif., California Univ., Fresno Field Sta. Pub. PH–50–H–55. Ha, In_{gw}.

Z16 **Zuppinger, Adolf, Poretti, G. G., Zaoralek, Peter, and Aebi, Hugo,** 1962, Radiation conditioned disturbance of tritium incorporation in organic cell substances: Strahlentherapie, v. 118, p. 42–45. N.S.A. 16: 20221. BiC, BiZ.

Z17 **Zuppinger, Adolf, Poretti, G. G., Zaoralek, Peter, and Aebi, Hugo,** 1963, Disturbances in the tritium content in organs after irradiation: Radiologia Clinica, v. 32, p. 402–410 [in English]. N.S.A. 17: 27181. AbO, BiC, BiZ, MeDf.

CLASSIFICATION INDEX—PRINCIPAL SUBJECT INDEX

This principal subject index is compiled from the principal topics and subject code, which precedes the main bibliography. Indexing follows the general form used in the tritium bibliographies published by the U.S. National Bureau of Standards, with two exceptions. First, new principal and subsidiary topics with their appropriate subject codes have been added, and those not applicable to the purpose and scope of this bibliography have been omitted. Second, the principal and subsidiary topics are stated first, followed then by the principal subject code enclosed in parentheses. This last change should help the reader to locate more readily the subject references. The letter-number symbols listed indicate references in the main bibliography (tritium references) only. However, the meanings of the auxiliary reference-list codings are identical to those of the main bibliography, except that they do not apply specifically to discussions of tritium.

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[Ocean water (InA_{ocean})]: B1, B6, B7, B50, G30, G31, G32, L45, L48, T14, T16.

[Pedology (soils) and agronomy (InA_{Pe})]: K61, M69, P9, Z14.

[Satellites (InA_{sat})]: F25.

AUXILIARY REFERENCE LIST

ANALYTICAL METHODS

Bell, C. G., Jr., and Hayes, F. N., eds., 1957, Liquid scintillation counting: Chicago, Northwestern Univ. Conf. on Liquid Scintillation Counting, Proc., New York, Pergamon Press, 292 p. [1958]. Ge of: AnC.

Birks, J. B., 1954, Scintillation counters: New York, Pergamon Press, 148 p. Ge of AnC.

Curran, S. C., and Craggs, J. D., 1949, Counting tubes: Theory and applications: New York, Academic Press. Ge of: AnC.

Edwards, J. M., and Holter, E. L., 1962, Applications of subsurface solid-state isotope injector to nuclear-tracer survey methods: Jour. Petroleum Technology, v. 14, p. 121–124. N.S.A. 17: 3090. Ha, In_{gw}, $MeDf_{gw}$.

Gfeller, Chr., and Oeschger, Hans, 1962, Limits for the measurement of weak activities: Helvetica Physica Acta, v. 35, nos. 4, 5, p. 307–313 [in German]. C.A. 59: 4759 c. AnC.

Houtermans, F. G., and Oeschger, H., 1958, Proportional Zählrohr zur Messung schwacher aktivitäten weicher β-Stralen: Helvetica Physica Acta, v. **31**, p. 117–126. C.A. 52: 19544 e. AnC.

Hull, D. E., 1958, The total count technique: A new principle in flow measurement: Internat. Jour. Appl. Radiation and Isotopes, v. 4, p. 1. AnC, In_{sw}.

Laustriat, Gilbert, 1965, Detection of low-energy β-rays by using liquid scintillation counters: Rev. Med. Toulouse, v. 1, no. 2, p. 147–162 [in French]. Ge of: AnC (with 48 references).

Parsons, P. J., 1962a, Movement of radioactive wastes through soil; IV, Migration from a single source of liquid waste deposited in porous media: Chalk River, Ontario, Canada, Atomic Energy Canada, Ltd., Pub., AECL–1485, 22 p.: Sci. Doc. Distrib. Office Pub., CRER–1077, 22 p. C.A. 57: 7047 cd. InA_{gw}, In_{Pe}, $MeDf_{gw}$, $MeDf_{Pe}$, $SeAd_{gw}$, $SeAd_{Pe}$.

Parsons, P. J., 1962, Movement of radioactive wastes through soil, V. The liquid disposal area: Chalk River, Ontario, Canada, Atomic Energy Canada, Ltd., Pub., AECL–1561, 15 p.; Sci. Doc. Distrib. Office Pub., CRER–1089, 15 p. C.A. 57: 16346 a. In_{Pe}, In_{gw}, In_{Hy}, InA_{Pe}, InA_{gw}, $SeAd_{Pe}$, $SeAd_{gw}$.

Raymond, J. R., and Bierschenk, W. H., 1957, Hydrologic investigations at Hanford: Am. Geophys. Union Trans. v. 38, no. 5, p. 724–729. An, In_{gw}, In_{Hy}, $MeDf_{gw}$.

Sheppard, C. W., 1962, Basic principles of the tracer method: New York, John Wiley & Sons, Inc., 282 p. Ge of: In.

Volarovich, M. P., and Churaev, N. V., 1960, Use of the radioactive tracer method to study problems of the translocation of water in the peat stratum during drainage: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Peaceful Uses of Atomic Energy, Proc., at Tashkent, Uzbek. SSR, v. 2. U.S. Atomic Energy Comm. Translation Pub., 6390, p. 304–321 [in English, 1964]. In_{gw}, $MeDf_{gw}$.

Waldron, J. D., ed., 1958, Advances in mass spectrometry: Conf. on Advances in Mass Spectrometry, Proc., New York, Pergamon Press, 704 p. C.A. 54: 13847 a. Ge of: AnMs.

Washtell, C. C. H., 1960, An introduction to radiation counters and detectors: New York, Philosophical Library, Inc., 115 p. Ge of: AnC.

Wilkinson, D. H., 1950, Ionization chambers and counters: New York, Cambridge Univ. Press of: AnC.

ATMOSPHERE

Alsop, R. J. L., Moroney, J. R., Nunn, R. O., Stevens, D. J., and Titterton, E. W., 1963, Global fallout in Australia during 1962: Australian Jour. Sci., v. 25, p. 426–429. C.A. 59: 3509 f. Ab, In, MeDf.

Benton, G. S., Estoque, M. A., and Dominitz, J., 1953, Baltimore, Md., Johns Hopkins Univ., Dept. Civil Eng., Scientific Rept. 1, Contract AF 19(122)–365 of Geophysics Research Div., U.S. Air Force, Cambridge Research Center. $MeDf_{atm}$.

Hagemann, F. T., Gray, J., Jr., and Machta, Lester, 1965, ^{14}C measurements in the atmosphere—1963 to 1964: U.S. Atomic Energy Comm. Pub., HASL–159, 124 p. C.A. 63: 5216 d. In_{atm}, $MeDf_{atm}$, Sa.

Hinzpeter, M., 1965, Relation of total β-activity to specific nuclide concentrations in fallout: Zentralblatt für Biol. Aerosol Forschung, v. 12, no. 4, p. 273–284 [in German]. C.A. 63: 10965 f. $MeDf_{atm}$.

Junge, C. E., 1958, Atmospheric chemistry, *in* Landsberg, H. E., and Van Mieghem, eds., Advances in geophysics: New York, Academic Press, Inc., v. 4, p. 1–108. Ge of: Ab, MeDf.

Kruger, Paul, Hamada, Gerald, and Miller, Albert, 1963, Radioactive fallout in California during the winter 1961–62: Jour. Appl. Meteorology, v. 2, no. 5, p. 608–613. C.A. 60: 5042 f. Ab, $MeDf_{atm}$, Sa.

Kuroda, P. K., Hodges, H. L., Fry, L. M., and Moore, H. E., 1962, Stratospheric residence time of strontium-90: Science, v. 137, no. 3523, p. 15–17. InA_{atm}, $MeDf_{atm}$.

Landsberg, H. E., and Van Mieghem, J., eds., 1958, Atmospheric diffusion and air pollution: Internat. Union of Theoretical and Appl. Mechanics—Internat. Union of Geodesy and Geophysics Symposium, held at Oxford, England, Aug. 24–29, 1958, Proc., Advances in Geophysics, v. 8. New York, Academic Press, 470 p. [1959]. Ge of: $MeDf_{atm}$.

Lassen, L., 1962, Distribution of natural radioactivity on the different particle sizes in atmospheric aerosols: 1st Natl. Conf. on Aerosols, at Liblice, near Prague, Proc., p. 345–352 [in English, 1965]. C.A. 64: 10973 f. $MeDf_{atm}$.

Library of Congress, 1962, Phenomena in the upper atmosphere review of Soviet literature: Washington, Library of Congress, Aerospace Inf. Div., U.S. Atomic Energy Comm. Pub., NP–11961, 27 p. N.S.A. 16: 27418. General of meteorology, geophysics, astrophysics (with summaries of 21 Soviet pubs.). Ge.

Lockhart, L. B., Jr., Baus, R. A., Patterson, R. L., Jr., and Saunders, A. W., Jr., 1959, Contamination of the air by radioactivity from the 1958 nuclear tests in the Pacific: Science, v. 130, no. 3368, p. 161–162. Ab_{atm}, $MeDf_{atm}$.

Lockhart, L. B., Jr., and Piatt, V. R., 1965, The present status of chemical research in atmosphere purification and control of nuclear-powered submarines: U.S. Atomic Energy Comm. Pub., Accession 29751, NRL–6251, 70 p. C.A. 64: 13708 h. An, MeDf, Sa.

Lodge, J. P., Jr., and Holland, J. Z., 1963, Atmospheric chemistry: Am. Geophys. Union Trans., v. 44, no. 2, p. 365–369. Ge of: Ab_{atm}.

Machta, Lester, 1959a, Role of atmosphere in fall-out problem, *in* Biological and environmental effects of nuclear war, Part 1: Hearings before Spec. Subcomm. on Radiation of the Joint Comm. on Atomic Energy, U.S. 86th Cong., 1st sess., p. 127–139. $MeDf_{atm}$.

Machta, Lester, 1959b, Fallout from nuclear weapons tests: Hearings before Spec. Subcomm. on Atomic Energy, U.S. 86th Cong., 1st sess., p. 787–806. N.S.A. 14: 6123. Ab_{atm}, Ab_{Pe}, $MeDf_{atm}$.

Machta, Lester, 1960, Meteorology and radioactive fallout: World Meteorol. Organization Bull., v. 9, no. 2, p. 64–70. Ge of: $MeDf_{atm}$.

Machta, Lester, and Lucas, H. F., Jr., 1962, Radon in the upper atmosphere: Science, v. 135, p. 296–299. N.S.A. 16: 7764. $MeDf_{atm}$.

Newell, R. E., 1963. The general circulation of the atmosphere and its effects on the movement of trace substances: Jour. Geophys. Research, v. 68, no. 13, p. 3949–3962. Ge of: In_{atm}, $MeDf_{atm}$ (with 30 references).

New York Times, 1955, Report issued by the [U.S.] Atomic Energy Commission on effects of H-bomb explosions: New York Times, Feb. 16, 1955, p. 18. Ge of: Ab_{atm}, Ha, In_{atm}, $MeDf_{atm}$.

Pierson, D. H., 1961, Transfer of stratospheric fission products into the tropopause: Nature, v. 192, p. 497–500. N.S.A. 16: 4417. $MeDf_{atm}$.

Rose, D. C., Fenton, K. B., Katzman, J., and Simpson, J. A., 1956, Latitude effect of the cosmic-ray nucleon and meson components at sea level from the Arctic to the Antarctic: Canadian Jour. Physics, v. 34, p. 968–977. AbG.

Santholzer, V., and Havlovic, V., 1962, Increase in the radioactivity of the fallout in spring 1962 and the mechanism of distribution of the fission products in the atmosphere: Jaderna Energia, v. 8, p. 422–428 [in Czech.]. N.S.A. 17: 8404. $MeDf_{atm}$.

Simpson, J. A., and Fagot, W. C., 1953, Properties of the low-energy nucleonic component at large atmospheric depths: Phys. Rev., v. 90, p. 1068–1072. AbG.

Stern, S. C., 1961, Isotope ratios of fission products in the stratosphere and in the tropospheric fallout, *in* Wood, R. C., and Jones, S. P., Letter progress report [on the atmosphere monitoring program] for January 1961: U.S. Atomic Energy Comm. Pub., TID–11923, 11 p. N.S.A. 15: 13166. Ab_{atm}, BiC, In_{atm}, $MeDf_{atm}$, Sa, $SeAd_{atm}$.

U.S. Atomic Energy Commission, 1959, Fallout from nuclear weapons tests: U.S. Govt. Spec. Subcomm. of the Joint Comm. on Atomic Energy Hearings on Radiation, May 5–8, v. 1, p. 23, Washington, U.S. Govt. Printing Office. Ab, MeDf.

U.S. Atomic Energy Commission, 1961, The circulation of the stratosphere: U.S. Atomic Energy Comm. Pub., TID–13093, 10 p. N.S.A. 16: 4374. MeDf.

U.S. Atomic Energy Commission, 1962, Study of techniques for determining distribution of radioactive material deposited in the upper atmosphere: U.S. Atomic Energy Comm. Pub., NYO–10393, 13 p. InA_{atm}, $MeDf_{atm}$.

Wilson, G. U., and Phillips, E. F., 1962, Meteorological factors affecting the strontium-90 content of rain water: Australian Jour. Sci., v. 24, p. 437–447. C.A. 58: 2293 d. MeDf.

Wood, R. C., and Jones, S. P., 1961, Letter progress report [on the atmosphere monitoring program] for January 1961: U.S. Atomic Energy Comm. Pub., TID–11923, 11 p. Ab_{atm}, $MeDf_{atm}$.

BIOLOGY

Jarvis, P. G., and Slayter, R. O., 1966, Calibration of β gauges for determining leaf water status: Science, v. 153, p. 78–79. BiB, InBi, Sa.

Katz, J. J., and Crespi, H. L., 1966, Deuterated organisms—Cultivation and uses: Science, v. 151, no. 3715, p. 1187–1194. AbO, An, BiB, InBi.

Moskalev, Yu. I., ed., 1964, Raspredelenie biologicheskoe deistvie uskorenie vyvedeniya radioaktivnye izotopov [Distribution, biological effects, and rapid excretion of radioactive isotopes]: Moscow, U.S.S.R., Meditsina, 375 p. [in Russian]. N.S.A. 19: 40311. Ge of: Bi (contains 45 papers).

Nakayama, F. S., and Ehrler, W. L., 1964, Beta-ray gauging technique for measuring leaf water-content changes and moisture status of plants: Plant Physiology, v. 39, no. 1, p. 95–98. C.A. 60: 13563 c. AbO, AnC, InBi.

Salo, Anneli, and Miettinen, J. K., 1964, Strontium–90 and cesium–137 in arctic vegetation during 1961: Nature, v. 201, no. 4925, p. 1177–1179. C.A. 60: 14811 bc. AbO, MeDf.

U.S. Government, 1963, Environmental radiation studies, *in* Fundamental nuclear energy research: Washington, U.S. Govt. Printing Office, p. 139–180. N.S.A. 18: 9817. Ge of: AbO, BiC, In_{gw}, In_{Pe}, In_{ocean}, InBi.

GEOLOGIC ABUNDANCE

Anderson, H. R., 1961, Primary cosmic radiation in 1958 and variations: Pasadena, Calif., California Inst. Technology, unpub. thesis. AbG.

Burg, Constant, 1965, Radioactive fallout and atmospheric pollution: Bull. Soc. Lorraine Sci. 5, no. 4, p. 131–139 [in French]. C.A. 64: 18917 e. Ge of: Ab_{atm}, $MeDf_{atm}$.

Czubek, J. A., ed., 1962, Nuclear Geophysics, v. III: Warsaw, Sci., Tech., and Econ. Info. Center of Govt. Comm. for Atomic Energy Nuclear Geophysics Conf., held at Kracow, Poland, Sept. 24–30, 1962 [1963], Proc. N.S.A. 18: 5510. Ge.

Hess, W. N., 1959, Van Allen belt protons from cosmic-ray neutron leakage: Phys. Rev. Letters, v. 3, p. 11–13. N.S.A. 13: 18428. AbG.

Hess, W. N., Canfield, E. H., and Lingenfelter, R. E., 1961, Cosmic-ray neutron demography: Jour. Geophys. Research, v. 66, p. 665–677. AbG.

Kellogg, P. J., 1959, Possible explanation of the radiation observed by Van Allen at high altitude in satellites: Nuovo Cimento, v. [10] 11, p. 48–66. AbG.

Kokubu, Nobuhide, Mayeda, T., and Urey, H. C., 1961, Deuterium content of minerals, rocks, and liquid inclusions from rocks: Geochim. et Cosmochim. Acta, v. 21, p. 247–256. C.A. 55: 10236 h. AbG_{sw}, AbG_{ocean}, AbG_{terr}, An, In_{terr}, In_{sw}, In_{ocean}.

Korff, S. A., 1963, Production of neutrons by cosmic radiation [abs.]: Houston, Tex., Rice Univ. Internat. Symposium on Natural radiation environment, 1963, Proc., p. 29. AbG_{atm}.

Lingenfelter, R. E., 1963, The cosmic-ray neutron leakage flux: Jour. Geophys. Research, v. 68, no. 20, p. 5633–5639. Ge of: AbG (with 27 references).

Lockwood, J. A., 1960, On the long-term variation in cosmic radiation: Jour. Geophys. Research, v. 65, p. 19–25. AbG.

Lord, J. J., 1951, The altitude and latitude variation in the rate of occurrence of nuclear distintegrations produced in the stratosphere by cosmic rays: Phys. Rev., v. 81, p. 901–909. AbG.

Meyer, P., and Simpson, J. A., 1955, Changes in the low-energy particle cut-off and primary spectrum of cosmic radiation: Phys. Rev., v. 99, p. 1517–1523. AbG.

Neher, H. V., 1959, Change of cosmic rays in space: Nature, v. 184, p. 423–425. AbG.

Neher, H. V., and Anderson, H. R., 1962, Cosmic rays at balloon altitudes and the solar cycle: Jour. Geophys. Research, v. 67, p. 1309–1316. AbG.

Oana, S., 1942, Geochemical studies of volcanos in Japan: XXV, Density measurements of water from fumarole of Yadedake, 2: Chem. Soc. Japan Bull., v. 17, p. 302–304. C.A. 41–4418. AbG, AnDn.

Schaeffer, O. A., Stoenner, R. W., and Davis, R., Jr., 1960, Meteorites as space probes for cosmic rays, *in* Radioisotopes in the physical sciences and industry, v. 1, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on Use of Radioisotopes in the Phys. Sci. and Industry, held at Copenhagen, Denmark, Sept. 6–17, 1960, Proc., p. 3–11 [1962]. C.A. 57: 5527 a. N.S.A. 16: 16038. AbG_{atm}.

Simpson, J. A., 1951, Neutrons produced in the atmosphere by cosmic radiations: Phys. Rev., v. 83, p. 1175–1188. AbG.

Soberman, R. K., 1956, High altitude cosmic-ray neutron-intensity variations: Phys. Rev., v. 90, p. 934–950. AbG.

Telegadas, K., 1959, Fallout from nuclear weapons tests: U.S. 86th Cong. Spec. Subcomm. of the Joint Comm. on Atomic Energy Hearings on Radiation, May 5–8, 1959, v. 8, app. 1, p. 2517–2533. Washington, U.S. Govt. Printing Office. Ab_{atm}, In_{atm}, $MeDf_{atm}$.

Yagoda, Herman, Filz, Robert, and Fukui, Katsura, 1961, Emission of carbon-group heavy nuclei from a 3+ solar flare: Phys. Rev. Letters, v. 6, p. 626–628. C.A. 55: 26756 ef. AbG.

GROUND WATER

American Petroleum Institute, 1958, Problems in the disposal of radioactive wastes in deep wells: Dallas, Tex. $MeDf_{gw}$.

Andrew, J. T. G., Ellis, W. R., Seatonberry, B. W., and Wiebenga, W. A., 1965, The use of radioisotopes as ground-water tracers in the Burdekin Delta area of North Queensland, Australia: Lucas Heights, Australian Atomic Energy Comm. Research Establishment Pub., AAEC/E–137, 44 p. N.S.A. 19: 42646. Ab_{gw}, In_{gw}, In_{hy}, InA_{gw}.

Arlin, Z. E., 1962, Deep-well disposal of uranium tailing water: U.S. Atomic Energy Comm. Pub., TID–7628, p. 356–360. C.A. 58: 1236 b. $MeDf_{gw}$.

Baumann, Paul, 1965, Technical development in ground water recharge, *in* Chow, Ven Te, Advances in hydroscience v. 2–1965: New York, Academic Press, p. 209–279. $MeDf_{gw}$, $MeDf_{hy}$.

Bear, Jacob, and Todd, D. K., 1960, The transition zone between fresh and Geophys. Research, v. 66, no. 4, p. 1185–1197. In_{gw}, $MeDf_{gw}$.

Bear, Jacob, and Todd, D. K., 1960, The transition zone between fresh and salt waters in coastal aquifers: California Univ. Water Resources Center Contr. 29, 156 p. $MeDf_{gw}$.

Becherly, J. G., 1960, Nuclear subsurface prospecting, paper 13, *in* Annual review of nuclear science: Vienna, Austria, Internat. Atomic Energy Agency. Ge of: In_{gw}.

Borowczyk, M. J., Mairhofer, and Zuber, A., 1965, Laboratory investigations on the determination of filtration velocity by means of radioisotopes: Atomkernenergie, v. 10, p. 51–56. In_{gw}, $MeDf_{gw}$.

Brinkman, Roland, Eichler, Roland, Ehhalt, D., and Münnich, K. O., 1963, Über den deuterium-gehalt von Niederschlags and grundwasser [Deuterium concentration in precipitation water and ground water]: Naturwissenschaften, v. 50, p. 611. AbG_{atm}, AbG_{gw}, In, Is, $SeAd_{gw}$, ThD.

Brown, R. F., 1966, Hydrology of the cavernous limestones of the Mammoth Cave area, Kentucky: U.S. Geol. Survey Water-Supply Paper 1837, 64 p. In_{gw}.

Brown, R. H., 1961, Hydrogeologic factors pertinent to ground water contamination: U.S. Dept. Health, Education and Welfare Symposium on Ground-water contamination, Proc., Robert A. Taft Sanitary Eng. Center Tech. Rept., W61–5, p. 7–16, In_{gw}, $MeDf_{gw}$.

Cahill, J. M., 1966, Preliminary evaluation of three tracers used in hydraulic experiments on sand models, *in* U.S. Geological Survey Research 1966: U.S. Geol. Survey Prof. Paper 550–B, p. B213–B217. In_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

Champlin, J. B. F., 1962, Research on field problems on injecting solutions into permeable rocks: U.S. Atomic Energy Comm. Pub., TID–7628, p. 324–341. C.A. 58: 1233 f. MeDf.

Davis, S. N., and De Wiest, R. J. M., 1966, Hydrogeology: New York, John Wiley & Sons, Inc., 463 p. $MeDf_{gw}$.

Day, P. R., 1956, Dispersion of moving salt-water boundary advancing through saturated sand: Am. Geophys. Union Trans., v. 37, no. 5, p. 595–601. $MeDf_{gw}$.

de Josselin de Jong, G., 1958, Longitudinal and transverse diffusion in granular deposits: Am. Geophys. Union Trans., v. 39, p. 67–74. In_{gw}, $MeDf_{gw}$.

De Wiest, R. J. M., 1965, Geohydrology: New York, John Wiley & Sons, Inc., 366 p. Ge of: $MeDf_{gw}$.

Filip, A., and Vukmirovic, V., 1964, Détermination de vitesse de filtration d'eau souterraine par la méthode de dilution au moyen de traceurs radioactifs: Internat. Assoc. Sci. Hydrology, v. 9, no. 2, p. 19–24. In_{gw}, $MeDf_{gw}$.

Guizerix, J., Grandclement, C., Gaillard, B., and Ruby, P., 1963, Appareil pour la mesure des vitesses relatives des eaux souterraines par la méthode de dilution ponctuelle [Apparatus for measuring the relative velocities of ground waters by the point dilution method]: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 25–35. In_{gw}, $MeDf_{gw}$.

Halligan, E. G., 1962, Deep well fluid-waste disposal: U.S. Atomic Energy Comm. Pub., TID–7628, p. 363–372. C.A. 58: 1236 a. Ha, MeDf.

Honstead, J. F., McConiga, M. W., and Raymond, J. R., 1955, Gable Mountain ground-water tests: U.S. Atomic Energy Comm. Research Devel. Rept., HW–34532. $MeDf_{gw}$.

Hubbard, King, 1940, The theory of ground-water motion: Jour. Geology, v. 48, no. 8, pt. 1, p. 785–944. $MeDf_{gw}$

Lieberman, J. A., and Simpson, E. S., 1960, Practices and problems in disposal of radioactive wastes into the ground: Helsinki, Finland, Internat. Assoc. Sci. Hydrology Gen. Assembly, Pub. 52, p. 581–591. In_{gw}, In_{Pe}, $MeDf_{gw}$ $MeDf_{Pe}$.

List, J. E., 1965, The stability and mixing of a density-stratified horizontal flow in a saturated porous medium: Pasadena, Calif., California Inst. Technology, W. M. Keck Lab. Hydraulics and Water Resources Rept. KH–11, 164 p. $MeDf_{gw}$.

Mandel, S., 1960, Hydrological field work with radioactive tracers in Israel, up

to May 1960: Internat. Assoc. Sci. Hydrology, Comm. on Subterranean Waters Pub. 52, p. 497–502. Ab_{gw}, In_{gw}, $MeDf_{gw}$.

Martin, P. W. (to McCullough Tool Co.), 1959, Tracer injector means utilizing a radioactive electrode: U.S. Patent 3,116,419 [Dec. 31, 1963]. N.S.A. 18: 6965. In_{gw}.

Martin, R. I., and Taylor, L. B., 1952, A symposium on water flooding of oil reservoirs: Rolla, Missouri, Missouri Univ., Mines and Metallurgy Bull., Tech. Ser. 8, 55 p. $MeDf_{gw}$.

Mercado, A., and Halevy, E., 1966, Determining the average porosity and permeability of a stratified aquifer with the aid of radioactive tracers: Water Resources Research, v. 2, no. 3. p. 525–531. In_{gw}, In_{hy}, $MeDf_{gw}$, $MeDf_{hy}$.

Moser, H., Neumaier, F., and Rauert, W., 1963, New experiences with the use of radioactive isotopes in hydrology *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, March 5–9, 1963, Proc., p. 283–295. N.S.A. 18: 1922. In_{gw}, In_{hy}, $MeDf_{gw}$.

Nelson, R. W., 1964, Stream functions for the three-dimensional flow in heterogeneous porous media: Berkeley, Calif., Internat. Assoc. Sci. Hydrology Gen. Assembly, Pub. 64, p. 290–301. $MeDf_{gw}$.

Ochiai, Toshiro, and Rodriguez, V. C., 1962, Ground water quantity measurement on the foot of Mt. Fuji by the use of radioisotopes: Toyko, Japan, Radioisotopes, v. 11, p. 373–379 [in English]. N.S.A. 17: 8416. In_{gw}, In_{hy}, $MeDf_{gw}$.

Ogata, Akio, 1961, Transverse diffusion in saturated isotropic granular media: U.S. Geol. Survey Prof. Paper 411–B, 8 p. $MeDf_{gw}$.

Ogata, Akio, 1964a, The spread of a dye stream in an isotropic granular medium: U.S. Geol. Survey Prof. Paper 411–G, 11 p. $MeDf_{gw}$.

Ogata, Akio, 1964b, Mathematics of dispersion with linear adsorption isotherm: U.S. Geol. Survey Prof. Paper 411–H, 9 p. $MeDf_{gw}$, $SeAd_{gw}$.

Ogata, Akio, and Banks, R. B., 1961, A solution of the differential equation of longitudinal dispersion in porous media: U.S. Geol. Survey Prof. Paper 411–A, 7 p. $MeDf_{gw}$.

Olsen, H. W., 1966, Darcy's law in saturated kaolinite: Water Resources Research, v. 2, no. 2, p. 287–295. $MeDf_{gw}$.

Orcutt, R. G., Rifai, M. N. E., Klein, G., and Kaufman, W. J., 1957, Underground movement of radioactive wastes: Sewage and Industrial Wastes, v. 29, p. 791–804. C.A. 51: 13594 i. An_{gw}, Ha, InA_{gw}, KiB, $MeDf_{gw}$, $SeAd_{gw}$.

Pavlov, A. N., 1964, Estimate of the age of the matsesta mineral waters from short-life isotopes: Akad. Nauk SSSR Doklady, Earth Sci. secs., v. 158, no. 1–6, p. 87–90 [1965]. InA_{gw}, $MeDf_{gw}$.

Piper, A. M., 1952, Geologic, hydrologic, and thermal features of the sites: Project 1 (8) a [of] Operations Windstorm and Jangle, OTS, U.S. Atomic Energy Comm. Pub., WT–343, 71 p. [1959]. N.S.A. 14: 10678. In_{gw}.

Piper, A. M., 1966, Potential effects of Project Chariot on local water supplies, northwestern Alaska: U.S. Geol. Survey Prof. Paper 539, 45 p. Ab_{gw}, Ha, In_{gw}.

Polubarinova-Kochina, P. Ya., 1952, Theory of ground-water movement, translated from the Russian by J. M. Roger De Wiest: Princeton, N.J., Princeton Univ. Press, 613 p. [in English, 1962]. $MeDf_{gw}$.

Pottier, J., and Jacquard, P., 1963, Influence of capillarity on the unstable displacement of immiscible fluids in a porous medium: Rev. Inst. Français Pétrole Annales Combustibles Liquides, v. 18, p. 527–540. C.A. 59: 6165 ab. MeDf, MeV.

Raymond, J. R., 1955, An electrical technique for ground water velocity measurement: U.S. Atomic Energy Comm. Research Development Rept., HW–36–217. An, $MeDf_{gw}$, $MeDf_{Hy}$.

Richard, J. A. (to Jersey Production Research Co.), 1959, Method of controlling well fluid circulation by radioactivation of fluid elements: U.S. Patent 3,115,576 [Dec. 24, 1963]. $MeDf_{gw}$.

Rifai, M. N. E., and others, 1956, Dispersion phenomena in laminar flow through porous media: Berkeley, Calif., California Univ., Sanitary Eng. Research Lab. Rept. 3, 156 p. $MeDf_{gw}$.

Scheidegger, A. E., 1954, Statistical hydrodynamics in porous media: Jour. Applied Physics, v. 25, no. 8, p. 997–1001. $MeDf_{gw}$.

Scheidegger, A. E., 1957, The physics of flow through porous media: New York, Macmillan Co., 236 p. Ge of: $MeDf_{gw}$ (with an extensive bibliography).

Simpson, E. S., 1962, Transverse dispersion in liquid flow through porous media: U.S. Geol. Survey Prof. Paper 411–C, 30 p. $MeDf_{gw}$.

Simpson, E. S., 1966, Flow velocity and the dispersion coefficient in porous media [abs.]: Program, 1966 Ann. Mtg., Geol. Soc. America, p. 204–205. In_{gw}, $MeDf_{gw}$.

Skibitzke, H. E., 1961, Temperature rise within radioactive liquid wastes injected into deep formations: U.S. Geol. Survey Prof. Paper 386–A, 8 p. C.A. 56: 2295 a. Me, ThD.

Skibitzke, H. E., 1964, Extending Darcy's concept of ground-water motion: U.S. Geol. Survey Prof. Paper 411–F, 6 p. $MeDf_{gw}$.

Souffraiu, J., Simpson, E. S., Baetsle, L., and de Jonghe, P., 1960, Investigations on the movement of radioactive substances in the ground; II, The Cu rod method for measuring ground-water flow: U.S. Atomic Energy Comm. Pub., TID–7628, p. 155–164. N.S.A. 16: 25046. InA_{gw}, $MeDf_{gw}$, $SeAd_{gw}$.

Stallman, R. W., 1962, Multiphase fluids in porous media—A review of theories pertinent to hydrologic studies: U.S. Geol. Survey Prof. Paper 411–E. 51 p. $MeDf_{gw}$.

Stallman, R. W., and Papadopulos, I. S., 1966, Measurement of hydraulic diffusivity of wedge-shaped aquifers drained by streams: U.S. Geol. Survey Prof. Paper 514, 50 p. $MeDf_{gw}$.

Szmánski, J., 1963, Determination of the permeable zones in the water injection wells by means of radioactive tracers, *in* Nuclear geophysics: Kracow, Poland, Sci. Tech. and Econ. Inf. Center of Gov. Comm. for Atomic Energy, v. 4, p. 943–958 [in Polish]. N.S.A. 18: 5531. In_{gw}, In_{hy}, $MeDf_{gw}$.

Theis, C. V., 1963, Hydrologic phenomena affecting the use of tracers in timing ground-water flow, *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, March 5–9, 1963, Proc., p. 193–206. N.S.A. 18: 1921. Ge of: In_{gw}, In_{hy}, InA_{gw}, $MeDf_{gw}$.

Todd, D. K., 1959, Ground-water hydrology: New York, John Wiley & Sons, Inc., 336 p. Ge of: In_{gw}, $MeDf_{gw}$.

Torre, C., 1963, The energy distribution of radioisotopes in ground-water flow: Atomkernenergie, v. 8, p. 226–231 [in German]. N.S.A. 17: 30685. In_{gw}, In_{hy}.

Watkins, J. W., Armstrong, F. E., and Heemstra, R. J., 1960, Feasibility of radioactive waste disposal in shallow sedimentary formations: Nuclear Sci. and Eng., v. 7, p. 133–143. C.A. 54: 11345 h. $MeDf_{gw}$.

Watkins, J. W., Dunning, H. N., Armstrong, F. E., Heemstra, R. J., and Hsiao, L., 1955, Radioactive isotopes in petroleum-production research: Geneva, Switzerland, Internat. Conf. on Peaceful Uses of Atomic Energy, 1955, held at the United Nations, New York, N.Y., Proc., v. 15, p. 73–77, [1956]. C.A. 50: 12665 g. Ge of: In_{gw} (with 38 references).

Watkins, J. W., and Mardock, E. S., 1954, Use of radioactive iodine as a tracer in water-flooding operations: Jour. Petroleum Technology, v. 6, no. 9, p. 117–124. C.A. 49: 4267 h. An, $MeDf_{gw}$.

Witkowski, E. J., and Manneschmidt, J. F., 1962, Ground disposal of liquid wastes at Oak Ridge National Laboratory: U.S. Atomic Energy Comm. Pub., TID–7628, p. 506–512. C.A. 58: 1234 de. Ad_{gw}, Ha, In_{gw}, $MeDf_{gw}$.

Youngs, E. G., 1966, Horizontal seepage through unconfined aquifers with non-uniform hydraulic conductivity: Jour. Hydrology, v. 4, no. 1, p. 91–97. $MeDf_{gw}$.

HANDLING, HEALTH, AND STORAGE

Abbatt, J. D., Lakey, J. R. A., and Mathias, D. J., 1960, Natural radioactivity in West Devon water supplies: Lancet, v. 2, p. 1272–1274. N.S.A. 15: 17142. AbG_{gw}, BiC, Ha, InBi.

Behoumek, Frantisek, 1960, The problem of radioactive waste disposal in the world: Jaderna Energia, v. 6, p. 53–61 [in Czechoslovakian]. BiC, Ha.

Bradshaw, R. L., Boegly, W. J., Jr., Empson, F. M., Kubota, H., and Struxness, E. G., 1962, Storage of high-level packaged solid wastes in rock salt: U.S. Atomic Energy Comm. Pub., TID–7628, p. 477–488. C.A. 58: 1234 h. AbG, Ha, MeDf, ThD.

Empson, F. M., 1962, Storage of low-level packaged solids in a salt mine: U.S. Atomic Energy Comm. Pub., TID–7628, p. 469–476. C.A. 58: 1235 ab. Ha, MeDf.

Gorman, A. E., 1956, Sanitary engineering objectives of the atomic energy industry: U.S. Atomic Energy Comm. Pub., TID–7517 (pt. Ia), 607 p. Ha.

Healy, J. W., Honstead, J. F., and Matsumoto, 1955, Flow patterns in disposal to the Columbia River, *in* Gorman, A. E., Sanitary engineering objectives of the atomic energy industry: A seminar sponsored by the Atomic Energy Comm. and the Public Health Service, held at the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio, Dec. 6–9, 1955, 9 p.; U.S. Atomic Energy Comm. Pub., TID–7517 (pt. II, less deletions) p. 23–36 [1956] N.S.A. 13: 13039. Ha, In_{sw}, $MeDf_{sw}$.

Jaag, O., 1963, Determination of radioactivity in water and soil: Oncologia, v. 16, no. 3, p. 230–244 [in German]. C.A. 60: 10168 fg. Ge of: AbG, AbO, BiB, BiZ, Ha, In, SeAd.

Morgan, J. M., 1962, Land burial of solid packaged low-hazard potential radioactive wastes in the United States: U.S. Atomic Energy Comm. Pub., TID–7628, p. 396–427. C.A. 58: 1235 f. Ge, Ha, MeDf.

Morgan, K. Z., 1957, Health physics, *in* Gray, E. D., ed., American Institute of Physics handbook: New York, McGraw-Hill Book Co., sec. 8m, p. 8-250 to 8-257. Ha, No.

Philberth, Bernhard, 1959, Storage of atomic wastes in glacial caps of the earth: Comptes Rendus, v. 248, p. 2090–3092 [in French]. N.S.A. 13: 13040. Ha.

Pierce, W. G., and Rich, E. I., 1962, Summary of rock salt deposits in the United States as possible storage sites for radioactive waste materials: U.S. Geol. Survey Bull. 1148, 91 p. C.A. 58: 1233 i. Ha, MeDf.

Prout, W. E., 1962, Studies of the containment of radioactive wastes in underground mined caverns at the Savannah River plant: U.S. Atomic Energy Comm. Pub., TID–7628, p. 380–390. C.A. 58: 1235 h. Ha, MeDf.

Stanley, W. E., and Eliassen, Rolf, 1960, Status of knowledge of ground water contaminants: U.S. Federal Housing Adm., Contract HA (___) fh–757, 465 p. [1961]. Ge of: Ha (with 57 references).

Terman, A. V., 1960, The application of radioactive indicators for hygienic research: Translated from Meditsinskaya Radiologiya, v. 5, no. 3, p. 76–79; U.S. Atomic Energy Comm. Pub., JPRS–5124, p. 193–206. N.S.A. 14: 25792. Ge of: Ha, In_{atm}, In_{Hy} (with 29 references).

U.S. Government, 1963, Research in the medical and life sciences, *in* Fundamental nuclear-energy research: Washington, U.S. Govt. Printing Office, p. 3–138. N.S.A. 18: 9815. Ge of: Ab_{atm}, BiC, Ha, $MeDf_{atm}$.

Voress, H. E., Davis, T. F., and Hubbard, T. N., Jr., 1958, Radioactive waste processing and disposal—A bibliography of selected report literature: U.S. Atomic Energy Comm., Div. Tech. Inf. Pub., TID–3311, 131 p. Ge of: Ha.

NUCLEAR PROPERTIES

Killeen, John, Hess, W. N., and Lingenfelter, R. E., 1963, Electrons from bomb neutron decay: Jour. Geophys. Research, v. 68, no. 16, p. 4637–4643. AbG.

Smales, A. A., and Wagner, L. R., 1960, Methods in geochemistry: New York, Interscience Publishers, Inc., 467 p. Ge.

Teis, R. V., 1946, Isotope composition of mineral waters: Comptes Rendus, Akad. Sci. URSS Doklady, v. 53, p. 135–137. C.A. 41: 4345 c. Ab_{gw}, EqL, $SeAd_{Pe}$.

Teis, R. V., 1948, Isotopic composition of fossil ices: Akad. Nauk SSSR Doklady, v. 62, p. 365–367. C.A. 43: 2050 gf. AbG_{snow}.

Trainor, J. H., and Lockwood, J. A., 1963, Neutron albedo and charged-particle measurements at 200–400 km [abs.]: Am. Geophys. Union Trans., v. 44, p. 73. AbG.

OCEANS

Broecker, Wallace, 1963, Gas exchange between the atmosphere and oceans: U.S. Atomic Energy Comm. Pub., TID–19900, 67 p. N.S.A. 18: 7592. $MeDf_{atm}$, $MeDf_{ocean}$, $SeAd_{atm}$, $SeAd_{ocean}$.

Duke, T. W., circa 1963, Use of radioisotopes in marine biological research: U. S. Atomic Energy Comm. Pub., TID–7689, p. 69–72. N.S.A. 18: 15748. AbO, BiB, BiC, In_{terr}, InBi.

U.S. Atomic Energy Commission, 1963, Radioelement studies in the oceans: U.S. Atomic Energy Comm. Pub., TID–18389, 38 p. N.S.A. 17: 17737. In_{ocean}, $MeDf_{ocean}$.

PEDOLOGY

Bergseth, H., Hageboe, F. A., Lien, H., and Steenberg, K., 1963, Determination of cation exchange capacity in colloidal soil material by means of radiostrontium (Sr 89): Soil. Sci., v. 95, p. 97–100. N.S.A. 17: 25135. $SeAd_{Pe}$.

Bianchi, W. C., and Haskell, E. E., Jr., 1966, Air in the vadose zone as it affects water movements beneath a recharge basin: Water Resources Research, v. 2, no. 2, p. 315–322. $MeDf_{Pe}$, $MeDf_{gw}$.

Churaev, N.V., 1960, Study of the water properties, structure, and processes of moisture transfer in peat, using labelled atoms: Translated from Akad. Nauk Uzbek, SSR, Taskentsk. Konf. po Mirnomu Ispol'z Atomnaya Energiya, v. 2, p. 243–?; U.S. Atomic Energy Comm. Pub., AEC–tr–6390, p. 322–338. N.S.A. 18: 39515. In_{gw}, In_{Pe}, $MeDf_{Pe}$, SeAd.

Graham, E. R., 1959, Weathering of fallout: Science, v. 129, p. 1276–1277. C.A. 53: 16719 g. Ad, MeDf.

Haney, W. A., and Honstead, J. F., 1958, A history and discussion of specific retention disposal of radioactive liquid wastes in the 200 areas: U.S. Atomic Energy Comm. Pub., HW–54599. N.S.A. 14: 17634. $MeDf_{Pe}$.

Hawkins, M. B., 1959, The effect of terrain and natural weathering factors on fallout deposits, *in* Biological and environmental effects of nuclear war, pt. 1: Hearings before Spec. Subcomm. on Radiation of the Joint Committee on Atomic Energy, U.S. 86th Cong., 1st sess., p. 168–186. Ab_{Pe}, $MeDf_{Pe}$, $SeAd_{Pe}$.

Honstead, J. F., 1959, The movement of liquid through soils: U.S. Atomic Energy Comm. Pub., HW–S4–42, 9 p. N.S.A. 14: 1171. Ha, $MeDf_{Pe}$, $MeDf_{gw}$.

Irish, E. R., 1962, Comparison of ground-waste disposal status at Hanford: U.S. Atomic Energy Comm. Pub., TID–7628, p. 491–504. C.A. 58: 1234 cd. AbG, Ha, MeDf, Nu.

James, P. E., and Wilkins, D. E., 1964, An evaluation of radioisotopes and fluorescent tracer techniques. Am. Soc. Agr. Engineers Ann. Mtg., Fort Collins, Colo., June 1964. U.S. Atomic Energy Comm. Pub., CONF–646–1, 18 p. N.S.A. 18: 39718. In_{Pe}, Sa, SpFl.

Jamison, D. K., Kornegay, B. H., Vaughan, W. A., and Morgan, J. M., Jr., eds., 1962, The use of inorganic exchange materials for radioactive waste treatment: Washington, U.S. Atomic Energy Comm. Working Meeting, Aug. 13–14, 1962, Proc. U.S. Atomic Energy Comm. Pub., TID–7644, 238 p. N.S.A. 17: 19703. Ge of: SeAd.

Liakopoulos, A. C., 1966, Theoretical prediction of evaporation losses from groundwater: Water Resources Research, v. 2, no. 2, p. 227–240. $MeDf_{Pe}$, $MeDf_{gw}$, $MeDf_{Hy}$.

Lomenick, T. F., and Cowser, K. E., 1962, Land burial of solid waste at Oak Ridge National Laboratory: U.S. Atomic Energy Comm. Pub., TID–7628, p. 437–455. C.A. 58: 1235 c. Ha, MeDf.

McHenry, J. R., and Honstead, J. F., 1957, Evaluation of sites for the disposal of radioactive waste solutions: U.S. Atomic Energy Comm. Pub., HW–53219, 12 p. N.S.A. 13: 13035. $MeDf_{Pe}$, $MeDf_{gw}$, $SeAd_{Pe}$, $SeAd_{gw}$.

Parsons, P. J., 1961, Movement of radioactive wastes through soil; III, Investigating the migration of fission products from high-ionic liquids deposited in soil: Chalk River, Ontario, Canada, Atomic Energy of Canada, Ltd., Pub., AECL–1325, 46 p.: Sci. Doc. Distrib. Office Pub., CRER–1018, 46 p. C.A. 56: 4546 a. Ab_{Pe}, Ab_{gw}, Ad_{gw}, InA_{Pe}, InA_{gw}, $MeDf_{Pe}$, $MeDf_{gw}$.

Remson, Irwin, and Randolph, J. R., 1962, Review of some elements of soil-moisture theory: U.S. Geol. Survey Prof. Paper 411–D, 38 p. $MeDf_{Pe}$, Th.

Smith, W. O., 1961, Mechanism of gravity drainage and its relation to specific yield of uniform sands: U.S. Geol. Survey Prof. Paper 402–A, 12 p. $MeDf_{Pe}$.

Stallman, R. W., and Reed, J. E., 1966, Steady flow in the zone of aeration: Paris, France, United Nations Educational, Scientific, and Cultural Organization (UNESCO) Symposium on water in the Unsaturated Zone, held at Wageningen, Netherlands, June 19–25, 1966, Proc., 26 p. $MeDf_{Pe}$.

Ward, H. L., 1964, Radioisotopes in agriculture—Analytical procedures, animal husbandry, entomology, fertilizer uptake, general studies, photosynthesis, plant genetics, and plant physiology: U.S. Atomic Energy Comm. Pub., TID–3078, Supp. 1, 24 p. Ge of radioisotopes in agriculture sciences (with 229 selected references for 1958–62).

PHYSICOCHEMICAL PROPERTIES

Baetsle, L., and de Jonghe, P., 1960, Investigations on the movement of radioactive substances in the ground; III, Practical aspects of the program and physicochemical considerations: U.S. Atomic Energy Comm. Pub., TID–7628, p. 198–210. InA_{gw}, InA_{hy}, $SeAd_{Pe}$, Sy_{gw}.

Biggar, J. W., and Nielson, 1962, Some comments on molecular diffusion and hydrodynamic dispersion in porous media: Jour. Geophys. Research, v. 67, p. 3636–3637. $MeDf_{gw}$, $SeDf_{gw}$.

Botter, Fernande, de la Perrieri, G., and Tistchenko, S., 1961, Isotopic analysis of H_2HD, D_2 mixtures and analyses of mixtures of ortho and para hydrogen by gas chromatography: Saclay, France, Comm. à l'Énergie Atomique Rap., CEA–1962, 27 p. C.A. 55: 25591 c. AdC, AnC, $MeDf_{art}$, SeAd.

Grove, G. R., Foster, K. W., and Vallee, R. E., 1955, Gaseous thermal diffusion [abs.]: Phys. Rev., v. 99, p. 340. C.A. 51: 10974 f. An, SeDf.

Grove, G. R., Foster, K. W., and Vallee, R. E., 1958, Parameters of thermal diffusion columns, *in* International Symposium on Isotope Separation Proceedings: Amsterdam, Netherlands, North-Holland Publishing Co., p. 462–470. C.A. 52: 11597 g. Ge of: SeDf (with 7 references).

Holland, J. Z., 1963, Distribution and physicochemical nature of fallout: Federation Proc., v. 22, no. 6, p. 1390–1397. C.A. 60: 7655 d. Ge of: MeDf.

Mal'tsev, E. D., Yudin, F. P., Shamin, V. S., and Dolgikh, P. F., 1962, The problem of heat generation presented by the disposal of liquid radioactive wastes in deep geological formations: Atomnaya Energiya, v. 12, p. 36–39. C.A. 58: 1236 fg. Ad, Eq, Ki, MeDf, ThD, ThP.

Meek, B. D., MacKenzie, A. J., and Stockinger, K. R., 1964, Evaluation of a radioactive tracer method for measuring water intake of soils: Soil Sci. Soc. America Proc., v. 28, p. 153–155. N.S.A. 18: 24045. Ad, In_{Pe}, $MeDf_{Pe}$, $SeAd_{Pe}$.

Rice, W. L. R., 1955, Use of clays for disposal of radioactive wastes [abs.]: Phys. Rev., v. 99, p. 340. Ab, SeAd.

Robinson, B. P., 1962, Ion-exchange minerals and disposal of radioactive wastes—A survey of literature: U.S. Geol. Survey Water-Supply Paper 1616, 132 p. Ge of: Ab, Ad, In, Is, Ki, Nu, Se, Th (with 590 references).

Suess, H. E., and Jensen, H., 1944, Rules on the condition of isotopic exchange equilibria: Naturwissenschaften, v. 32, p. 372–374. C.A. 43: 6078 a. EqJ.

Taylor, H. S., 1934, Protium-deuterium-tritium, the hydrogen trio: Sci. Monthly [later merged with Science], p. 364–372. C.A. 28: 66267. Nu.

SURFACE WATER

Clayton, C. G., and Smith, D. B., 1963, A comparison of radioisotope methods for river flow measurements: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan. Mar. 5–9, 1963, Proc., STI/PUB/71, p. 1–24, [1964]. AbG_{sw}, Ad, AnC, In_{hy}, In_{sw}, InG, $MeDf_{sw}$, NuB, NuIn, Sa_{sw}, **$SeAd_{sw}$.**

Glover, R. E., 1964, Dispersion of dissolved or suspended materials in flowing streams: U.S. Geol. Survey Prof. Paper 433–B, 32 p. In_{sw}, $MeDf_{sw}$.

Gonfiantini, Roberto, Togliatti, V., Tongiorgi, E., De Brueck, W., and Picciotto, Edgard, 1963, Snow stratigraphy and oxygen isotope variations in the glaciological pit of King Baudouin Station, Queen Maud Land, Antarctica: Jour. Geophys. Research, v. 68, p. 3791–3798. C.A. 58: 11128 e; C.A. 59: 3678 bc. Ab_{snow}, InA_{snow}, $MeDf_{snow}$, Sa.

Honstead, J. F., 1954, Columbia River survey, 1951, 1952, 1953: U.S. Atomic Energy Comm. Pub., TID–10126 [Declassified Mar. 1, 1957], 92 p. N.S.A. 11: 11666. $MeDf_{sw}$.

Honstead, J. F., 1957, Dispersion of dissolved material in the Columbia River: U.S. Atomic Energy Comm. Pub., HW–49008, 16 p. N.S.A. 14: 18709. $MeDf_{sw}$, Sa.

Kolupaila, Steponas, 1961, Bibliography of hydrometry: Notre Dame, Ind., Notre Dame Univ. Press, 975 p. (See especially p. 580–583, with 28 references.) In_{sw}, In_{hy}, In_{gw}, In_{Hy}, $MeDf_{sw}$, $MeDf_{gw}$, $MeDf_{Hy}$.

Moser, H. Neumaier, F., and Rauert, W., 1962, The utilization of radioactive isotopes in hydrology; V, Measurement of the water flow of open currents by means of radioactive tracers: Atomkernenergie, v. 7, p. 321–324 [in German]. $MeDf_{sw}$.

Oana, S., 1942, Geochemical studies of volcanos in Japan, XXVI, Density measurements of stream waters: Chem. Soc. Japan Bull., v. 17, p. 314–320. C.A. 41: 4418 d. AbG, AnDn.

Sabo, J. J., and Bedrosian, P. H., eds., 1963, Studies of the fate of certain radionuclides in estuarine and other aquatic environments: Washington, D.C., U.S. Public Health Service Symposium on the Various Aspects of Radiological Surveys of Aquatic Environments, held at Savannah, Ga., Proc., 73 p. N.S.A. 17: 29151. AbO, BiB, In_{sw}, In_{Pe}, Sa, $SeAd_{sw}$.

Struxness, E. G., Carrigan, P. H., Jr., Churchill, M. A., Cowser, K. E., Morton, R. J., Nelson, D. J., and Parker, F. L., 1967, Comprehensive report of the Clinch River study: U.S. Atomic Energy Comm. Pub., ORNL–4035; UC–70, Waste disposal and processing, 121 p. Health Physics Div., Oak Ridge Natl. Lab., Oak Ridge, Tenn. Ge of: In_{sw}, In_{gw}, InBi, BiC, **Ha**, MeDf, Sa, SeAd.

Svasek, J. N., 1963, Radioactive tracers in hydrology: Assoc. Belge Développement Pacifique Énergie Atomique Bull. Inf., v. 8, no. 44–46, p. 64–67 [in French]. N.S.A. 18: 14303. In_{sw}, In_{Pe}.

Timblin, L. O., Jr., and Peterka, A. J., 1963, Use of radioisotopes for open-channel flow measurements *in* Radioisotopes in hydrology, Proceedings Series: Vienna, Austria, Internat. Atomic Energy Agency Symposium on the Application of Radioisotopes in Hydrology, held at Tokyo, Japan, Mar. 5–9, 1963, Proc., p. 37–61.

U.S. **Atomic Energy Commission,** 1962, High dilution on-stream isotopic tracers: U.S. Atomic Energy Comm. Pub., JLI–2748–0–7, 121 p. N.S.A. 17: 34195. In_{sw}.

TRACERS AND INDICATORS

Betts, R. H., and Davies, J. A., 1964, Recent applications of tracers in the physical sciences in Canada: Canadian Nuclear Assoc. Conf. on Canada's Role in a World of Expanding Nuclear Industry, held at Toronto, Canada, May 1964, Proc. U.S. Atomic Energy Comm. Pub., CONF–539–4, 12 p. N.S.A. 18: 29163. Ge of: In.

Bozóky, László, and Vodrös, Daniel, 1960, Exploration of underground water movements with radioisotopes: Energia es Atomtech., v. 13, p. 135–136 [in Hungarian]. N.S.A. 14: 16896. In_{gw}, Sa.

Caswell, A. E., Jr., 1959, Radioactivity oil well logging and oil field tracer applications: Tulsa, Okla., Well Surveys, Inc., 4 p.; U.S. Atomic Energy Comm. Pub., TID–7571, p. 146–149. N.S.A. 14: 10676. Ge of: In_{gw}, In_{terr}.

Cowser, K. E., 1962, Movement of ruthenium in the Oak Ridge National Laboratory waste-pit system: U.S. Atomic Energy Comm. Pub., TID–7628, p. 513–531. C.A. 58: 1234 e. Ab, Ad, Ha, MeDf, NuR.

Hess, H. H., Adkins, J. N., Benson, W. E., Frye, J. C., Heroy, W. B., Hubbert, M. K., Russell, R. J., and Theis, C. V., 1957, The disposal of radioactive waste on land: [U.S.] Natl. Acad. Sci.—Natl. Research Council Pub. 519, 142 p. C.A. 54: 25420 a. Ge of: In.

Hours, R., 1955, Les traceurs radio-actifs en hydrologie [Radioactive tracers in hydrology]: Mémoires et travaux de la Société hydrotechnique de France, v. 1, p. 14–24; Houille Blanche Spec. A/1955, p. 14–24. C.A. 51: 8334 f. MeDf, SeAd.

Hull, D. E., 1960, Tracing of water flow by means of radioactive isotopes and scintillation counters: Internat. Jour. Appl. Radiation and Isotopes, v. 7, p. 260. N.S.A. 14: 9638. AnC, In_{Hy}.

Kaufman, W. J., and Klingerman, P. C., 1963, Nature and disposition of sediment sorbed radionuclides entering San Francisco Bay: U.S. Atomic Energy Comm. Pub., TID–7664, p. 149–157. AbO, AdL, AnC, In_{sw}, In_{terr}, InBi, KiB, $MeDf_{sw}$, $MeDf_{terr}$, Sa, SeAd.

Kazmann, R. G., 1965, Modern hydrology: New York, Harper & Row, Publishers, 301 p. (See especially p. 157–158.) Ge of: In_{gw}, Ge of: $MeDf_{gw}$.

Kulcsar, Miklos, 1966, Radioactive isotope tracer technique on the plant scale: Magyar Kémikusok Lapja, v. 21, no. 2, p. 76–82 [in Hungarian]. C.A. 64: 13791 ab. Ge of: In (with 221 references).

Mihram, R. G., 1959, Some uses of radioisotopes in oil field operations: Duncan, Okla., Halliburton Oil Well Cementing Co., 6 p. U.S. Atomic Energy Comm. Pub., TID–7571, p. 8–13. N.S.A. 14: 10675. Ge of: In_{gw}, In_{terr}.

O'Rourke, E. V., 1962, Uses of water injection to the subsurface through boreholes: U.S. Atomic Energy Comm. Pub., TID–7628, p. 374–378. C.A. 58: 1235 g. Ha, In, MeDf.

Simpson, E. S., 1962, Investigation on the movement of radioactive substances in the ground; I, Geohydrology and general considerations: U.S. Atomic Energy Comm. Pub., TID–7628, p. 145–153. C.A. 57: 16345 a. AdL, An, InA_{gw}, Sa_{gw}, SeAd.

Skibitske, H. E., Chapman, H. T. Robinson, G. M., and McCullough, R. A., 1961, Radio-tracer technique for the study of flow in saturated porous materials: Internat. Jour. Appl. Radiation and Isotopes, v. 10, p. 38–46. C.A. 55: 17124 e. An, In_{gw}, $MeDf_{gw}$.

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