

Supplement to
MELLOR'S COMPREHENSIVE
TREATISE ON

INORGANIC
AND THEORETICAL
CHEMISTRY

*Prepared under the direction
of an Editorial Board*

VOLUME VIII
SUPPLEMENT I

Nitrogen (Part I)



LONGMANS

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48 Grosvenor Street, London W.1
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First published 1964

*Made and printed in Great Britain by
William Clowes and Sons, Limited, London and Beccles*

PREFACE

ON occasion a chemist may find it necessary to embark on an exhaustive study of the information now available on a certain topic, and to ascertain precisely by what steps it has been acquired, evaluated and understood. In these days of increasingly rapid extension of chemical knowledge he will not lightly undertake such a task, for it requires him personally to analyse indexes of abstract literature, to trace the original sources of the facts, discussions and theories the existence of which is thereby disclosed, and to examine with care all those sources, whether original papers, treatises, books or patent specifications, which may be accessible to him. Such labours may extend over many weeks or months, and it will therefore occasion no surprise if he prefers to rely, in the first instance at any rate, on a detailed review such as is provided by the original volumes of Mellor's "Comprehensive Treatise on Inorganic and Theoretical Chemistry" and the corresponding Supplements which from time to time are published.

The present supplementary volume offers a review of the chemistry of nitrogen and ammonia, gathering together, examining and arranging in a convenient manner the information that has become available since the publication of the original Treatise, and indicating clearly the sources of such information. The contributors have brought to their tasks specialized knowledge of, and interest in, their prescribed range of subject matter, and hence the Editors have been content to leave to their judgment the breadth and depth of their consideration of the various matters at issue. In a work of this character there must of necessity be some selection, and in this respect the Editors have offered only general guidance, believing that the specialist contributors are in the best position to discriminate, disregarding some material as trivial or irrelevant, and dealing at some length with other more significant aspects of the subject. Nevertheless all have endeavoured to ensure that by consulting this Supplement together with the appropriate volume of the original Treatise any chemist, particularly if his interests are in the inorganic or physical areas of the subject, should readily obtain a clear and reasonably complete picture of useful knowledge in the topics treated, while at the same time he is offered in generous measure quantitative data expressed in tabulated numerical or in graphical form and (ideally at any rate) both the original source of every statement and its reference in "Chemical Abstracts". Equally it is hoped that biochemists, spectrochemists, radiochemists, some organic chemists, and chemists concerned with the production of chemical materials will find in these Supplements most of the important information to which they would expect to have ready access, and the relevant sections (except in respect of organic reactions and the finer technological points of manufacturing processes) have therefore been prepared with the same attention to detail as have those concerned, for example, with the physico-chemical properties of individual compounds.

Of the ammonium salts only the halides, sulphide, sulphate, carbonate, nitrate and phosphate are considered here; other ammonium salts have been, or will be, treated in the Supplements dealing with the acids from which they are derived.

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ACKNOWLEDGMENTS

INEVITABLY the preparation or supplementation of a large work of reference is an increasingly complex task, requiring the closest integration of effort among those who establish and record scientific facts and those who present them to their readers. In these days of extensive publication in many languages the interpretation and presentation of the information usually involve a chain of authors, reviewers, and abstractors who all need to work with mutual appreciation and understanding. All those who have shared in the preparation of this Supplement have therefore a duty to express their indebtedness to people who, by their lucid presentation, informed criticism or accurate analysis of the scientific subject matter considered herein, have rendered possible a task that, in its present scope and form, would otherwise have been beyond the powers of the Contributors and Editors to perform. It has been their aim to acknowledge clearly the source of every significant statement, quoting the original author's name and the reference both to the original paper and to the abstract of that paper in "Chemical Abstracts".

The Editors also desire to express their appreciation of the effective way in which the Contributors have readily responded to their suggestions and requests. Although the Editors have endeavoured to supply abstracts of all relevant papers for their consideration, access to the libraries of academic and scholastic institutions and to the Science Library, South Kensington, and the library of the Patent Office has from time to time afforded valuable information the examination of which might otherwise have been difficult. Imperial Chemical Industries Ltd., through its Billingham and Alkali Divisions, has again supported the project of supplementation of Mellor's "Comprehensive Treatise" both by encouragement and also by affording facilities to certain contributors in their study of published information. For similar reasons warm thanks are also offered to the British Oxygen Co., Ltd., the North Thames Gas Board, Messrs. Fisons Ltd. and the Gas Council, London.

Once again the Editors welcome an opportunity to acknowledge the advice and help always offered in generous measure by Messrs. Longmans, Green & Co., Ltd. and to express both to the Company and to individual members of its staff their appreciation of this happy co-operation.

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page 517, fig. 2 from *J.A.C.S.*, published by the American Chemical Society. Page 64, fig. 4 from *I.U.P.A.C. and Inst. Mech. Eng. Joint Conf.*, published by the Institution of Mechanical Engineers. Page 73, fig. 6 from *J. Chem. Phys.*, published by the American Institute of Physics. Page 156, figs. 1, 2; pages 174–5, figs. 15–18; pages 180–1, figs. 21, 22; pages 187–8, figs. 24, 25; pages 205–6, figs. 32–4 from *J. Electrochem. Soc.* Page 172, figs. 7, 8 from *J. Inst. Metals*. Pages 219–20, figs. 45, 46 from *J. Iron & Steel Inst.*, both published by the Institute of Metals. Page 171, fig. 6; pages 173–4, figs. 9–14; pages 178–9, figs. 19, 20; pages 190–1, figs. 26, 27; pages 193–4, figs. 28, 29; page 198, fig. 30; page 216, fig. 42 from *J. Metals, AIME Trans.*, published by AIME. Page 88, fig. 18 from *J. phys. Chem.*, American Chemical Society. Pages 82–5, figs. 10–15 from *J. Res. Nat. Bur. Stand.* Page 15, fig. 7 from *Philips Technical Review*, published by Philips Electrical, Ltd. Page 44, fig. 2 from *Phys. Rev.* Page 216, fig. 43; pages 221–3, figs. 47–50; page 230, fig. 63 from *Proc. Roy. Soc. A*. Page 524, fig. 3 from *Rec. Trav. Chim.*, published by the Royal Netherlands Chemical Society. Pages 225–6, figs. 54–6 from *Sci. Repts. Res. Inst. Tohoku Univ.* Pages 168–9, figs. 3–5 from *Trans. Am. Soc. Metals*. Page 87, fig. 17 from *Trans. Faraday Soc.* Page 217, fig. 44 from *Trans. Indian Inst. Metals*. Page 86, fig. 16 by permission of the Union Carbide International Company, New York. Page 186, fig. 23 from *Z. anorg. Chem.*, published by Johann Ambrosius Barth. Page 202, fig. 31; page 460, fig. 1 from *Z. physik. Chem.*, published by Akademische Verlagsgesellschaft Geest & Portig K.-G., Leipzig. Pages 211–13, figs. 36–41 from *Z. Elektrochem.*, published by Verlag Chemie, G.m.b.H., Weinheim. Page 81, fig. 9; page 101, fig. 22; pages 111–12, figs. 32, 33; page 517, fig. 1; page 260, fig. 1 from *Ind. Eng. Chem.*, published by the American Chemical Society. Page 264, fig. 2 by permission of the Tennessee Valley Authority; pages 265–6, figs. 3, 4 by permission of the Montecatini General Mining and Chemical Corporation and the Commercial Solvents Corporation; all three figures from *Chem. Eng. Prog.*, published by the American Institute of Chemical Engineers.

LIST OF LITERATURE ABBREVIATIONS

The following list of Journal titles includes all those referred to in Volume II, Supplements 1, 2 and 3, and in the present Supplement if information additional to the abbreviation employed in the reference lists is available. For uniformity, the literature abbreviations used in the references are the same as in *An Advanced Treatise on Physical Chemistry* by J. R. Partington. Where a source is cited which does not appear in that work, the abbreviation is that currently used by Chemical Abstracts. In many cases further information, e.g. concerning change of title, period of publication, etc., will be found in the lists of titles of periodicals published from time to time by the American Chemical Society in Chemical Abstracts. Information concerning location is also given in the World List of Scientific Periodicals.

- Arsberetning vedkommende Norges Fiskerier.* Bergen.
- Abh. Deut. Kältetech. Ver.* Abhandlungen des deutschen kältetechnischen Vereins. Karlsruhe.
- Abhl. Akad. Munich.* Abhandlungen der mathematisch-physikalischen Klasse der Königlichen Bayerischen Akademie der Wissenschaften. Munich.
- Abhl. Braunschweig. Wiss. Ges.* Abhandlungen der braunschweigischen wissenschaftlichen Gesellschaft.
- Abhl. Ges. Wiss. Gött.* Abhandlungen der Königlichen Gesellschaft der Wissenschaften zu Göttingen. Mathematisch-physikalische Klasse. Göttingen.
- Abhl. K. Akad. Berlin.* Abhandlungen der Kgl. Akademie der Wissenschaften zu Berlin. Physikalisch-mathematische Klasse. Berlin.
- Abhl. Naturwiss. Verein Hamburg.* Abhandlungen aus dem Gebiete der Naturwissenschaften. Herausgegeben vom Naturwissenschaftlichen Verein in Hamburg. Hamburg.
- Abhl. Preuss. Akad. Wiss. Math. Klasse.* Abhandlungen der preussischen Akademie der Wissenschaften, Mathematisch-naturwissenschaftliche Klasse. Berlin.
- Abhl. Sächs. Akad.* Abhandlungen der Königlichen Sächsischen Akademie der Wissenschaften zu Leipzig. Mathematisch-physische Klasse. Leipzig.
- Abstracts Bact.* Now Biological Abstracts, Philadelphia.
- Abstr. Comm. 1st Intern. Congr. Biochem.* International Congress of Biochemistry, 1st Congress, Cambridge, England, 1949. Abstracts of Communications.
- Abstr. Japan. Chem. Lit.* Abstracts of Japanese Chemical Literature.
- Abstr. Roy. Soc.* Abstracts of Papers Communicated to the Royal Society of London. London.
- Acad. Rep. Populare Romine.* Academia republicii populare Romine, Filiala Iași, Studii și cercetări științifice. Bucharest.
- Acad. Română Mem. sect. știint.* Academia Română Memoriile secțiunii științifice. Bucharest.
- Acad. Tchèque Sci., Bull. Intern., Classe Sci. Math. Nat. Med.* Académie tchèque des sciences, Bulletin international, Résumé des travaux présentés, Classe des sciences, mathématiques, naturelles, et de la médecine.
- Acero y Energia* (Barcelona). Barcelona.
- Acker- u. Pflanzenbau* (see *Z. Acker- u. Pflanzenbau*).
- Acta Acad. Aboensis Math. Phys.* Acta Academiae Aboensis, Mathematica et Physica. Abö. Finland.
- Acta Adriat.* Acta Adriatica. Split, Yugoslavia.
- Acta Agr. Scand.* Acta Agriculturae Scandinavica. Stockholm.
- Acta Agral. Fennica.* Acta Agralia Fennica. Helsinki.
- Acta Agron.* Acta Agronomica. Palmira, Columbia.
- Acta Chem. Scand.* Acta Chemica Scandinavica. Copenhagen.
- Acta Chim. Acad. Sci. Hung.* Acta Chimica Academiae Scientiarum Hungaricae. Budapest.
- Acta Comment. Univ. Dorpatensis.* Acta et Commentationes Universitatis Dorpatensis. Dorpat (Yuriev or Jurjeff).
- Acta Cryst.* Acta Crystallographica. London.
- Acta Endocrinol.* Acta Endocrinologica. Copenhagen.
- Acta Gastro-Enterol. Belg.* Acta Gastro-Enterologica Belgica.
- Acta Lit. Sci. Reg. Univ. Hung.* (See *Acta Univ. Szeged*) Acta Litterarum ac Scientiarum Regiae Universitatis Hungaricae Francisco-Josephinae. Szeged, Hungary.

- Acta Math.* Acta Mathematica. Stockholm.
Acta Med. Philippina. Acta Medica Philippina. Manila.
Acta Med. Scand. Acta Medica Scandinavica. Stockholm.
Acta Metallurgica. London.
Acta Orthopaed. Scand. Acta Orthopaedica Scandinavica. Copenhagen.
Acta Path. Microbiol. Scand. Suppl. Acta Pathologica et Microbiologica Scandinavica. Copenhagen.
Acta Phys. Austriaca. Acta Physica Austriaca. Vienna.
Acta Phys. Acad. Sci. Hung. Acta Physica Academiae Scientiarum Hungaricae. Budapest.
Acta Phys. Polon. Acta Physica Polonica. Warsaw.
Acta Physicochim. U.R.S.S. Acta Physicochimica U.R.S.S. Moscow.
Acta Physiol. Acad. Sci. Hung. Acta Physiologica Academiae Scientiarum Hungaricae. Budapest.
Acta Physiol. Scand. Acta Physiologica Scandinavica. Stockholm.
Acta Phytochim. (Japan). Acta Phytochimica (Japan). Tokyo.
Acta Radiol. Acta Radiologica. Stockholm.
Acta Soc. Sci. Fenn. Acta Societatis Scientiarum Fennicae. Helsinki.
Acta Univ. Asiae Mediae. Acta Universitatis Asiae Mediae. Tashkent, U.S.S.R.
Acta Univ. Latviensis. Acta Universitatis Latviensis. Riga.
Acta Univ. Szeged, Chem. et Phys. Acta Universitatis Szegediensis, Sectio Scientiarum Naturalium, Acta Chemica et Physica. Szeged, Hung.
Acta Univ. Voron. Acta Universitatis Voronegiensis. Voronezh, U.S.S.R.
Acustica. Stuttgart.
Adv. in Biol. and Med. Phys. Advances in Biological and Medical Physics, New York, London.
Adv. in Chem. Advances in Chemistry Series. New York.
Adv. in Enzymol. Advances in Enzymology. New York.
Adv. in Modern Biol. (U.S.S.R.). Advances in Modern Biology. Moscow.
A.E.C.D. Atomic Energy Commission Documents.
A.E.R.E., Reports. Atomic Energy Research Establishment, Reports.
Aeronaut. Eng. Rev. Aeronautical Engineering Review. Easton, Pa.
Afinidad. Barcelona.
Agrártudomány. (Agricultural Science). Budapest.
Agr. Chem. Agricultural Chemicals. Baltimore.
Agriculture. Ministry of Agriculture. London.
Agr. Gaz. N.S. Wales. Agricultural Gazette of New South Wales. Sydney.
Agr. J. of India. Agricultural Journal of India. Delhi.
Agr. & Live-stock in India. Agriculture and Live-stock in India.
Agricultura. Louvain. Belgium.
Agricultura Coloniale. Florence.
Agr. Res. Inst. Pusa, Sci. Repts. Agricultural Research Institute of Pusa, Scientific Reports.
Agrokemia. Budapest.
Agron. J. Agronomy Journal. Madison, Wis.
A.I. Ch. E. Journal. American Institute of Chemical Engineers Journal. New York.
A.I.M.E. Trans. American Institute of Metallurgical Engineers, Transactions. New York.
Air Repair. Pittsburgh, Pa.
Aircraft Eng. Aircraft Engineering. London.
Akad. Nauk. S.S.S.R. Akademiya Nauk S.S.S.R. Moscow.
Akad. Nauk Ukr. S.S.R., Inst. Teploenerg. Sb. Tr. Akademiya Nauk U.S.S.R., Institut Teploenergetiki, Sbornik Trudov.
Akust. Z. Akustische Zeitschrift. Leipzig.
Alabama Agr. Expt. Sta. Alabama Polytechnic Institute, Agricultural Experiment Station. Auburn, Alabama.
Alembic Club Reprint. Alembic Club Reprints. Edinburgh.
Allg. Brauer u. Hopfenzeit. Allgemeine Brauer- und Hopfenzeitung.
Allg. Öl u. Fettztg. Allgemeine Öl- und Fettzeitung. Vienna.
Allgem. Forstz. Allgemeine Forstzeitschrift. Munich.
Allgem. Wärmetechnik. Zeitschrift für Wärme-, Kälte- und Verfahrenstechnik. Frankfurt a.M.
Aluminium. Düsseldorf.
Aluminium (Budapest).
Aluminium Non-Ferrous Rev. Aluminium and the Non-Ferrous Review. London.
Am. Dyestuff Repr. American Dyestuff Reporter. New York.
Amer. Brewer. American Brewer. New York.
Amer. Ceram. Soc. Bull. American Ceramic Society Bulletin. Columbus. Ohio.

- Amer. Chem. Abstr.* Chemical Abstracts. Published by the American Chemical Society. Easton, Pa.
- Amer. Chem. J.* American Chemical Journal. Baltimore.
- Amer. Doc. Inst.* American Documentation Institute. Washington.
- Amer. Fertilizer.* American Fertilizer. Philadelphia.
- Amer. Foundryman.* American Foundryman. Chicago.
- Amer. Gas J.* American Gas Journal. Dallas.
- Amer. Heart J.* American Heart Journal. St. Louis.
- Amer. Inst. Chem. Eng.* American Institute of Chemical Engineers. New York.
- Amer. Inst. Min. Met. Eng. Contrib.* American Institute of Mining and Metallurgical Engineers. Contributions. New York.
- Amer. Inst. Min. Met. Eng. Techn. Publ.* American Institute of Mining and Metallurgical Engineers. Technical Publication. New York.
- Amer. Inst. Min. Met. Eng. Met. Div. Techn. Pub.* American Institute of Mining and Metallurgical Engineers. Metallurgical Division. Technical Publication. [Journal of Metals.] New York.
- Amer. J. Botany.* American Journal of Botany. New York.
- Amer. J. Cancer.* American Journal of Cancer.
- Amer. J. Clin. Pathol.* American Journal of Clinical Pathology. Baltimore.
- Amer. J. Dental Res.* American Journal of Dental Research. St. Louis.
- Amer. J. Diseases Children.* American Journal of Diseases of Children. Chicago, Illinois.
- Amer. J. Hyg.* American Journal of Hygiene. Baltimore.
- Amer. J. Math. Phys.* American Journal of Mathematics, Pure and Applied. Cambridge, Mass.
- Amer. J. Med.* American Journal of Medicine. New York.
- Amer. J. Med. Sci.* American Journal of the Medical Sciences. Philadelphia.
- Amer. J. Obstet. Gynecol.* American Journal of Obstetrics and Gynecology. St. Louis.
- Amer. J. Ophthalmol.* American Journal of Ophthalmology. Chicago, Illinois.
- Amer. J. Orthodontics etc.* American Journal of Orthodontics and Oral Surgery.
- Amer. J. Pharm.* American Journal of Pharmacy. Philadelphia.
- Amer. J. Phys.* American Journal of Physics. New York.
- Amer. J. Physiol.* American Journal of Physiology. Washington.
- Amer. J. Pub. Health.* American Journal of Public Health. New York.
- Amer. J. Roentgen.* American Journal of Roentgenology. Springfield, Illinois.
- Amer. J. Sci.* American Journal of Science. New Haven, Conn.
- Amer. J. Surg.* American Journal of Surgery. New York.
- Amer. J. Trop. Med.* American Journal of Tropical Medicine. Baltimore.
- Amer. Machinist.* American Machinist. New York. [Also a London edition, with supplement.]
- Amer. Min.* The American Mineralogist. Menasha, Wis.
- Amer. Perfumer.* (See *Amer. Perfumer Essent. Oil Rev.*)
- Amer. Perfumer Essent. Oil Rev.* American Perfumer and Essential Oil Review. Bristol, Conn.
- Amer. Potato J.* American Potato Journal. New Brunswick, N.J.
- Amer. Rocket Soc. J.* American Rocket Society Journal. New York.
- Amer. Ry. Eng. Assoc. Bull.* American Railway Engineering Association Bulletins. Chicago.
- Amer. Scientist.* American Scientist. New Haven, Conn.
- Amer. Soc. Metals.* American Society for Metals. Cleveland, Ohio.
- Amer. Soc. Refrig. Eng. J.* American Society of Refrigerating Engineers Journal. New York.
- Amer. Soc. Testing Mat. Bull.* American Society for Testing Materials. Bulletin. Philadelphia.
- Amer. Soc. Testing Mat. Radiography Symposium.* American Society for Testing Materials. Symposium on Radiography and X-Ray Diffraction Methods. Philadelphia, 1937.
- An. Acad. Brasil. Cienc.* Anais da Academia Brasileira de Ciencias. Rio de Janeiro.
- An. Acad. Roman. Mem. Sti.* Analele Academiei Române. Memoriile Secț. Științifice. Bucharest.
- An. Asoc. Quim. Argentina.* Anales de la Asociación Química Argentina. Buenos Aires.
- An. Asoc. Quim. Farm. Uruguay.* Anales de la Asociación de Química y Farmacia del Uruguay. Montevideo.
- An. Assoc. Quim. Brasil.* Anais de Associação Química do Brasil. Rio de Janeiro.
- An. Edafol. y Fisiol. Vegetal (Madrid).* Anales de Edafología y Fisiología Vegetal. Madrid.
- An. Fac. Farm. y Bioquim., Univ. Nacl. Mayor San Marcos.* Anales de la Facultad de Farmacia y Bioquímica, Universidad Nacional Mayor de San Marcos. Lima.
- An. Fac. Farm. Odont.* Anais da Faculdade de Farmácia e Odontologia da Universidade de São Paulo. São Paulo.
- An. Facult. Quim. Farm.* Anales de la Facultad de Química y Farmacia. Montevideo.
- An. Farm. Bioquim.* Anales de Farmacia y Bioquímica. Buenos Aires.

- An. Fis. Quim.* Anales de la Real Sociedad Española de Física y Química. Madrid. [Now divided into A, Physics and B, Chemistry].
- An. I. Congr. Pan-Amer. Ing. Minas y Geol. Santiago Chile.* Anales del congreso panamericano de ingeniería de minas y geología, 1st. Congress. Santiago.
- An. Inst. Med. Exptl. Valencia.* Anales del instituto de medicina experimental de Valencia.
- An. Ofic. Quim. Prov. Buenos Aires.* Anales de la oficina química de la provincia. (La Plata).
- An. Quim. Farm.* Anales de Química y Farmacia. Santiago, Chile.
- An. Real. Acad. Farm.* Anales de la Real Academia de Farmacia. Madrid.
- An. Real. Soc. Espan. Fis. Quim.* Anales de la real sociedad española de física y química. Madrid.
- An. Soc. Cient. Argentina.* Anales de la Sociedad Científica Argentina. Buenos Aires.
- An. Soc. Españ. Fis. Quim.* Anales de la Sociedad Española de Física y Química. Madrid.
- Anal. Chem.* See *Ind. Eng. Chem. Anal.*
- Anal. Chim. Acta.* Analytica Chimica Acta. Houston, Tex., London, Amsterdam.
- Analyst.* The Analyst. Cambridge.
- Anat. Record.* Anatomical Record. Philadelphia.
- Anesthesiology.* Journal of the American Society of Anesthesiologists. Philadelphia, Pa.
- Anesthesia and Analgesia.* Cleveland, Ohio.
- Angew. Bot.* Angewandte Botanik. Berlin-Zehlendorf.
- Angew. Chem.* Angewandte Chemie. Leipzig.
- Anilínokrasochnaya Prom.* Anilínokrasochnaya Promyshlennost. Moscow.
- Ann. (Ann. Chem.).* Annalen der Chemie. [Liebig's Annalen]. Weinheim.
- Ann. Acad. Brasil. Sci.* Annaes da Academia Brasileira de Sciencias. Rio de Janeiro.
- Ann. Acad. Sci. Fenn.* Annales Academiae Scientiarum Fennicae. Helsinki.
- Ann. Acad. Sci. Tech. Varsovie.* Annales de l'Académie des Sciences Techniques à Varsovie. Warsaw.
- Ann. Agr. Coll. Sweden.* (See *Kgl. Lantbrucks-Högskolans Ann.*).
- Ann. Agron.* Annales Agronomiques. Paris.
- Ann. Appl. Biol.* Annals of Applied Biology. Cambridge.
- Ann. Astrophys.* Annales d'astrophysique. Paris.
- Ann. Biol. Clin. Paris.* Annales de Biologie Clinique. Paris.
- Ann. Botany (London).* Annals of Botany. London.
- Ann. Chim.* Annales de Chimie. Paris. [Formerly combined with *Annales de Physique* as *Annales de Chimie et de Physique*].
- Ann. Chim. Anal. Appl.* Annales de Chimie Analytique et de Chimie Appliquée. Paris.
- Ann. Chim. Appl.* Annali di Chimica Applicata. Rome.
- Ann. Chim. Phys.* Annales de Chimie et de Physique. Paris.
- Ann. Chim. Rome.* Annali di chimica. Rome.
- Ann. Combustibles Liquides.* Annales de l'Office National des Combustibles Liquides. Paris.
- Ann. de l'Ecole Norm.* Annales Scientifiques de l'Ecole Normale Supérieure. Paris.
- Ann. de Phys.* Annales de Physique. Paris. [See *Ann. Chim.*].
- Ann. Dermatol. Syphil.* Annales de Dermatologie et de Syphiligraphie. Paris.
- Ann. des Ponts et Chaussées.* Annales des Ponts et Chaussées. Paris.
- Ann. Ecole Nat. Agr. Montpellier.* Annales de l'École Nationale d'Agriculture de Montpellier. Montpellier.
- Ann. Endocrinol. (Paris).* Annales d'endocrinologie. Paris.
- Ann. Entomol. Soc. Amer.* Annals of the Entomological Society of America. College Park, Ma.
- Ann. Ergzb.* Annalen der Chemie Ergänzungsbände. [See *Ann.*].
- Ann. Fac. Sci. Marseille.* Annales de la Faculté des Sciences, Université de Marseille.
- Ann. Fac. Sci. Toulouse.* Annales de la Faculté des Sciences, Université de Toulouse. Toulouse.
- Ann. Fac. Sci. Univ. Toulouse, Sci. Math. et Sci. Phys.* Annales de la faculté des sciences de l'université de Toulouse pour les sciences mathématiques et les sciences physiques. Paris.
- Ann. Fals.* Annales des Falsifications et des Fraudes. Paris.
- Ann. Gembloux.* Annales de Gembloux. Belgium.
- Ann. Géophys.* Annales de Géophysique. Paris.
- Ann. Inst. Anal. Phys. Chim.* Annales de l'Institut d'Analyse Physico-chimique. Moscow.
- Ann. Inst. Hydrol. et Climatol.* Annales de l'Institut d'Hydrologie et de Climatologie. Paris.
- Ann. Inst. Mines Leningrad.* Annales de l'Institut Mines. Leningrad.
- Ann. Inst. Natl. Recherche Agron.* Annales de l'Institut National de la Recherche Agronomique. Paris.
- Ann. Inst. Pasteur.* Annales de l'Institut Pasteur. Paris.
- Ann. Intern. Med.* Annals of Internal Medicine. Philadelphia.
- Ann. Ist. Super. Agrar. Portici.* Annali del r. Istituto Superiore Agrario del Portici.

- Ann. Mat. Pura ed Applicata.* Annali di Mathematica Pura ed Applicata. Milan, Bologna.
- Ann. Med. Leg. Crim. Police Sci. Med. Soc. Toxicol.* Annales de Médecine Légale de Criminologie, Police Scientifique, Médecine Sociale et Toxicologie. Paris.
- Ann. Mines.* Annales des Mines. Paris. [A continuation of *Journal des Mines*].
- Ann. New York Acad. Sci.* Annals of the New York Academy of Sciences. New York.
- Ann. Pharm. Franç.* Annales Pharmaceutiques Françaises. Paris.
- Ann. Phil.* Annals of Philosophy. London.
- Ann. Phys.* Annalen der Physik. Leipzig. [Several series, each with a separate volume number sequence; formerly *Annalen der Physik und Chemie*, etc. Sometimes quoted as Poggendorff's *Annalen*, Wiedemann's *Annalen*, Drude's *Annalen*, with the name of the Editor].
- Ann. Phys. Beibl.* Beiblätter zu den Annalen der Physik (1881-1919). Leipzig. [Continued as *Phys. Ber.*].
- Ann. Phys. Boltzmann Festschr.* Ludwig Boltzmann Festschrift Gewidmet. Leipzig. 1904. [Uniform with the volumes of *Annalen der Physik*].
- Ann. Phys. Ergzb.* Annalen der Physik Ergänzungsbände. [See *Ann. Phys.*].
- Ann. Phys. Pogg. Jubelband.* Annalen der Physik. Poggendorff Jubelband. Berlin, 1874. [See *Ann. Phys.*].
- Ann. Postes, Teleg. Teleph.* Annales des Postes, Télégraphie et Téléphonie.
- Ann. Rep. Alkali etc., Works.* Annual Report on Alkali etc., Works. London.
- Ann. Rep. Chem. Soc.* Annual Reports of the Chemical Society. London.
- Ann. Rep. E. Malling Res. Sta.* Annual Report, East Malling Research Station, Maidstone.
- Ann. Rep. Mich. Acad. Sci.* Annual Report of Michigan Academy of Science.
- Ann. Rep. N. Y. State Assoc. Milk Sanitarians.* Annual Report of the New York State Association of Milk Sanitarians. New York.
- Ann. Rep. Progr. Chem.* Annual Reports on the Progress of Chemistry. London.
- Ann. Rep. Smithsonian Inst.* Smithsonian Institute Reports. Washington.
- Ann. Rept. Intern. Assoc. Milk Sanitarians.* Annual Report of the International Association of Milk Sanitarians. New York.
- Ann. Rev. Biochem.* Annual Review of Biochemistry. Stanford, Calif.
- Ann. Rev. Microbiol.* Annual Review of Microbiology. Stanford, Calif.
- Ann. Rev. Nucl. Sci.* Annual Review of Nuclear Science. Stanford, Calif.
- Ann. Rev. Phys. Chem.* Annual Review of Physical Chemistry. Stanford, Calif.
- Ann. Sci.* Annals of Science. London.
- Ann. Sci. Agron. (Ann. Agron.).* Annales de la science agronomique française et étrangère.
- Ann. Sci. Univ. Jassy.* Annales Scientifique de l'Université de Jassy. Jassy, Rumania.
- Ann. Sect. Anal. Phys. Chim. Inst. Chim. Gén. U.R.S.S.* Annales du Secteur d'Analyse Physico-Chimique. Institut de Chimie Générale, U.R.S.S. Moscow.
- Ann. Soc. Geol. Belg.* Annales de la Société Géologique de Belgique. Bulletin. Liège.
- Ann. Soc. Sci. Bruxelles.* Annales de la Société Scientifique de Bruxelles. Louvain.
- Ann. Sper. Agrar. (Rome).* Annali della Sperimentazione Agraria. Rome.
- Ann. Staz. Sper. Agrar.* Annali della r. stazione sperimentale agraria di Modena. Modena, Italy.
- Ann. Surg.* Annals of Surgery. Philadelphia.
- Ann. Univ. Mariae-Curie-Sklodowska Lublin-Polonia.* Annales Universitatis Mariae-Curie-Sklodowska. Lublin, Poland.
- Ann. Univ. Sofia (phys. math.).* Annuaire de l'Université de Sofia. Faculté Physico-Mathématique. Sofia.
- Annali di Chimica.* Annali di Chimica e Storia Naturali. Rome.
- Annuar. Regia Staz. Chim. Agrar. Torino.* Annuario della Regia Stazione Chimica Agraria in Torino. Turin.
- Antibiotics and Chemotherapy.* Washington.
- Anz. Akad. Wiss. Wien. (See Österr. Akad. Wiss.).* Anzeiger der Akademie der Wissenschaften in Wien, Mathematisch-naturwissenschaftliche Klasse. Vienna.
- Anz. Schädlingskunde.* Anzeiger für Schädlingskunde. Hamburg.
- Apotheker Ztg.* Apothekerzeitung. Berlin.
- Apparatebau.* Hanover.
- Appl. Microbiol.* Applied Microbiology. Baltimore.
- Appl. Sci. Res.* Applied Scientific Research. The Hague.
- Aptechnoe Delo.* (Pharmaceutical Transactions.) Moscow.
- Arb. dritt. Abt. anat. Inst. kaiser. Univ. Kyoto.* Arbeiten aus der dritten Abteilung des anatomischen Institutes der kaiserlichen Universität Kyoto.
- Arb. K. Wilhelm Inst. Kohlenforsch.* Arbeiten des Kaiser-Wilhelm Instituts für Kohlenforschung in Mülheim-Ruhr. Berlin.

- Arb. Kais. Ges.* Arbeiten aus dem kaiserlichen Gesundheitsamte.
- Arb. Med. Univ. Okayama.* Arbeiten aus der Medizinischen Fakultät, Universität Okayama, Japan.
- Arb. Reichsgesund.* Arbeiten aus dem Reichsgesundheitsamte.
- Arb. Staatl. Inst. Exptl. Therap. u. Forsch.-Inst. Chemotherap. Frankfurt.* Arbeiten aus dem Staatlichen Institut für Experimentelle Therapie und dem Forschungs-Institut für Chemotherapie zu Frankfurt. Frankfurt a.M.
- Arch. Biochem.* Archives of Biochemistry. New York, London.
- Arch. Biochem. Biophys.* Archives of Biochemistry and Biophysics. New York, London.
- Arch. di Fisiol.* Archivio di Fisiologia. Florence.
- Arch. Disease Childhood.* Archives of Disease in Childhood. London.
- Arch. 'E. Maragliano' Patol. e Clin.* Archivio 'E. Maragliano' di Patologia e Clinica. Genoa.
- Arch. Eisenhüttenw.* Archiv für das Eisenhüttenwesen. Düsseldorf.
- Arch. Elektrotech.* Archiv für Elektrotechnik. Berlin.
- Arch. Exp. Path. Pharm.* Archiv für Experimentelle Pathologie und Pharmakologie. Berlin.
- Arch. Farmacol. Sper.* Archivio di Farmacologia Sperimentale e Scienze Affini. Rome.
- Arch. Farm. Bioquim. Tucumán.* Archivos de Farmacia y Bioquímica del Tucumán. Tucumán, Argentina.
- Arch. Gartenbau.* Archiv für Gartenbau. Berlin.
- Arch. ges. Physiol. (Pflüger).* Pflüger's Archiv für die gesamte Physiologie des Menschen und der Tiere. Berlin.
- Arch. ges. Virusforsch.* Archiv für die gesamte Virusforschung. Vienna.
- Arch. ges. Wärmetech.* Archiv für die gesamte Wärmetechnik. Frankfurt a.M.
- Arch. Gewerbepath. Gewerbehyg.* Archiv für Gewerbepathologie und Gewerbehygiene.
- Arch. Hydrobiol.* Archiv für Hydrobiologie. Stuttgart.
- Arch. Ind. Health.* Archives of Industrial Health.
- Arch. Ind. Hyg. Occupational Med.* Archives of Industrial Hygiene and Occupational Medicine. Chicago.
- Arch. Inst. Cardiol. Mex.* Archivos del Instituto de Cardiología de Mexico. Mexico City.
- Arch. Inst. Farmacol. Exptl.* Archivos del Instituto de Farmacología Experimental. Madrid.
- Arch. Internal Med.* Archives of Internal Medicine. Chicago.
- Arch. Intern. Pharmacod.* Archives Internationales de Pharmacodynamie et de Thérapie Ghent.
- Arch. Intern. Physiol.* Archives Internationales de Physiologie. Liège.
- Arch. Ist. Biochim. Ital.* Archivio dell'Istituto Biochimico Italiano.
- Arch. Ital. Malattie Apparato Digerente.* Archivio Italiano delle Malattie dell'Apparato Digerente. Bologna.
- Arch. Klin. Chir., Langenbecks.* Archiv für Klinische Chirurgie, Langenbecks. Berlin.
- Arch. Lagerstättenforsch.* Archiv für Lagerstättenforschung. Berlin.
- Arch. Mat. Naturvidensk.* Archiv for Matematik og Naturvidenskab. Oslo.
- Arch. Med. Interna. Havana.* Archivos de Medicina Interna. Havana.
- Arch. Metallkde.* Archiv für Metallkunde. Berlin.
- Arch. Mikrobiol.* Archiv für Mikrobiologie. Berlin.
- Arch. Mineralogiczne.* Archiwum Mineralogiczne Towarzystwa Naukowego Warszawskiego. Warsaw.
- Arch. Min. Soc. Sci. Varsovie.* Archives de Mineralogie de la Société des Sciences de Varsovie. Warsaw.
- Arch. Mus. Teyler.* Archives du Musée Teyler. Haarlem.
- Arch. Néerl.* Archives Néerlandaises des Sciences Exactes et Naturelles. Leiden.
- Arch. Néerl. Phys.* Archives Néerlandaises de Physiologie de l'Homme et des Animaux. Leiden.
- Arch. Neurol. Psychiatry.* Archives of Neurology and Psychiatry. Chicago.
- Arch. Ophthalmol.* Archives of Ophthalmology. Chicago.
- Arch. Ophthalmol., Graefe's.* Archiv für Ophthalmologie vereinigt mit Archiv für Augenheilkunde, Albrecht von Graefe's. Berlin.
- Arch. Otolaryngol.* Archives of Otolaryngology. Chicago.
- Arch. Pathol.* Archives of Pathology. Chicago.
- Arch. Pflanzenbau.* Archiv für Pflanzenbau.
- Arch. Pharm.* Archiv der Pharmazie. Weinheim.
- Arch. Pharm. Chemi.* Archiv for Pharmaci og Chemi. Copenhagen.
- Arch. Physiol.* Archives de Physiologie Normale et Pathologique. Paris.
- Arch. Phys. Biol.* Archives de Physique Biologique. Paris.

- Arch. Phys. Med. Rehabil.* Archives of Physical Medicine and Rehabilitation. Chicago, Illinois.
- Arch. Protistenk.* Archiv für Protistenkunde.
- Arch. Sci.* (Geneva). Archives des Sciences (Geneva).
- Arch. Sci. Biol., Italy.* Archivio di Scienze Biologiche (Italy). Bologna.
- Arch. Sci. Biol. U.R.S.S.* Archives des Sciences Biologiques. Petrograd.
- Arch. Sci. Med.* Archivio per le Scienze Mediche. Turin.
- Arch. Sci. Phys. Nat.* Archives des Sciences Physiques et Naturelles. Geneva.
- Arch. Sci. Physiol.* Archives des Sciences Physiologiques. Paris.
- Arch. Soc. Biol. Montevideo.* Archivos de la Sociedad de Biología de Montevideo. Montevideo.
- Arch. Suikerind.* Archief voor de Suikerindustrie in Nederlandsch-Indië. The Hague.
- Arch. techn. Messen.* Archiv für technisches Messen. Munich.
- Arch. Venezolanos Nutric.* Archivos Venezolanos de Nutricion. Caracas.
- Arch. Wärmewirtsch.* Archiv für Wärmewirtschaft. Berlin.
- Archiv Gesch. Naturwiss. Technik.* Archiv für die Geschichte der Naturwissenschaft und der Technik. Leipzig.
- Arhiv Hem. Farm.* Arhiv za Hemiju i Farmaciju. Belgrade.
- Arch. Kem.* Arhiv za Kemiju. Zagreb.
- Ariz. Bur. Mines, Mineral Technol. Bull.* Arizona Bureau of Mines, Mineral Technology Bulletin.
- Arkansas Agr. Expt. Sta. Bull.* University of Arkansas Agricultural Experiment Station. Fayetteville, Ark.
- Arkh. Biol. Nauk.* Arkhiv Biologicheskikh Nauk. U.S.S.R.
- Arkiv. Botan.* Arkiv för Botanik.
- Arkiv Fys.* Arkiv för Fysik. Uppsala.
- Arkiv Kem.* Arkiv för Kemi. Uppsala.
- Arkiv Kem. Min. Geol.* Arkiv för Kemi, Mineralogi och Geologi. Uppsala.
- Arkiv Mat. Astron. Fys.* Arkiv för Matematik, Astronomi och Fysik. Uppsala.
- Arkiv Zool.* Arkiv för Zoologi, utgivet av K. Svenska Vetenskapsakademien. Uppsala.
- Army Ordnance.* Washington.
- Arquiv. Biol. e Tecnol., Inst. Biol. e Pesquisas Tecnol.* Arquivos de Biologia e Tecnologia, Instituto de Biologia e Pesquisas Tecnológicas. Parana.
- Arquiv. Inst. Biol. São Paulo.* Arquivos do Instituto Biologica. São Paulo.
- Assoc. Food Drug Officials U.S. Quart. Bull.* Association of Food and Drug Officials of the United States. Quarterly Bulletin. Austin, Texas.
- Assoc. Operative Millers.* Association Operative Millers, Bulletin. Kansas City.
- Assoc. Southern Agr. Workers.* Association of Southern Agricultural Workers. New Orleans.
- Assoc. Tech. Ind. Papetière Bull.* Association Technique de l'Industrie Papetière, Bulletin. Paris.
- Asphalt Teerind. Ztg.* Asphalt und Teerindustrie Zeitung und Zeitschrift für Strassenbau, Strassenunterhaltung sowie Tief- und Brückenbau.
- A.S.T.M. Bull.* American Society for Testing Materials Bulletin. Philadelphia.
- Astron. J.* Astronomical Journal. New York.
- Astron. J. Soviet Union.* Astronomical Journal of the Soviet Union. Moscow.
- Astron. Zhur.* Astronomicheskii Zhurnal. Moscow.
- Astrophys. J.* The Astrophysical Journal. Chicago.
- Astrophys. Norvegica.* Astrophysica Norvegica.
- Ateneo Parmense.* Parma.
- Atm. Energ. S.S.S.R.* Atomic Energy U.S.S.R.
- Atomics Eng. and Technol.* Atomics, Engineering and Technology. London.
- Atti Accad. Catania.* Atti della R. Accademia Gioenia di Scienze Naturali. Catania.
- Atti. Accad. Ital. Fis. Mat.* Atti della Reale Accademia d'Italia. Memorie della Classe di Scienze Fisiche, Matematiche e Naturali. Rome.
- Atti Accad. Nazl. Lincei, Rend., Classe Sci. Fis., Mat. e Nat.* Atti della Accademia Nazionale dei Lincei, Rendiconti, Classe di Scienze Fisiche, Matematiche e Naturali. Rome.
- Atti Congr. Naz. Chim. Ind.* Atti del Congresso Nazionale di Chimica Industriale. Milan.
- Atti Congr. Naz. Chim. Pura Applic.* Atti del Congresso Nazionale di Chimica Pura ed Applicata. Rome.
- Atti III Congr. Intern. Vetro, Venice.* Atti del Congresso Internazionale del Vetro, 3rd Congress. Venice, 1953.
- Atti Mem. Accad. Sci. Padova.* Atti e memorie della regia accademia di scienze, lettere e arti di Padova. Padua.

- Atti R. Accad. Lincei.* Atti della Reale Accademia dei Lincei. Rendiconti. Classe di Scienza Fisiche, Matematiche e Naturali. Rome.
- Atti R. Accad. Napoli.* Atti della Reale Accademia delle Scienze Fisiche e Matematiche. Societa Reale di Napoli. Naples.
- Atti R. Accad. Torino.* Atti della Reale Accademia delle Scienze di Torino. Turin.
- Atti R. Inst. Veneto.* Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti. Venice.
- Atti Regia Accad. Fisiocrit. Siena.* Atti della Regia Accademia dei Fisiocritici in Siena, Sezione Medico-Fisica. Siena.
- Atti Soc. Nat. Mat. Modena.* Atti della società dei naturalisti e matematici di Modena, Modena.
- Atti X Congr. Intern. Chim.* Atti del congresso internazionale di chimica, 10th Congress. Rome, 1938.
- Australasian Engr.* The Australasian Engineer. Sydney.
- Australia Bur. Min. Res., Geol. and Geophys. Summary Rep.* Australia, Bureau of Mineral Resources, Geology and Geophysics. Summary Reports. Canberra.
- Australian Chem. Inst. J. and Proc.* Australian Chemical Institute Journal and Proceedings.
- Australian J. Agr. Res.* Australian Journal of Agricultural Research. Melbourne.
- Australian J. Appl. Sci.* Australian Journal of Applied Science. Melbourne.
- Australian J. Biol. Sci.* Australian Journal of Biological Sciences. Victoria.
- Australian J. Dairy Technol.* Australian Journal of Dairy Technology. Melbourne.
- Australian J. Exp. Biol. Med. Sci.* Australian Journal of Experimental Biology and Medical Science. Adelaide.
- Australian J. Sci.* Australian Journal of Scientific Research. Series A. Physical Sciences. Melbourne.
- Australian Pulp and Paper Ind. Tech. Assoc. Proc.* Australian Pulp and Paper Industry, Technical Association Proceedings. Melbourne.
- Autogene Metallbearbeit.* Autogene Metallbearbeitung.
- Avhl. Norsk. Videns. Akad. Oslo.* Avhandlingar utgitt av det Norske Videnskaps-Akademie i Oslo. I. Matematisk-Naturvidenskapelig Klasse. Oslo.
- Avtogennoe Delo. (Acetylene Welding).* Moscow.
- Avtomat. Svarka.* Avtomaticheskaya Svarka (Automatic Welding) Kiev.
- Avtomobil. i Traktor. Prom.* Avtomobil'naya i Traktornaya Promyshlennost. Moscow.
- Azerbaid. Neft. Khozy.* Azerbaidzhanskoe Neftyanoe Khozyaistvo. Baku, U.S.S.R.
- B.A.E.R.* British Atomic Energy Reports.
- Baking Technology.*
- B.A. Rep.* British Association for the Advancement of Science. Reports. London.
- B.A. Rep. Coll. Chem.* Reports on Colloid Chemistry. British Association for the Advancement of Science. London.
- Bauing.* Der Bauingenieur. Berlin.
- Beama J.* The Beama Journal. London.
- Bee World.* London.
- Beiheft Z. V. deut. Chem.* Zeitschrift des Vereins deutscher Chemiker (Beiheft). [Formerly Zeitschrift für Angewandte Chemie]. Weinheim.
- Beit. Pathol. Anat. u. Allgem. Pathol.* Beiträge zur Pathologischen Anatomie und zur Allgemeinen Pathologie. Jena.
- Beitr. Geophys.* Gerlands Beiträge zur Geophysik. Leipzig.
- Beitr. Klin. Tuberk.* Beiträge zur Klinik der Tuberkulose. Berlin.
- Beitr. Kryst. Min.* Beiträge zur Krystallographie und Mineralogie. Heidelberg.
- Beitr. Min. Petr.* Beiträge zur Mineralogie und Petrographie. Berlin.
- Bell Lab. Rec.* Bell Laboratories Record. New York.
- Bell Syst. Techn. J.* Bell System Technical Journal. New York.
- Bell Telephone Quart.* Bell Telephone Quarterly. New York.
- Bell Telephone Syst. Techn. Monogr.* Bell Telephone System Technical Monographs. New York.
- Bell Telephone Syst. Techn. Publ.* Bell Telephone System Technical Publications. New York.
- Ber.* Berichte der Deutschen Chemischen Gesellschaft. Berlin.
- Ber. D. botan. Ges.* Berichte der Deutschen Botanischen Gesellschaft. Jena.
- Ber. D. keram. Ges.* Berichte der Deutschen keramischen Gesellschaft. Bad Honef/Rhein.
- Ber. D. Phys. Ges.* See *Z. Phys.*
- Ber. ges. Physiol. exptl. Pharmakol.* Berichte über die gesamte Physiologie und experimentelle Pharmakologie. Berlin.
- Ber. Ges. Kohlentechn.* Berichte der Gesellschaft für Kohlentechnik. Dortmund.
- Ber. Inst. Phys. Chem., Akad. Wiss. U.S.S.R.* Berichte des Instituts für physikalische Chemie, Akademie der Wissenschaften der U.S.S.R. Kiev.

- Ber. Nat. Med. Verein. Innsbruck.* Berichte des naturwissenschaftlich-medizinischen Vereins in Innsbruck. Innsbruck.
- Ber. Oberhess. Ges. Natur- u. Heilkde.* Bericht der Oberhessischen Gesellschaft für Natur- und Heilkunde. Giessen.
- Ber. Phys.-ökonom. Ges. Königsberg.* Bericht über die in den Sitzungen der Physikalisch-ökonomischen Gesellschaft zu Königsberg in Pr. gehaltenen Vorträge. Königsberg.
- Ber. Verhandl. Sächs. Akad. Wiss. Leipzig.* Berichte über die Verhandlungen der Sächsischen Akademie der Wissenschaften zu Leipzig.
- Ber. Verh. Nat. Ges. Freiburg.* Berichte über die Verhandlungen der Naturforschenden Gesellschaft zu Freiburg i. Br. Freiburg.
- Beret. 18th Skand. Naturforskermode.* Beretning om det Skandinaviske Naturforskermode. 18th Meeting, Copenhagen, 1929.
- Berg. u. Hütten. Monatsh.* Berg- und hüttenmännische Monatshefte der montanistischen Hochschule in Leoben. Vienna.
- Berg- und Hüttenmännisches Jahrb.* Berg- und hüttenmännisches Jahrbuch der montanistischen Hochschule in Leoben. Vienna.
- Bergbau.* Bergbau Archiv. Essen.
- Bergcultures.* Bogor, Indonesia.
- Bergm. J.* Bergmännische Journal. Freiberg.
- Berl. u. Münch. Tier. Woch.* Berliner und Münchener tierärztliche Wochenschrift. Berlin-Friedenau.
- Berlin Ber.* Sitzungsberichte der [Königlichen] Preussischen Akademie der Wissenschaften. Physikalisch-Mathematische Klasse. Heidelberg.
- Berlin. klin. Wochenschr.* Berliner klinische Wochenschrift. Berlin.
- Better Crops with Plant Food.* Washington.
- Bibl. Univ.* Bibliothèque Universelle de Genève. Geneva.
- Biedermann's Zentr.* Biedermann's Zentralblatt für Agrikulturchemie und rationellen Landwirtschaft. Berlin, Leipzig.
- Bihang Kgl. Svensk. Vet. Akad. Handl.* Bihang till Kongliga Svenska Vetenskaps-Akademiens Handlinger. Stockholm.
- Biochem. J.* The Biochemical Journal. Cambridge.
- Biochem. J. (Ukraine).* Biochemical Journal (Ukraine).
- Biochem. Z.* Biochemische Zeitschrift. Heidelberg.
- Biochim. & Biophys. Acta.* Biochimica et Biophysica Acta. Amsterdam.
- Biochim. Terap.* Biochimica e Terapia Sperimentale. Milan.
- Biodynamica.* Madison, Wis.
- Biokhimiya.* Moscow, Leningrad.
- Biol. Abstr.* Biological Abstracts. Philadelphia.
- Biol. Bull.* Biological Bulletin. Woods Hole, Mass.
- Biol. Rev.* Biological Reviews of the Cambridge Philosophical Society. Cambridge.
- Biol. Zentr.* Biologisches Zentralblatt. Leipzig.
- Blast Furnace Steel Plant.* Blast Furnace and Steel Plant. Pittsburg.
- Bodas Oro Real Soc. Españ. Fis. y Quím. Crónica Actos Conmem. Conf. Gen. Coloquios y Ses. Cient., Madrid.* Bodas de Oro de la Real Sociedad Española de Física y Química. Crónica de los Actos Conmemorativos Conferencias Generales Coloquios y Sesiones Científicas, Madrid.
- Bodenkultur.* Vienna.
- Bodenkunde u. Pflanzenernähr.* Bodenkunde und Pflanzenernährung.
- Bol. Acad. Cienc. Argentina.* Boletín de la Academia Nacional de Ciencias de la Republica Argentina. Córdoba.
- Bol. Acad. Cienc. Exactas (Mad).* Boletín de la Academia de Ciencias Exactas, Físicas y Naturales (Madrid).
- Bol. Acad. Nacl. Cienc. Córdoba.* (See *Bol. Acad. Cienc. Argentina*).
- Bol. Assoc. Brasil. Met.* Boletim da Associação Brasileira de Metais. São Paulo.
- Bol. Inst. Españ. Oceanog.* Boletín del Instituto Español de Oceanografía. Madrid.
- Bol. Inst. Geol. Españ.* Boletín del instituto geológico y minero de España. Madrid.
- Bol. Inst. Med. Exptl. Estud. Cancer, Buenos Aires.* Boletín del Instituto de Medicina Experimental para el Estudio y Tratamiento del Cancer, Buenos Aires.
- Bol. Inst. Nacl. Invest. Agron. (Madrid).* Boletín del Instituto Nacional de Investigaciones Agronómicas. Madrid.
- Bol. Min. Soc. Nacl. (Chile).* Boletín minero (Sociedad Nacional de Minería, Santiago, Chile). Santiago.
- Bol. Obras. Sanit. Nacion.* Boletín de Obras Sanitarias de la Nación. Buenos Aires.

- Bol. Ofic. Asoc. Tecn. Cuba.* Boletín Oficial de la Asociación de Técnicos Azucareros. Havana, Cuba.
- Bol. Soc. Biol. Santiago Chile.* Boletín de la Sociedad de Biología de Santiago de Chile. Santiago.
- Bol. Soc. Chilena Quím.* Boletín de la Sociedad Chilena de Química. Concepción.
- Bol. Soc. Nacl. Min.* Boletín de la Sociedad Nacional de Minería del Perú. Lima.
- Bol. Soc. Quím. Peru.* Boletín de la Sociedad Química del Perú. Lima.
- Boll. Accad. Catania.* Bollettino delle Sedute dell'Accademia Gioena di Scienze Naturali in Catania. Catania.
- Boll. Chim. Farm.* Bollettino Chimico Farmaceutico. Milan.
- Boll. Ist. Super. Agrar. Pisa.* Bollettino dell'Istituto superiore agrario di Pisa.
- Boll. Lab. Chim. Prov., Bologna.* Bollettino dei Laboratori Chimici Provinciali (Bologna).
- Boll. Laniera.* Bollettino della Laniera. Rome.
- Boll. Oculist.* Bollettino d'Oculistica. Bologna, New York.
- Boll. Sci. Fac. Chim. Ind. Bologna.* Bollettino Scientifico della Facoltà di Chimica Industriale dell'Università di Bologna. Bologna.
- Boll. Soc. Eustachiana.* Bollettino della Società Eustachiana degli Istituti Scientifici dell'Università di Camerino. Camerino.
- Boll. Soc. Geol. Ital.* Bollettino della Società Geologica Italiana. Rome.
- Boll. Soc. Ital. Biol. Sper.* Bollettino della Società Italiana di Biologia Sperimentale. Naples.
- Boll. Staz. Pato. Vegetale.* Bollettino della Stazione di Patologia Vegetale. Rome.
- Boll. Tec. Regio Ist. Sper. Colt. Tabacchi 'Leonardo Angeloni', Scafati.* Bollettino Tecnico del Regio Istituto Sperimentale per la Coltivazione dei Tabacchi 'Leonardo Angeloni', Scafati. Rome.
- Bombay Technol.* Bombay Technologist. Bombay.
- Bot. Abstr.* Botanical Abstracts. Philadelphia.
- Bot. Gaz.* Botanical Gazette. Chicago.
- Bot. Zhur.* Botanicheskii Zhurnal. Moscow.
- Botan. Arch.* Botanisches Archiv. Leipzig.
- Botan. Mag. Tokyo.* The Botanical Magazine (Tokyo). Tokyo.
- Botan. Rev.* Botanical Review. New York.
- B.P.* British Patent.
- Bragantia.* São Paulo.
- Brandschutz.* Stuttgart.
- Brasil, Dept. Nacl. Produção Mineral, Bol.* Brazil, Ministério da Agricultura, Departamento Nacional da Produção Mineral Boletín. Rio de Janeiro.
- Brasseur Franç.* Le Brasseur Français.
- Braunkohle.* Düsseldorf.
- Braunkohlenarch.* Das Braunkohlenarchiv, Vorkommen-Gewinnung-Verarbeitung-Verwendung der Brennstoffe. Halle.
- Brennstoff-Chem.* Brennstoff-Chemie. Essen.
- Brennstoff- u. Wärmewirtsch.* Brennstoff und Wärmewirtschaft. Halle.
- Brennstoff-Wärme-Kraft.* Düsseldorf, Germany.
- Brit. Assoc. Adv. Sci. Rep.* British Association for the Advancement of Science Report of the Annual Meeting. London.
- Brit. Cast Iron Res. Assoc.* Journal. Birmingham.
- Brit. Chem. Abstr.* British Abstracts. Bureau of Abstracts. London.
- Brit. Chem. Eng.* British Chemical Engineering. London.
- Brit. Clayworker.* The British Clayworker. London.
- Brit. Heart J.* British Heart Journal. London.
- Brit. J. Appl. Phys.* British Journal of Applied Physics. London.
- Brit. J. Exp. Path.* British Journal of Experimental Pathology. London.
- Brit. J. Ind. Med.* British Journal of Industrial Medicine. London.
- Brit. J. Nutrition.* British Journal of Nutrition. Cambridge.
- Brit. J. Ophthalmol.* British Journal of Ophthalmology. London.
- Brit. J. Pharmacol.* British Journal of Pharmacology and Chemotherapy. London.
- Brit. J. Phot.* British Journal of Photography. London.
- Brit. J. Radiol.* British Journal of Radiology. London.
- Brit. Med. Bull.* British Medical Bulletin. London.
- Brit. Med. J.* British Medical Journal. London.
- Brit. Stand. Specif.* British Standard Specification. British Standards Institution. London.
- Brown Boveri Rev.* The Brown Boveri Review. Baden, Switzerland.