

THE
EXTRA PHARMACOPŒIA

MARTINDALE

VOL. I

THE
EXTRA PHARMACOPŒIA

MARTINDALE

Twenty-first Edition

IN TWO VOLUMES

PREVIOUS EDITIONS OF THE EXTRA PHARMACOPŒIA

| | | | | | NO. OF PAGES (excluding Introductory) |
|--------------------------------------|----|----|----|------|--|
| 1st Edition published | .. | .. | .. | 1883 | 313 |
| 2nd | " | " | .. | 1884 | 330 |
| 3rd | " | " | .. | 1884 | 330 |
| 4th | " | " | .. | 1885 | 446 |
| 5th | " | " | .. | 1888 | 462 |
| 6th | " | " | .. | 1890 | 485 |
| 7th | " | " | .. | 1892 | 524 |
| 8th | " | " | .. | 1895 | 580 |
| 9th | " | " | .. | 1898 | 626 |
| 10th | " | " | .. | 1901 | 688 |
| 11th | " | " | .. | 1904 | 809 |
| 12th | " | " | .. | 1906 | 1075 |
| 13th | " | " | .. | 1908 | 1203 |
| 14th | " | " | .. | 1910 | 1054 |
| • Supplement: Organic Analysis Chart | .. | .. | .. | 1910 | 80 |
| 15th Edition, Vol. I published | .. | .. | .. | 1912 | 1112 |
| 15th | " | II | " | 1912 | 370 |
| 16th | " | I | " | 1915 | 1113 |
| 16th | " | II | " | 1915 | 469 |
| 17th | " | I | " | 1920 | 1115 |
| 17th | " | II | " | 1921 | 688 |
| 18th | " | I | " | 1924 | 1163 |
| 18th | " | II | " | 1925 | 728 |
| 19th | " | I | " | 1928 | 1207 |
| 19th | " | II | " | 1929 | 759 |
| 20th | " | I | " | 1932 | 1216 |
| 20th | " | II | " | 1935 | 889 |

PREFACE

The publication of Volume I of the Twenty-First Edition of the *Extra Pharmacopœia* will remind "Martindale" readers that the First Edition of this survey of substances used for the treatment of human ailments and diseases was written in 1883 by William Martindale and W. Wynn Westcott and that, following the death in 1933 of William Harrison Martindale, the responsibility for its continued production was taken over by the Council of the Pharmaceutical Society of Great Britain.

At this important and outstanding period of the history of the book, it is of interest to mention and record that the first ten volumes were produced under the joint Editorship of William Martindale and W. Wynn Westcott. The former died in 1902 and his son, William Harrison Martindale, carried on the work through eight more editions with Dr. Westcott, until the death of the latter in 1925. The nineteenth and twentieth editions, published in 1928 and 1932 respectively, were issued by the late William Harrison Martindale with the aid of occasional assistance from medical friends on points of difficulty, and the intense personal attention devoted by him to the yearly increasing task of revision undoubtedly contributed to his death. Reference must be made also to the change of publishers, which has terminated a long association between former publishers and the *Extra Pharmacopœia*; previous editions have been published by Messrs. H. K. Lewis & Co. Ltd., whereas this edition is published by the Pharmaceutical Press.

The responsibility for further revision was delegated by the Council to the British Pharmaceutical Codex Revision Committee and the Editor of the *Codex*, Mr. C. E. Corfield, was appointed Editor of "Martindale." Under this new arrangement, Volume II of the Twentieth Edition, which is concerned mainly with matters of diagnosis, with the analysis and assay of medical products, and with numerous other subjects associated with medicine, chemistry and pharmacy not included in the first volume, was produced in 1935. In the preface to this volume readers were reminded that Martindale's *Extra Pharmacopœia* had owed much to the self-sacrificing personal labours of William Martindale and of W. H. Martindale in producing a working summary of the literature on original work and notable advances throughout the whole field of therapeutics. It was recognised that these authors had "animated the whole work with an indefinable personality which expressed itself at times in *ex cathedra* judgments of a refreshing directness, and at others in the warnings of an experienced and well-informed mind against the stampede of novelty."

To-day it is necessary to record an increasingly wide field of therapeutic agents and to review an ever-increasing bulk of scientific literature. This has made the continuance of revision

by an individual an impossibility and has necessitated a revision of the work by an organisation having medical, pharmaceutical and chemical experts, and having no direct commercial interests. Thus, the *Extra Pharmacopœia* will continue to meet that need in medicine and in pharmacy of a comprehensive summary of the composition and applications of the multitude of old and new, official and proprietary substances about which the doctor or the pharmacist may require information.

In this new Edition a large proportion of the matter has been re-arranged and rewritten, and the whole of the material has been examined exhaustively with the object of removing matter of little or no value and replacing it by useful accounts of the many new substances or modern applications which have been introduced during the last four years. Every effort has been made to give information on all the compounds and preparations which the doctor uses or is recommended to use for the treatment of his patient, including notes on their composition and practical observations on the results of their application, and to provide the dispenser with that general and practical knowledge of the constitution and properties of the chemical, animal and vegetable drugs, which is necessary for him to prepare and dispense successfully the prescriptions of the medical practitioner in both hospital and private practice.

Classification

The increase in the number of medicinal substances resulting from the researches of the chemist, the pharmacist, the pharmacologist and other investigators in the laboratories of the manufacturers, the hospitals or other institutions, has necessitated a change in the classification and arrangement of the book, so as to bring together substances which are either somewhat similar or clearly related in constitution, and to group, as far as possible, those substances which have similar therapeutic or pharmacological action and are used for similar purposes.

The classification, as in previous editions, is based upon the selection of parent substances in common use which serve to form sections of the book, and thus enable readers to review a group of medicinal agents of related composition or medicinal action with the minimum amount of inconvenience. These principal or parent substances are arranged alphabetically, and in each section are included those compounds which are chemically related and those substances which, although not having a close connection by constitution or origin, bear a somewhat similar pharmacological action or are frequently used for the treatment of the same ailment or disease. For example, the several official barbiturates are grouped under the heading "*Barbitonum*," and in this section will be found all the information concerning the many well-known proprietary and non-proprietary barbiturates, together with closely related substances, their more complex derivatives and the compounded preparations which depend for their action wholly or

partly upon the presence of one of these powerful hypnotics. Similarly, under the heading "*Arsenum*" is a section arranged to provide the reader with a systematic account of the information which is necessary to understand the composition, properties and application of the simple inorganic arsenic compounds and the complex organic arsenicals such as Tryparsamide and Neoarsphenamine.

The extension of this system has resulted in modifications in several of the headings familiar to readers of earlier editions. The section on "*Coal Tar Derivatives*," which previously contained the descriptions of the flavine antiseptics and a small but miscellaneous collection of dyes and synthetic chemicals, has been discontinued, and the necessary information included under more appropriate headings. The section on "*Nutrimenta*," which contained brief accounts of various milk and other food products, and of the vitamins and commercial vitamin preparations, has been replaced by more complete and systematic notes in more convenient sections. Similarly, it has been deemed undesirable to continue the inclusion of the several important hormones and glandular products of animal origin in one section under "*Animal Organotherapy*." The rapidly increasing importance in therapeutics of posterior and anterior pituitary, thyroid and parathyroid, the male and female hormones, liver and stomach extracts, make it necessary to increase considerably the information given on these substances, and in this edition Adrenaline, Liver Extracts, Insulin, Estrin, Pituitary, and Thyroid are placed in separate sections in a manner similar to the inclusion of Insulin in previous editions. The introduction of new therapeutic agents and the discovery of new applications for some of the older products have resulted in a drastic alteration in the manner of presenting the information which in previous editions was included in a section under the heading "*Supplementary List of Drugs*." In order to avoid increasing unduly the size of the volume, notes which may not have been of much value to readers have been deleted; in some cases the inclusion of extended notes on an older drug would have made a supplementary list inconvenient and often ambiguous. The new classification has made it possible to decrease the notes on some products previously dealt with in other sections without transferring them to a supplementary list, as well as to emphasise the value of certain products mentioned in the old list. The substances mainly concerned in this respect are vegetable drugs which are still given a place in National Pharmacopœias, and have accepted therapeutic properties, and in which the absence of a separated chemical constituent does not appear to justify their entire deletion or even their relegation to a position of almost complete obscurity. The section dealing with "*Vaccines and Sera*" remains as a separate chapter, because in this form the information appears to be of greater value to the doctor who is concerned with the treatment of a particular disease, and for this reason the notes are arranged mainly under the sub-headings of diseases in

preference to dealing separately with individual Antitoxins, Sera, Toxins and Vaccines.

New Pharmacopœias and Formulæries

Since the publication of the Twentieth Edition several new Pharmacopœias have been produced, including the *United States Pharmacopœia XI*, the *Swiss Pharmacopœia V*, and the *Danish Pharmacopœia*, 1933. An *Addendum*, 1936, to the *British Pharmacopœia*, 1932, has been published recently. In addition, new editions of some established Formulæries have appeared, including the *National Formulary of Unofficial Preparations* issued by the American Pharmaceutical Association, *N.F. VI*, 1936, and the *British Pharmaceutical Codex*, 1934, as well as new editions of several hospital pharmacopœias. All these publications have been examined, and the *Extra Pharmacopœia* has been revised so as to bring it into line with the new volumes. The articles and preparations of the *B.P.* 1932 now replace those of the *B.P.* 1914, instead of being included in a synopsis, and many of the isolated combinations of previous editions have been replaced by the recognised formulæ of the *British Pharmaceutical Codex* or by accepted formulæ from the pharmacopœias of the principal London and provincial hospitals.

Abbreviations and Nomenclature

In earlier editions, the cubic centimetre has been used as the unit of volume in the metric system for expressing the doses of liquids and volumes of liquids in various formulæ; the abbreviation used was *Cc.* In this edition the cubic centimetre has been replaced by the millilitre, which is the recognised international unit adopted in both the *British Pharmacopœia* and the *British Pharmaceutical Codex*, and which is common to all scientific literature in Great Britain; the abbreviation used is *ml.* Likewise the abbreviation *Gm.* for gramme has been replaced by *g.*, which is the abbreviation recommended and used by the editors of the principal scientific publications. Doses are given in both metric and Imperial systems, as in previous editions, but the abbreviations *gr.* for grain and *m.* for minim are used only in formulæ or when doses occur in a descriptive paragraph, or in abstracts from the literature.

The nomenclature adopted throughout the book is based upon that of the *B.P.* and the *B.P.C.*, and thus the book contributes towards the general adoption of a uniform system, which is always helpful to both the prescriber and the dispenser. Nevertheless, it will probably be a long time hence before an international nomenclature is accepted, and the dispensing of foreign prescriptions thereby simplified, and one does not foresee in the near future the adoption of any uniform system by proprietary medicine manufacturers by which the doctor or the public may more easily understand the constituents named in their disclosed formulæ.

Synonyms and Proprietary Names

In addition to the official or general name of the substance, commonly used synonyms are given, as well as the trade names

which indicate the products of particular manufacturers. The doctor will thus be able to see immediately whether he is prescribing a well-known drug under an official name or under a proprietary name, and the pharmacist is provided with the knowledge which enables him to understand when a non-proprietary product may be dispensed and when it is not permissible to dispense a non-proprietary equivalent on a prescription for the product of a particular factory. Coupled with these proprietary names is an indication of the source of the article, whether of British or foreign manufacture perhaps, and the name of the firm or firms from which supplies or further information can be obtained. The inclusion of the names of these proprietary forms of a drug is an important feature of the *Extra Pharmacopœia*, and provides practically the only concise information available to the doctor by which he can discover whether many of the so-called ethical proprietaries are new products of the research laboratory, or simply older chemicals or preparations making a new appearance in a modified form. In this edition the asterisk and registration numbers have been replaced by the name of the manufacturer and/or agent, and the town, a system which has been tried out in an appendix to the *B.P.C.* 1934, and since proved by usage to be of the utmost value to both doctor and pharmacist.

A similar system is adopted for chemical compounds and preparations of chemical or animal substances which have no common equivalent, and which are available to the prescriber and the dispenser only under the registered name of the maker. Thus, the user is provided with information on nearly every branded product which is available to medicine and pharmacy. In the majority of cases the notes included have been taken from literature issued by the respective makers or agents; they include, in general, an indication of the composition, the therapeutic use and the usual dose, with any abstracts from the literature having important bearing on its use for the treatment of the disease for which it has been recommended. In presenting this information to the doctor, it is necessary to remind him that a very large number of important contributions to the physician's resources come from the laboratories of manufacturing chemists who very naturally protect their interests by patents and trade-marks. At the same time the dispenser must be reminded that when a substance is ordered under its trade-mark description it is an actionable infringement to supply a product of another maker. A reference to the pages dealing with the barbitone group of hypnotics, the organic arsenicals, or the pituitary products will suffice to show that the new volume is an invaluable guide to both doctors and pharmacists in connection with all drugs of a proprietary character.

Poisons and Dangerous Drugs

In previous editions, the *Extra Pharmacopœia* has provided the doctor and the pharmacist with a complete guide to the application of the existing law to the sale and supply of "poisons"

and "dangerous drugs." Every substance or preparation was marked so as to indicate clearly whether it was a Schedule I or a Schedule II poison. In this edition, following the coming into force of the Poisons Rules, 1935, governing the distribution of substances contained in the Poisons List prepared for the purpose of administering the Pharmacy and Poisons Act, 1933, this service is continued, and every effort has been made to apply this much more complicated system of control to the individual preparations and substances described in the book. To-day poisons are in one of two parts of the List, and the Rules contain a number of schedules which determine the special restrictions, exemptions, or other conditions which apply to the various groups.

At the beginning of each section containing a group of poisons, the corresponding item in the Poisons List is quoted and its position marked by [P1] for part I or [P2] for part 2. Similarly, items from the schedules appended to the Poisons Rules are given to indicate whether the sale or supply of substances in the group are subject to any special restrictions or exemptions. The least complicated system possible has been devised for this purpose, and readers should note that the symbols [§1] and [§4], for example, refer respectively to Schedules I and IV of the Rules. Dangerous drugs are indicated by the symbol [D]. Preceding the names of substances which are poisons, readers will observe symbols or groups of symbols, from which they obtain without effort a concise summary to the conditions which apply. Thus, [P1-§1] tells him that he is concerned with a Part I poison, subject to the special restrictions governing the poisons in Schedule I. Likewise, [P1-§1-§4] indicates that the substance is in Part I of the Poisons List, that it is included in Schedules I and IV and, consequently, supplied to the public only by authorised sellers on the prescription of a doctor, dentist or veterinary surgeon.

Some Important Therapeutic Agents Described

The following notes give a brief indication of some of the many important substances dealt with and draw attention to a few of the new therapeutic agents described.

ACIDUM ACETYLSALICYLICUM. The composition, with proprietary names, of official substances, so-called ethical proprietaries, and advertised remedies, p. 14.

ACIDUM MANDELICUM. The treatment of urinary infections with preparations of the acid and its salts, p. 24.

SODII THIOSULPHAS. The prevention and treatment of stomatitis due to injections of mercury, bismuth, or arsenic, p. 103.

ACIDUM TANNICUM. Its application and value for the treatment of burns, p. 104.

ACRIFLAVINA. The prevention of sepsis in wounds with acriflavine, euflavine and proflavine preparations, p. 115.

ADRENALINA. A full account of its uses, with summaries of the composition of the various combinations recommended, p. 125.

KAOLINUM. The various brands of colloidal kaolin for gastric and intestinal affections, including references to magnesium trisilicate, *p.* 165.

ANTIMONII ET SODII TARTRAS. The use of organic antimony compounds in leishmaniasis, kala-azar, bilharziasis, etc., *p.* 182.

ARGENTOPROTEINUM. The composition of the various types of colloidal silver and their use as non-irritant antiseptics, *p.* 191.

ARSENUM. An exhaustive account of inorganic and organic arsenicals, including acetarsol, tryparsamide and the arspenamines, *p.* 195.

AURI ET SODII THIOSULPHAS. The gold compounds introduced for the treatment of tuberculosis and rheumatoid arthritis, *p.* 240.

BARBITONUM. The composition and characters of all the important members of the wide field of barbiturates, *p.* 253.

CALCII GLUCONAS. The calcium compound preferred for painless intramuscular injection, *p.* 309.

CASEINUM. A useful summary of the composition of many proprietary infants' and invalids' foods, *p.* 344.

PULVIS VITAMIN B₁. Opinions and claims regarding the therapeutic value of this antineuritic vitamin, *p.* 351.

CHLOROFORMUM. The anæsthetic uses and preparations of chloroform, with notes on the anæsthetic hydrocarbons, *p.* 365.

CINCHOPHENUM. The composition and toxic effects of these widely used and dangerous drugs, *p.* 378.

COCAINA. A summary and analysis of the enormous group of official and proprietary local anæsthetics, *p.* 384.

DIGITALIS. The glycosides and standardised preparations available for the treatment of heart diseases, *p.* 440.

EPHEDRINA. The action of the ephedrine alkaloids and the composition of commercial substances containing them, *p.* 452.

ERGOTA. Ergometrine and the other new alkaloids of ergot—their composition, pharmacology, and clinical uses, *p.* 458.

HISTAMINÆ PHOSPHAS ACIDUS. The new official salt used in the treatment of rheumatism, *p.* 465.

HISTIDINE HYDROCHLORIDE. Opinions and experiences concerning its action in the treatment of peptic ulcers, *p.* 467.

HEPAS. A concise description of liver extracts and stomach products for pernicious anæmia, including the various proprietary preparations available, *p.* 517.

HYDRARGYRUM. The mercury preparations and compounds used for syphilis, and the new Mersalyl for cardiac œdema, *p.* 534.

INSULIN. Up-to-date information on the administration of this hormone essential to the life of diabetic sufferers, *p.* 571.

IODUM. The composition of the iodine preparations and compounds for X-ray diagnosis and for internal use by mouth and by injection, *p.* 586.

EMETINA. The treatment of amœbic dysentery by the administration of emetine salts with bismuth, arsenic, etc., *p.* 600.

LIGATURES. A brief account of surgical ligatures and sutures, with notes on their sterilisation, *p.* 613.

MORPHINA. A summary of the principal factors related to the treatment of morphine addicts. "D.D.A." and "[P1-81]" poisons are clearly indicated, p. 637.

ESTRINUM. Under this heading the male and female hormones are described, and the numerous proprietary products which depend for their action upon these bodies are summarised, p. 658.

OLEUM HYDROCARI. The varieties and derivatives used in the treatment of leprosy are described, p. 680.

OLEUM MORRHUÆ. Calciferol, halibut-liver oil, and vitamin A and D preparations generally are summarised in this section, p. 685.

PEPTONUM. The subject of non-specific protein therapy and the numerous substances used for producing protein shock, p. 725.

PHENOL. The composition of all its preparations and their classification as poisons; the complications of the Poisons List and the restrictions and exemptions of the schedules to the Poisons Rules have been minutely applied, p. 744.

DINITROPHENOLS. The nitro-compounds which have been used for the reduction of obesity, with results arising therefrom, p. 753.

IODOPHTHALEINUM. Its intravenous and oral administration for producing opacity of the gall-bladder to X-rays, p. 756.

PHYSOSTIGMINA. The synthetic peristaltic stimulant, Prostigmin, related to physostigmine, is described, p. 760.

PITUITARIUM. The active principles of the anterior and posterior pituitary lobes are explained, and the many proprietary products are described or compared, p. 784.

CHINIOFONUM. The official substance, better known as Yatren, for acute and chronic amœbic dysentery, p. 797.

QUININA. Descriptions of all the quinine compounds; their use in malaria and, with urethane, for varicose veins; descriptions and references relating to synthetic anti-malarials such as Quino-Plasmoquine, Atebrin and Atebrin-Musonate, p. 809.

STRAMONIUM. The preparations of stramonium used in the treatment of parkinsonism, p. 861.

THYROIDEUM. The actions of the thyroid constituents are explained and the proprietary substances containing thyroid and related substances are summarised, p. 889.

UREA. The symmetrical ureas and related compounds administered for trypanosomiasis, gonococcal, streptococcal and other infections; results with Prontosil and Prontosil S are included, p. 906.

Vaccines, Toxins and Antitoxins

It has been deemed desirable to retain the arrangement of former editions in which preparations derived from bacteria or from the products of bacterial growth are dealt with collectively in one section of the book. This section is introduced by a general account of the principles underlying the use of bacterial antigens and a description of the nature and preparation of vaccines, anti-

viruses, bacteriophages, toxins, antitoxins, etc. As far as possible, individual substances belonging to these groups are dealt with under the diseases for which they are used. The administration of vaccines by mouth must still be regarded as in the experimental stage; references to some clinical trials are given under Oral Cold Vaccine, Dysentery Vaccine, Typhoid Vaccine and B.C.G. Vaccine. The subject matter relating to the Schick Test and active immunisation against diphtheria, and that relating to the Dick Test and active immunisation against scarlet fever, included in Volume II of the Twentieth Edition, has been transferred, with additions, to the present volume. The literature relating to Meningococcus Antitoxin, the serum treatment of pneumonia, the use of Snake Venom in hæmophilia, Cobra Venom as an analgesic in cancer and in the treatment of epilepsy, and reports on the vaccine prophylaxis and treatment of whooping cough, have been abstracted. The use of Staphylococcus Antitoxin, Staphylococcus Toxoid and Tetanus Toxoid are amongst other additions to this section, the whole of which has been revised in the light of recent reports.

Summaries of Legal Requirements

The pages at the end of the volume contain a practical summary of the Poisons Rules, 1935, in which the reader is provided with a concise account of the conditions governing the sale or supply of poisons by the doctor, dentist or veterinary surgeon, the pharmacist, the wholesaler and the hospital. This section also contains for purposes of reference the various schedules appended to the Rules, the schedules of poisons applicable to Northern Ireland and the Irish Free State, a summary of Dangerous Drug legislation which outlines the principal points to be remembered by the prescriber and dispenser, and a summary of the regulations made under the Therapeutic Substances Act, 1925, which provides for the regulation of the manufacture, sale, and importation of vaccines, sera and other therapeutic substances, such as the organic arsenicals of the arsphenamine group, insulin and pituitary (posterior lobe) extract.

Therapeutic Index

The Therapeutic Index has been subjected to exhaustive examination, and is reproduced in a modified and much improved form. A large proportion of the references to treatment have been transferred to their rightful places in the main part of the book, many additions have been made so as to bring the index into line with modern treatment of disease with newer drugs, and greater emphasis in the list has been given to the grouping of drugs in accordance with their pharmacological action. The doctor requires an index of this character as a general guide to the different drugs which at various times have been used in connection with a particular ailment or disease, or to groups of drugs which have a somewhat similar pharmacological action. He is recommended to

use the index only as a guide to treatment by drugs, and to refer to the summary of their uses and the different forms of administration in the body of the book.

Antidotes to Poisons

Other sections of the work in which changes of interest have been made include the revised brief accounts of the important subjects of Blood Transfusion and Antidotes to Poisons. Much useful information has been added to the notes on antidotes under the substances which behave as powerful poisons, and the paragraphs will be of increased value to medical men who are called upon to treat cases of poisoning.

Acknowledgments

Throughout the revision the fullest use has been made of medical and pharmaceutical literature, and as far as possible care has been taken to select matter which is likely to be of most value to the doctor and the pharmacist. In reviewing such a wide range of pharmacopœias, formularies, and literature, it is probable that some point of importance may have been overlooked, or that a typographical error may have occurred. The Editor and the Revision Committee will be grateful if readers will draw their attention to any such errors, and they will welcome suggestions regarding the subject matter or arrangement of the work from medical men or pharmacists.

Assistance has been obtained from several persons having special knowledge of and experience in the different parts of the work and on particular drugs, and the Council of the Pharmaceutical Society desire to record their indebtedness to all these helpers and particularly to the members of their laboratory and office staff, whose perseverance has made it possible to produce a completely revised edition in such a comparatively short time.

December 1936.

ABBREVIATIONS

The abbreviated titles of journals are those given in the *World List of Scientific Periodicals* (2nd Edn., 1934). When the reference is to a periodical of which two volumes are published during a year the number placed first indicates the first or second volume of the year followed by the year, and the last number refers to the page, thus, *Brit. med. J.*, i/1932, 250. When only one volume of a periodical is published each year, the reference gives the year and the page, thus, *Quart. J. Pharm.*, 1934, 341. In other cases the volume number is given in italics in addition to the year and page, thus, *J. biol. Chem.*, 1928, 77, 797.

α —optical rotation.

A.O.A.C.—Methods of Analysis of the Association of Official Agricultural Chemists, Washington, 3rd Edn., 1930.

A.R.—Reagent for Analytical Purposes.

Acta paediatr., *Stockh.*—*Acta paediatrica*.

Allen—Allen's Commercial Organic Analysis. 5th Edn., Vols. I-VI edited by S. S. Sadtler, E. C. Lathrop and C. A. Mitchell; Vols. VII-X edited by C. A. Mitchell (1924-1933).

Amer. J. Cancer—American Journal of Cancer.

Amer. J. Dis. Child.—American Journal of Diseases of Children.

Amer. J. Hyg.—American Journal of Hygiene.

Amer. J. med. Sci.—American Journal of Medical Sciences.

Amer. J. Obstet. Gynec.—American Journal of Obstetrics and Gynecology.

Amer. J. Pharm.—American Journal of Pharmacy.

Amer. J. Physiol.—American Journal of Physiology.

Amer. J. Publ. Hlth—American Journal of Public Health.

Amer. J. Syph.—American Journal of Syphilis.

Amer. J. trop. Med.—American Journal of Tropical Medicine.

Amer. Perfum.—American Perfumer and Essential Oil Review.

Amer. Rev. Tuberc. (Suppl.)—American Review of Tuberculosis (Supplement).

Analyst—Analyst.

Ann. Eugen., *Camb.*—Annals of Eugenics.

Ann. Falsif.—Annales des Falsifications.

Ann. Hyg. publ., *Paris*—Archives d'hygiène publique et de médecine légale (industrielle et sociale).

Ann. Inst. Pasteur—Annales de l'Institut Pasteur.

Ann. Surg.—Annals of Surgery.

Ann. trop. Med. Parasit.—Annals of Tropical Medicine and Parasitology.

Apothekerztg., *Berl.*—*Apothekerzeitung*, Berlin.

Arch. Derm. Syph., *N.Y.*—Archives of Dermatology and Syphilology.

Arch. Dis. Childh.—Archives of Disease in Childhood.

Arch. exp. Path. Pharmac.—Archiv für experimentelle Pathologie u. Pharmacologie.

Arch. int. Pharmacodyn.—Archives internationales de pharmacodynamie et de thérapie.

Arch. intern. Med.—Archives of Internal Medicine.

Arch. Kinderheilk.—Archiv für Kinderheilkunde.

Arch. klin. Chir.—Archiv für klinische Chirurgie.

Arch. Méd. Enf.—Archives de médecine des enfants.

Arch. Pharm., *Berl.*—Archiv der Pharmazie.

Arch. Pharm. Chemi—Archiv für Pharmaci og Chemi.

Arch. Neurol. Psychiat., *Lond.*—Archives of Neurology and Psychiatry.

Arch. Radiol. Electrother.—Archives of Radiology and Electrotherapy.

Ass. méd.—Association médicale.

b.p.—boiling-point.

B.P. '14—British Pharmacopœia, 1914.

B.P. '32—British Pharmacopœia, 1932.

B.P. Add.—Addendum, 1936, to the British Pharmacopœia, 1932.

B.P.C.—British Pharmaceutical Codex, 1934.

Barnett—Preparation of Organic Compounds, by E. de Barry Barnett, 2nd Edn., 1920.

Ber. dtsch. chem. Ges.—Bericht der Deutschen Chemischen Gesellschaft.

Berl. klin. Wschr.—Berliner klinische Wochenschrift.

Biochem. J.—Biochemical Journal.

- Biochem. Z.*—Biochemische Zeitschrift.
- Boll. Ist. sieroter., Milano*—Bollettino dell'istituto sieroterapico milanese.
- Brit. chem. Abstr.*—British Chemical Abstracts. (A) Pure Chemistry. (B) Applied Chemistry.
- Brit. colon. Drugg.*—British and Colonial Druggist (since 1915—British and Colonial Pharmacist).
- Brit. colon. Pharm.*—British and Colonial Pharmacist.
- Brit. dent. J.*—British Dental Journal.
- Brit. J. Actino-Therap.*—British Journal of Actinotherapy and Physiotherapy.
- Brit. J. Biophys.*—British Journal of Biophysics.
- Brit. J. Child. Dis.*—British Journal of Children's Diseases.
- Brit. J. Derm.*—British Journal of Dermatology.
- Brit. J. exp. Path.*—British Journal of Experimental Pathology.
- Brit. J. phys. Med.*—British Journal of Physical Medicine.
- Brit. J. Radiol. (B.A.R.P. Sect.)*—British Journal of Radiology (British Association for the Advancement of Radiology and Physiotherapy Section), continued since 1927 as British Journal of Radiology, New Series.
- Brit. J. Radiol., N.S.*—British Journal of Radiology, New Series.
- Brit. J. Radiol. (Röntg. Soc. Sect.)*—British Journal of Radiology (Röntgen Society Section), continued since 1927 as British Journal of Radiology, New Series.
- Brit. J. Surg.*—British Journal of Surgery.
- Brit. J. vener. Dis.*—British Journal of Venereal Diseases.
- Brit. med. J.*—British Medical Journal.
- Brit. med. J. Epit.*—British Medical Journal Epitome.
- Brompton H.*—Pharmacopœia of the Hospital for Consumption and Diseases of the Chest, 11th Edn., 1928.
- Brooke*—Tropical Medicine, Hygiene and Parasitology, by Gilbert E. Brooke, 1920.
- Bruce and Dilling*—Bruce and Dilling's Materia Medica and Therapeutics, by W. J. Dilling, 14th Edn., 1933.
- Bull. Acad. Méd. Paris*—Bulletin de l'Académie de médecine.
- Bull. Dep. Agric. Can.*—Bulletin of the Department of Agriculture of the Dominion of Canada.
- Bull. Féd. int. Pharm.*—Bulletin de la Fédération internationale pharmaceutique.
- Bull. Hyg.*—Bulletin of Hygiene.
- Bull. imp. Inst., Lond.*—Bulletin of the Imperial Institute.
- Bull. Inst. Pasteur*—Bulletin de l'Institut Pasteur.
- Bull. Off. int. Hyg. publ.*—Bulletin mensuel de l'Office internationale d'hygiène publique.
- Bull. Soc. chim. Fr.*—Bulletin, Société chimique de France.
- Bull. Soc. méd. Hôp. Paris*—Bulletin et mémoires de la Société médicale des hôpitaux de Paris.
- Bull. tech. Mus., Sydney*—Bulletin of the Technological Museum, Sydney.
- C.H.W.*—Formulæ of Chelsea Hospital for Women, 1927.
- C.L.T.H.*—Formulæ of the Central London Throat, Nose and Ear Hospital, 3rd Edn., 1924.
- C.X.H.*—Charing Cross Hospital Pharmacopœia, 1922.
- Canad. Form.*—The Canadian Formulary, 1933.
- Canad. med. Ass. J.*—Canadian Medical Association Journal.
- Canad. publ. Hlth J.*—Canadian Public Health Journal.
- Chem. Abstr.*—Chemical Abstracts.
- Chem. & Drugg.*—Chemist and Druggist.
- Chem. Ind. Rev.*—Chemistry and Industry Review.
- Chem. Z.*—Chemische Zeitschrift.
- Chininum*—Chininum Scriptioes Collectæ, Bureau for increasing the use of Quinine, Amsterdam, 1925.
- Cline J.*—Clinical Journal.
- cm.*—centimetre.
- Colyer*—Colyer's Dental Surgery and Pathology, by Sir J. F. Colyer, 6th Edn., 1931, and earlier issues (previously Smale and Colyer's Diseases and Injuries of Teeth).
- C.R. Acad. Sci., Paris*—Compte rendu hebdomadaire des séances de l'Académie des sciences.
- C.R. Soc. Biol. Paris*—Compte rendu hebdomadaire des séances et mémoires de la Société de biologie.

- Cushny*—Text-book of Pharmacology and Therapeutics, by A. R. Cushny, 10th Edn., revised by C. W. Edmunds and J. A. Gunn (1934).
- [D]—Drugs or preparations coming within the scope of the Dangerous Drugs Acts, 1920, 1923, 1925 and 1932, and the Dangerous Drugs (Consolidation) Regulations, 1928.
- Dansk Tidsskr., Farm.*—*Dansk Tidsskrift for Farmaci.*
- Dtsch. med. Wschr.*—*Deutsche medizinische Wochenschrift.*
- Disp.*—Art of Dispensing, published by *The Chemist and Druggist*, London, 10th Edn., 1926.
- Dixon*—Manual, of Pharmacology, by the late W. E. Dixon, F.R.S., 7th Edn., 1929.
- E.G.A.*—Pharmacopœia of the Elizabeth Garrett-Anderson Hospital, 1926.
- Ec. Prod. India*—Economic Products of India.
- Edinb. med. J.*—Edinburgh Medical Journal.
- Emery*—Clinical Bacteriology and Hæmatology, by W. d'Pste Emery, 6th Ed., 1921.
- F.E. VIII*—*Farmacopea Espanola*. Octava Edicion, 1930
- (*p.*—freezing-point.
- Fr. Cx.*—*Codex Medicamentarius Gallicus*, *Pharmacopée Française* (1908).
- Fr. Cx. Supp. I to V*—Supplements I (1920) to V (1926) of the *Codex Medicamentarius Gallicus*.
- Finnemore*—Essential Oils, their Chemistry and Technology, by H. Finnemore, 1926.
- g.*—gramme.
- G.H.*—Pharmacopœia of Guy's Hospital, 1916.
- Gehe*—Gehe's Codex, 6th Edn., 1933.
- Ghosh*—Treatise on Materia Medica and Therapeutics, by the late R. Ghosh, I.M.S. Edited by B. H. Deane, 12th Edn., 1930.
- Glasg. med. J.*—Glasgow Medical Journal.
- gr.*—grain.
- Gradwohl and Blaivas*—The Newer Methods of Blood and Urine Chemistry, by R. B. H. Gradwohl and A. J. Blaivas, 2nd Edn., 1920.
- Gt. Orm. H.*—Pharmacopœia of the Hospital for Sick Children, Great Ormond Street, 1931.
- Hager*—Handbuch der Pharmaceutischen Praxis, revised by G. Fredericks, G. Arends and H. Zörnig, 1925.
- Hale-White*—Hale-White's Materia Medica, Pharmacy, Pharmacology and Therapeutics, revised by A. H. Douthwaite, 22nd Edn., 1935.
- Hare*—Text-Book of Practical Therapeutics, by H. A. Hare, 21st Edn., 1930.
- Helv. chim. Acta*—*Helvetica chimica acta.*
- Hewlett and McIntosh*—A Manual of Bacteriology, 9th Edn., revised by R. T. Hewlett and J. McIntosh, 1932.
- Hoppe-Seyl. Z.*—Hoppe-Seyler's Zeitschrift für physiologische Chemie.
- Hospitalstidende*—Hospitalstidende.
- Hutchison*—Food and Principles of Dietetics, by R. Hutchison and V. H. Mottram, 7th Edn., 1933.
- I.A.*—International Agreement, 1930.
- I.V.*—iodine value.
- I. c. Add.*—Indian and Colonial Addendum (1900) to the B.P. 1898.
- Indian J. med. Res.*—Indian Journal of Medical Research.
- Indian med. Gaz.*—Indian Medical Gazette.
- Indian med. Res. Mem.*—Indian Medical Research Memoirs.
- Industr. Engng Chem. (anal. Edn.)*—Industrial and Engineering Chemistry, (Analytical Edition).
- Int. Conf. trop. Amer.*—Proceedings of the International Conference on Health Problems in Tropical America, 1924, United Fruit Co., Boston.
- Int. J. Leprosy*—International Journal of Leprosy.
- Int. J. Med.*—International Journal of Medicine and Surgery, now included in Surgical Journal.
- J. R. Army med. Cps*—Journal of the Royal Army Medical Corps.
- J. R. nav. med. Serv.*—Journal of the Royal Naval Medical Service.
- J. agric. Sci.*—Journal of Agricultural Science.
- J. Allergy*—Journal of Allergy.
- J. Amer. chem. Soc.*—Journal of the American Chemical Society.
- J. Amer. diet. Ass.*—Journal of the American Dietetic Association.
- J. Amer. med. Ass.*—Journal of the American Medical Association.

- J. Amer. pharm. Ass.*—Journal of the American Pharmaceutical Association.
J. Ass. off. agric. Chem., Wash.—Journal of the Association of Official Agricultural Chemists.
J. biol. Chem.—Journal of Biological Chemistry.
J. Cancer Res.—Journal of Cancer Research.
J. chem. Soc.—Journal of the Chemical Society.
J. chem. Soc. Abstr.—Journal of the Chemical Society Abstracts (continued since 1926 as British Chemical Abstracts).
J. clin. Invest.—Journal of Clinical Investigation.
J. clin. Res.—Journal of Clinical Research.
J. comp. Path.—Journal of Comparative Pathology and Therapeutics.
J. exp. Med.—Journal of Experimental Medicine.
J. Hyg., Camb.—Journal of Hygiene.
J. Immunol.—Journal of Immunology.
J. Indian med. Ass.—Journal of the Indian Medical Association.
J. infect. Dis.—Journal of Infectious Diseases.
J. Instn elect. Engrs—Journal of the Institution of Electrical Engineers.
J. Lab. clin. Med.—Journal of Laboratory and Clinical Medicine.
J. Laryng.—Journal of Laryngology (Rhinology) and Otology.
J. ment. Sci.—Journal of Mental Science.
J. Obstet. Gynaec.—Journal of Obstetrics and Gynaecology of the British Empire.
J. Path. Bact.—Journal of Pathology and Bacteriology.
J. Pharm. Chim., Paris—Journal de pharmacie et de chimie.
J. Pharmacol.—Journal of Pharmacology and Experimental Therapeutics.
J. Prat., Paris—Journal des praticiens.
J. Physiol.—Journal of Physiology.
J. Röntgen Soc.—Journal of the Röntgen Society, continued from 1924 to 1927 as The British Journal of Radiology (Röntgen Society Section), and since 1927 as The British Journal of Radiology, New Series.
J. State Med.—Journal of State Medicine.
J. Soc. chem. Ind., Lond.—Journal of the Society of Chemical Industry.
J. Suisse Pharm.—Journal suisse de pharmacie, now Schweizerische Apothekerzeitung.
J. Text. Inst., Manch—Journal of the Textile Institute, Manchester.
J. trop. Med. (Hyg.)—Journal of Tropical Medicine and Hygiene.
K.C.H.—King's College Hospital Pharmacopœia, 1934.
Kenwood—Public Health Laboratory Work, by H. R. Kenwood, 8th Edn., 1925.
Klin. Wschr.—Klinische Wochenschrift.
Knox—Radiography and Radio-Therapeutics, by Robert Knox, 4th Edn., in 2 vols. (Vol. II completed and edited by W. M. Levitt), 1923-32.
L.H.—London Hospital Pharmacopœia, 1934.
L.L.—London Lock Hospitals Pharmacopœia.
Lancet—Lancet.
Leprosy Rev.—Leprosy Review.
m.—minim.
m.a.—milliampere.
m.p.—melting-point.
M.R.C.—Medical Research Council.
M.R.I.—Manchester Royal Infirmary Pharmacopœia.
May—Chemistry of Synthetic Drugs, by Percy May, 3rd Edn., 1921.
Med. Annu.—Medical Annual.
Med. J. Aust.—Medical Journal of Australia.
Med. J. Rec.—Medical Journal and Record.
Med. Klinik—Medizinische Klinik.
Med. Offr—Medical Officer.
Med. Pr.—The Medical Press and Circular.
Med. Rec., N.Y.—Medical Record.
Medicine, Baltimore—Medicine, Baltimore.
Mem. Univ. Calif.—Memoirs of the University of California.
Merck—E. Merck's Annual Report of recent advances in Pharmaceutical Chemistry and Therapeutics.
Merck's Index—Merck's Index, 5th Edn., 1927.
Mfg Chem.—Manufacturing Chemist.
mg.—milligramme.
ml.—millilitre.