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Martindale

The Extra Pharmacopoeia

Twenty-sixth Edition

AMENDMENTS

London

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*The First Edition of the Extra Pharmacopoeia compiled by William Martindale,
was published in July 1883*

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Preface

The unprecedented rate at which our knowledge of medicine and pharmacy is advancing makes it a formidable challenge to provide within a single volume an up-to-date source of basic information on the properties and uses of the many drugs in current use—yet such is the tradition established by the Extra Pharmacopoeia since the first volume was produced by William Martindale in 1883. It is a tradition which has developed through changes made in successive editions to match the changes which have occurred in the practice of medicine and pharmacy, and with its continuation very much in mind changes have been made during the revision for the 26th Edition which it is believed will increase the usefulness of the book.

The decade preceding the revision period was characterised by the many new drugs which were introduced and though comparable increases occurred in the numbers of published studies and comparative trials many of these drugs remained to be thoroughly investigated or assessed. Therefore, in the ensuing years it seemed inevitable that there would emerge a trend for a deeper understanding of the properties and actions of drugs both old and new. It is such a trend which has characterised the period of revision for this edition of the Extra Pharmacopoeia.

The realisation that the unwanted effects of a drug might not be immediately apparent heralded the need for more thorough toxicological studies in advance of drugs coming into general use and also for more careful systems of recording untoward reactions when drugs were used. Much new information on the unwanted and toxic effects of drugs and on the precautions which should be observed both before and during drug treatment, particularly when a drug is given in conjunction with other drugs, has been collected and introduced into this edition. A fuller understanding of the necessity for these precautions and a greater awareness of possible untoward reactions may be gained from studies of the fate of drugs within the body. The knowledge gained from such studies can also influence the choice of a drug in the treatment of a particular disease or the dosage in which a drug is administered to an individual patient, while a knowledge of the absorption of drugs can influence dosage and the route of administration. It is because consideration of absorption and fate is becoming increasingly important in the safe and effective use of drugs that a new section for information on these subjects has been introduced into many monographs.

It would indeed be gratifying to be able to record that the actions of the drugs in current use have been established from carefully confirmed studies, but despite our ever increasing knowledge this is not yet the case, and for some drugs, particularly the older ones, the long accepted explanations of their actions are, of necessity, continued. However, the uses to which drugs are put may be determined with much greater precision and in order to assist the prescriber in his choice of suitable treatments the monographs have been grouped into sections generally

according to the principal uses of the drugs described, irrespective of their chemistry or derivation. This policy has affected the arrangement of many chapters and has made necessary the creation of some new chapters.

The text has been completely revised and, where necessary, rewritten. For a few monographs prepared during the early part of the revision, a further complete revision became necessary before the manuscripts were despatched to the printer: such is the rate of progress. With all monographs, changes of a more minor character have been made at each of the printing stages so as to make the text as up-to-date as possible.

The vast amount of information collected during the period of the revision is greatly in excess of that collected during the preparation of any earlier edition. In order to accommodate this new information and yet produce a volume of reasonable proportions it has been necessary to make some deletions; drugs and preparations which were described in pharmacopoeias and formularies prior to 1932 have been deleted if thorough investigation indicated that they were no longer available or were not in general use. However, no matter how carefully the process of selection is carried out it is almost inevitable that some of the drugs deleted will at some time be prescribed, but it is hoped that the demands for information arising from these occasional prescriptions will be met, without too great an inconvenience, by reference to the pages of earlier editions of the Extra Pharmacopoeia.

The drugs included in this edition have been selected not only because of their use in the United Kingdom but also because of their use in overseas countries, for the Extra Pharmacopoeia is increasingly being used as a source of information on drugs by pharmacists and physicians throughout the world. There is also an increasing use of preparations outside their country of origin, no doubt a reflection of improving world-wide communications, and considerable effort has been taken to include the names of preparations marketed in most of the countries of the world, but particularly in Australia, the United States of America, and on the continent of Europe.

Undoubtedly the most obvious change made during the revision is the use of the metric system of weights and measures. This change is in line with the practice of medicine and pharmacy in the United Kingdom since 1969 but, particularly for those pharmacists and physicians long accustomed to posology in the Imperial system, doses by weight are given in both systems for many commonly used drugs.

Arrangement of the Extra Pharmacopoeia

PART 1 (pp. 1-1994) contains monographs on some 2800 substances arranged in 116 chapters. As already indicated, generally these are grouped so as to bring together drugs which are used for similar purposes or which have similar actions. The many actions and uses of some drugs have presented problems of classification and the different purposes for which drugs are employed in various parts of the world have presented added problems. For instance, metronidazole is classified as a trichomonocide on the basis of its principal use in temperate countries though it is widely employed as an amoebicide in tropical and subtropical countries.

Monographs are arranged in alphabetical order of their main titles except that the monograph on a substance which forms the title of a chapter is placed first.

PART 2 (pp. 1995–2052) consists of a series of short monographs on some 460 drugs and ancillary substances with a Supplementary List of Proprietary Products; these are arranged in the alphabetical order of their main titles.

PART 3 (pp. 2053–2102) gives the composition of more than 1700 proprietary medicines which are advertised to the public in the press or by window or counter display and which are usually supplied on demand. The formulas are generally expressed in the terms employed by the manufacturers or as described on the labels on the containers. As in earlier editions, the claims made for these products by their manufacturers are not included as they are often not supported by the known therapeutic effects of the ingredients in the doses employed.

Nomenclature

TITLES. The title of each monograph is in English, with preference being given to British Approved Names, United States Adopted Names, and International Non-proprietary Names. Other names given include abbreviated English or Latin names of substances included in current or past editions of the *British Pharmacopoeia*, the *British Pharmaceutical Codex*, and the *British National Formulary*; English and Latin synonyms; French, German, Scandinavian, Spanish, Portuguese, Italian, and other foreign names from the relevant pharmacopoeias when these may not be readily identifiable; and manufacturers' code numbers.

BOTANICAL NAMES. The nomenclature follows the International Rules of Botanical Nomenclature.

CHEMICAL NAMES. The nomenclature generally follows the definitive rules issued by the International Union of Pure and Applied Chemistry, 1957–65, as accepted and interpreted by The Chemical Society, London.

NAMES OF MICRO-ORGANISMS. The nomenclature used is principally that of *The National Collection of Type Cultures: Catalogue of Species* (Medical Research Council Memorandum No. 35), *Nomenclature of Fungi Pathogenic to Man and Animals* (Medical Research Council Memorandum No. 23), *The National Collection of Industrial Bacteria: Catalogue of Strains*, 2nd Edn (HM Stationery Office 1964), and *Index Bergeyana* (London, E. & S. Livingstone, 1966).

Pharmacopoeias

If a substance is included in the *British Pharmacopoeia* or the *British Pharmaceutical Codex* this is indicated by including in parentheses, immediately after the main title of the substance, the initials *B.P.* or *B.P.C.* Substances which are the subject of monographs in the *European Pharmacopoeia*, Volume 1, or the *International Pharmacopoeia* are indicated by the abbreviations *Eur.P.* or *I.P.*, respectively, in parentheses after the main title or other title.

The pharmacopoeias in which each substance appears are listed and differences of pharmaceutical or therapeutic significance are indicated. It is necessary, of course, to refer to the pharmacopoeia for details of standards.

The following foreign pharmacopoeias and related publications have been examined for this edition:

Argentinian
Belgian vol. 3
Czechoslovak

French supp.
German
Hungarian

Indian
Italian and supp.
Nordic addenda
Polish vol. I and II
Portuguese supp.
Roumanian supp. 1 and 2
United States

Australian Pharmaceutical Formulary
Danish Dispensatory
Indian National Formulary
*Prescribers' List
Uganda National Formulary
United States National Formulary and supp. 1 and 2

**Prescribers' List*, Department of Health, Canberra, 1968.

Atomic and Molecular Weights

Atomic weights are based on the table of Atomic Weights 1967, published by the International Union of Pure and Applied Chemistry and based on the ^{12}C scale. In the table of Atomic Weights (see p. xix) the values are those given by the International Union of Pure and Applied Chemistry in 1969. Molecular weights are given corrected to one place of decimals or to four significant figures for relative weights of less than 100.

Doses

The doses given in the statements under the title 'Dose' are usually those in the *B.P.* or *B.P.C.* if the drug is described in either of these publications. In other instances, the doses quoted are generally those of another pharmacopoeia or standard reference book. Unless otherwise stated, the doses represent the average range of quantities which are generally regarded as suitable for adults when administered by mouth, and may usually be repeated three or four times in twenty-four hours; if it is usual to administer a drug by a method other than by mouth, the dose suitable for that method of administration is stated. More detailed information on doses and drug administration is usually given in the text under 'Uses' and in the abstracts.

When doses for children are expressed as a range of quantities within specified age limits, the lower dose applies at the lower age and the higher dose at the higher age.

Doses are expressed in the metric system but the approximate Imperial equivalents are given, in parentheses, for many commonly used drugs which have long been prescribed in Imperial weights.

Pharmaceutical Information

Chemical and physical properties likely to be of use or interest are given for each drug. Special attention has been paid to the collection of data on the stability of drugs and on incompatibilities with drugs and preparations of drugs, particularly those likely to occur in solutions for intravenous administration.

ISO-OSMOTIC SOLUTIONS. The term iso-osmotic is used for solutions which exert the same osmotic pressure as serum and does not necessarily indicate that such solutions would be in osmotic equilibrium with red blood-cells. It is used in preference to the more generally employed term 'isotonic' which in pharmaceutical practice has not always been correctly used to indicate osmotic equilibrium with red blood-cells. Care is necessary if solutions not in osmotic equilibrium with red blood-cells are administered by rapid intravenous infusion.

PERCENTAGE STRENGTHS. Unless otherwise stated, solutions of solids in liquids are expressed as percentage w/v, of liquids in liquids as percentage v/v, and of gases in liquids as percentage w/w.

SOLUBILITY. Figures for solubility are given when reliable information is available and unless otherwise indicated in the text the figures are for solubility at 'ordinary room temperatures'. In other cases, solubility of about 1 in 1 to 1 in 10 is indicated by the expression 'very soluble', solubility of about 1 in 10 to 1 in 1000 by 'soluble', 1 in 1000 to 1 in 2000 by 'slightly soluble', 1 in 2000 to 1 in 10,000 by 'very slightly soluble', and solubility of less than 1 in 10,000 by 'almost insoluble'.

STORAGE. Substances and preparations should be stored under conditions which prevent contamination and diminish deterioration, and the conditions of storage given in the text indicate the precautions which should be taken in specific cases. The term 'a cool place' is generally used to describe a place in which the temperature does not exceed 15°.

TEMPERATURE. Temperatures are expressed in degrees Celsius (centigrade) unless otherwise indicated.

Pharmacological and Therapeutic Information

Information on the toxic effects, treatment of toxic effects, precautions, absorption and fate, and uses of each substance is provided by concise statements under these headings and these are elaborated and expanded by abstracts from published papers and reviews. In compiling these statements the intention has been to present unbiased summaries and, where views are conflicting, to represent these as fairly as possible by a suitable selection of abstracts.

The abstracts of medical and pharmaceutical literature have been a characteristic and valuable feature of the Extra Pharmacopoeia since the book was first published. During the revision for this edition the range of journals examined was greater than for any earlier edition and in five years well over 30,000 abstracts or references were collected and considered for inclusion. Limitation of space has required that only those abstracts considered to be of the most value to the majority of users could be included, though, so far as possible, the remainder have been included as references.

Formulas

Formulas are given for preparations in current editions of the *British Pharmacopoeia*, the *British Pharmaceutical Codex*, and the *British National Formulary*, and for those preparations in earlier editions of these publications which enquiries have indicated are still required. Similarly, formulas are given for preparations in the *United States Pharmacopoeia* and the *United States National Formulary*, and formulas from other pharmacopoeias are also included if they are considered to be of special interest. Selected formulas from hospital and Commonwealth formularies and from the medical and pharmaceutical literature are included for their special interest to those pharmacists required to formulate comparable preparations.

Preparations of the *British National Formulary*, the *National Formulary*, and the *National War Formulary* not formulated in the metric system have been converted to the metric system according to the procedure based on the Weights and Measures (Equivalents for dealing with drugs) Regulations 1970 (SI 1970: No. 1897) and the instructions issued by the Department of Health and Social Security. Preparations from editions of the *British Pharmaceutical Codex* prior to 1968 are formulated in the metric quantities indicated in the appropriate edition, where these are given, or in accordance with the above procedure. Dose volumes have been

converted to the approximately equivalent metric volumes of 4 or 15 ml; pharmacists in the United Kingdom are required by the Regulations to dispense dose volumes of 5 or 10 ml, or multiples of these amounts, and they should satisfy themselves that the adjustment may be made without the properties of the preparation being affected.

However, the Regulations also state that for a prescription for a formulation in any edition of the *British Pharmaceutical Codex* or *National Formulary* prior to 1968 expressed in Imperial units there shall be dispensed the formulation in metric units given in the *Compendium of Past Formulae 1933 to 1966* (London, The National Pharmaceutical Union, 1969). Where the formulations of the *Compendium* differ from the formulations revised according to the above procedure, they are given as amended formulas.

Ingredients of preparations are described according to the title under which they appear in the Extra Pharmacopoeia; in the preparation of medicaments to formulas originating outside the United Kingdom it is necessary to ensure that ingredients of suitable quality are employed if it is intended that the product should comply with the standards specified by the appropriate authority.

The term 'freshly prepared' is used to indicate that a preparation must be made not more than twenty-four hours before issue for use, and the term 'recently prepared' indicates that deterioration is likely if the preparation is stored for more than a few weeks at temperate room conditions.

Proprietary Preparations

In Parts 1 and 2, the information on proprietary preparations is presented in the same manner as in the last edition, each product being described at the end of the monograph on its principal ingredient. Whenever possible, the proprietary names used in overseas countries are also included.

The proprietary preparations described in Parts 1 and 2 are mostly those intended for supply on prescription. Most proprietary medicines which are advertised to the public and supplied on demand are described in Part 3.

The information on composition, dosage, and uses of proprietary preparations is mainly taken from the literature issued by the manufacturers or their distributing agents and has been confirmed by them, but no responsibility is accepted for the accuracy of this information.

Information on diluents suggested for liquid proprietary preparations for oral administration has been provided by the manufacturers or taken from the *Diluent Directory* issued by the Central NHS (Chemist Contractors) Committee.

Indexes

INDEX TO CLINICAL USES. This index is arranged so as to refer the reader to those chapters and monographs where any of the listed diseases are mentioned. It is not an exhaustive therapeutic index; entries have been limited to those diseases where treatment appears to be effective and it contains few entries in respect of substances that are not specifically referred to in the text as having been used in the treatment of the disease in question.

GENERAL INDEX. An exhaustive and carefully constructed index is essential for a reference book such as the Extra Pharmacopoeia if the reader is to make the fullest use of its contents. The general index to drugs, preparations, and com-

pounds in this edition has been compiled to exacting standards to meet these requirements and this has produced nearly 34,000 entries. The arrangement of the index is similar to that in the previous edition. A special effort has been made to introduce into the text cross-references which direct the reader to complementary information in other sections of the book.

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Abbreviations

The titles of journals are abbreviated according to the general style of *World List of Scientific Periodicals* (London, Butterworths, 1963-5).

For abbreviations of the names of manufacturers or their distributors, see Directory of Manufacturers, p. 2103.

Å—angstrom ($=10^{-1}$ nm).

ABPI—Association of the British Pharmaceutical Industry.

ACO Prep.: Sweden—ACO Preparat 1960-1961, Stockholm, Sweden.

A.D.R.—Accepted Dental Remedies, published by the American Dental Association.

A.D.T.—Accepted Dental Therapeutics, published by the American Dental Association.

AMA—American Medical Association.

A.P.F.—Australian Pharmaceutical Formulary.

ATCC—American Type Culture Collection, 12301 Parklawn Drive, Rockville, Md. 20852, USA.

aa—*ana*, 'of each'.

Aberdeen Roy. Infirm.—Aberdeen Royal Infirmary.
Addenbrooke's Hosp., Cambridge—Addenbrooke's Hospital, Cambridge.

Adelaide Child. Hosp.—Adelaide Children's Hospital, Australia.

agg.—aggregate (in botanical names), including 2 or more species which resemble each other closely.

am—*ante meridiem*, 'before noon'.

Arg.P.—Argentinian Pharmacopoeia.

Aust.—Austria or Austrian.

Aust.P.—Austrian Pharmacopoeia.

Austral.—Australia or Australian.

BAN—British Approved Name.

B.N.F.—British National Formulary. Refers to 1971 Edn unless otherwise specified.

B.P.—British Pharmacopoeia. Unless otherwise specified in the text, B.P. references are to the 1968 Edn, including the addenda.

B.P.C.—British Pharmaceutical Codex. Unless otherwise specified in the text, B.P.C. references are to the 1968 Edn, including the supplement.

BS—British Standard (specification).

B.Vet.C.—British Veterinary Codex.

Belg.—Belgium or Belgian.

Belg.P.—Belgian Pharmacopoeia 1962, vol. I, II, and III (Pharmacopée Belge, Cinquième Edition).

Birmingham Child. Hosp.—Birmingham Children's Hospital.

Bolton Roy. Infirm.—Bolton Royal Infirmary, Bolton, Lancs.

b.p.—boiling point.

Braz.—Brazil or Brazilian.

Braz.P.—Brazilian Pharmacopoeia 1959 (Farmacopéia dos Estados Unidos do Brasil, 2ª Edição).

Brompton Hosp.—Brompton Hospital, London.

Bulg.—Bulgaria or Bulgarian.

C—Celsius (centigrade). Unless otherwise indi-

cated in the text, temperatures are expressed in this thermometric scale.

CI—Colour Index (Colour Index, 2nd Edn 1956 and supplements).

CM—Chick Martin (coefficient).

CNS—central nervous system.

CSF—cerebrospinal fluid.

Canad.—Canada or Canadian.

Canad.F.—Canadian Formulary.

Cape Hosp.—Cape of Good Hope Hospitals.

Charing Cross Hosp.—Charing Cross Hospital, London.

Chelsea Hosp. for Women—Chelsea Hospital for Women, London.

Chil.P.—Chilean Pharmacopoeia.

Chin.P.—Chinese Pharmacopoeia.

ci—curie(s).

cm—centimetre(s).

cm²—square centimetre(s).

cm³—cubic centimetre(s).

cP—centipoise(s).

cS—centistoke(s).

Cz.—Czechoslovakia or Czechoslovak.

Cz.P.—Czechoslovak Pharmacopoeia.

D & C—designation applied in USA to dyes permitted for use in drugs and cosmetics.

D.P.F.—Dental Practitioners' Formulary. Unless otherwise specified in the text, D.P.F. references are to the 1971 Edn.

D.T.F.—Drug Tariff Formulary: Drug Tariff (National Health Service, Department of Health and Social Security).

Dan.—Danish.

Dan. Disp.—Danish Dispensatory (Dispensatorium Danicum).

Denm.—Denmark.

EC—electron capture (see p. 1589).

ECG—electrocardiogram.

ECT—electroconvulsive therapy.

EEG—electro-encephalogram.

ENT—ear, nose, and throat.

ESR—erythrocyte sedimentation rate.

Ed.—editor(s), or edited by.

Edinburgh Roy. Infirm.—Edinburgh Royal Infirmary.

Edn—edition.

e.g.—*exempli gratia*, 'for example'.

e.s.u.—electrostatic unit(s).

et al.—*et alii*, 'and others': for three or more co-authors or co-workers.

Eur.P.—European Pharmacopoeia vol. I.

eV—electron volt(s).

Ext. D & C—designation applied in USA to dyes permitted for use in external drug and cosmetic preparations.

- F—Fahrenheit.
 FAO/WHO—Food and Agricultural Organization of the United Nations and the World Health Organization.
 FDA—Food and Drug Administration of USA.
 F D & C—designation applied in USA to dyes permitted for use in foods, drugs, and cosmetics.
 FDD—Food and Drug Directorate of Canada.
 FIGLU—formiminoglutamic acid.
 F.N. *Belge*—The Belgian 'Formulaire Nationale'.
 FSC—Food Standards Committee of the Ministry of Agriculture, Fisheries, and Food.
 Fin.—Finland or Finnish.
 fl oz—fluid ounce.
Formulaire F.N.P.—Formulaire de la Fédération Nationale Pharmaceutique, Paris.
 f.p.—freezing point.
 Fr.—France or French.
 Fr.P.—French Pharmacopoeia and supplement.
 ft—foot (feet).
 ft²—square foot (feet).
 g—gramme(s).
 gal—gallon(s).
Garrett Anderson Hosp.—Elizabeth Garrett Anderson Hospital, London.
 Ger.—Germany or German.
 Ger.P.—German Pharmacopoeia.
 gf—gramme-force.
Glasgow Roy. Infirm.—Glasgow Royal Infirmary.
 gr—grain(s).
Gt Ormond St Child. Hosp.—The Hospital for Sick Children, Great Ormond St, London.
Guy's Hosp.—Guy's Hospital, London.
 HA unit(s)—haemagglutination unit(s).
 HCG—human chorionic gonadotrophin.
 HLB—hydrophilic-lipophilic balance.
Hadassah Univ. Hosp.—Hadassah University Hospital, Jerusalem, Israel.
 Hb—haemoglobin.
 Hung.—Hungary or Hungarian.
 Hung.P.—Hungarian Pharmacopoeia.
 I.P.—International Pharmacopoeia.
 IQ—intelligence quotient.
 ISO—International Organisation for Standardisation.
ibid.—*ibidem*, 'in the same place (journal or book)'.
idem—'the same': used for the same authors and titles.
 i.e.—*id est*, 'that is'.
 in—inch(es).
 in²—square inch(es).
 Ind.—India or Indian.
Ind.N.F.—National Formulary of India.
Ind.P.—Indian Pharmacopoeia.
 i.r.—infra-red.
It.P.—Italian Pharmacopoeia and supplement.
 Ital.—Italy or Italian.
 iu—international unit(s).
 Jap.—Japan or Japanese.
Jap.N.F.—The National Formulary of Japan.
Jap.P.—Japanese Pharmacopoeia.
Jug.P.—Jugoslav Pharmacopoeia.
 kcal—kilocalorie(s).
 keV—thousand (kilo) electron volt(s).
 kg—kilogramme(s).
King's Coll. Hosp.—King's College Hospital, London.
 LD50—a dose lethal to 50% of the specified animals or micro-organisms.
 lb—pound(s) weight.
Leeds Gen. Infirm.—The General Infirmary at Leeds.
 Lf—flocculation equivalents.
Liverpool Ear, Nose, & Throat Infirm.—Liverpool Ear, Nose, and Throat Infirmary.
 loc. cit.—*loco citato*, 'in the place cited'.
London Hosp.—The London Hospital.
 Ltd—Limited.
 M—mole or molar.
 MB 1959: Sweden—MB Formulary 1959 (Apotekarsocieteten's Förlag, Stockholm).
 MIC—minimum inhibitory concentration.
 MRC—Medical Research Council.
 m—metre(s).
 m²—square metre(s).
 m³—cubic metre(s).
 mA—milli-ampere(s).
Manchester & Salford Skin Hosp.—Manchester and Salford Hospital for Skin Diseases.
Manchester Roy. Infirm.—Manchester Royal Infirmary.
 max.—maximum.
 mCi—millicurie(s).
 mEq—milliequivalent(s).
 MeV—million (mega) electron volt(s).
 Mex.P.—Mexican Pharmacopoeia.
 mg—milligramme(s).
 mg%—milligramme(s) per 100 ml.
Middlesex Hosp.—Middlesex Hospital, London.
 min—minim(s).
 ml—millilitre(s).
 mm—millimetre(s).
 mm³—cubic millimetre(s).
 mM—millimole(s) or millimolar.
 mmHg—millimetre(s) of mercury.
 mol. wt.—molecular weight.
Moorfields Eye Hosp.—Moorfields Eye Hospital, London.
 m.p.—melting point.
 Mrad—megarad.
 μ Ci—microcurie(s).
 μ g—microgramme(s).
 μ g%—microgramme(s) per 100 ml.
 μ l—microlitre(s).
 μ m—micrometre(s).
 N—normal.
 NCIB—The National Collection of Industrial Bacteria (maintained at the Torry Research Station, PO Box 31, 135 Abbey Rd, Aberdeen, Scotland).
 NCTC—National Collection of Type Cultures (Central Public Health Laboratory, Colindale Avenue, London, NW 9).
 N.F.—National Formulary (now replaced by the British National Formulary).
 N.F. units—units defined in the United States National Formulary.
 NPU—National Pharmaceutical Union.
 NRRL—Northern Utilization Research and Development Division, US Department of Agriculture, Peoria, Ill., USA (formerly Northern Regional Research Laboratory).
 N.W.F.—National War Formulary.
 N.Z.F.—New Zealand Formulary and amendments.
 nCi—nanocurie(s).
 Neth.—The Netherlands or Netherlandish.
Neth.P.—Netherlands Pharmacopoeia.
Newcastle Gen. Hosp.—Newcastle General Hospital, Newcastle upon Tyne.
 ng—nanogramme(s).
 nm—nanometre(s).
Nord.P.—Nordic Pharmacopoeia including all addenda. This Pharmacopoeia is official in Denmark, Finland, Iceland, Norway, and Sweden.
 Norw.—Norway or Norwegian.
 OP—over proof.

- Orsett Hosp.**—Orsett Hospital, Essex.
 o/w—oil in water.
 oz—ounce(s).
 pCO₂—plasma concentration of carbon dioxide.
 pH—the negative logarithm of the hydrogen ion concentration.
 Pharm. Soc. Lab. Rep.—Pharmaceutical Society's Laboratory Report.
 pK_a—the negative logarithm of the dissociation constant.
 pm—*post meridiem*, 'after noon'.
 pO₂—plasma concentration of oxygen.
 Pol.—Poland or Polish.
 Pol.P.—Polish Pharmacopoeia vol. I and II.
 Port.—Portugal or Portuguese.
 Port.P.—Portuguese Pharmacopoeia and supplement.
 ppm—part(s) per million.
 q.s.—*quantum sufficit*, 'as much as suffices'.
 Queen Eliz. Hosp. for Child.—Queen Elizabeth Hospital for Children, London.
 Queen Eliz. Hosp., S. Australia—Queen Elizabeth Hospital, South Australia.
 q.v.—*quod vide*, 'which see'.
 RW—Rideal-Walker (coefficient).
 r—röntgen.
 rad—radiation absorbed dose.
 Radcliffe Infirm., Oxford—Radcliffe Infirmary, Oxford.
 rem.—röntgen-equivalent-man.
 rep.—röntgen-equivalent-physical.
 rev/min—revolutions per minute.
 Rochester Methodist Hosp.—Rochester Methodist Hospital, Rochester, Minn., USA.
 Roum.P.—Roumanian Pharmacopoeia and supplements.
 Roy. Child. Hosp., Melbourne—Royal Children's Hospital, Melbourne, Australia.
 Roy. Dental Hosp.—Royal Dental Hospital.
 Roy. Free Hosp.—Royal Free Hospital, London.
 Roy. Marsden Hosp.—Royal Marsden Hospital, London.
 Roy. Nat. Orthopaedic Hosp.—Royal National Orthopaedic Hospital, Stanmore, Middx.
 Roy. Nat. T.N. and E. Hosp.—Royal National Throat, Nose and Ear Hospital, London.
 Roy. Sussex County Hosp.—Royal Sussex County Hospital, Brighton.
 Roy. Victoria Infirm., Newcastle—Royal Victoria Infirmary, Newcastle upon Tyne.
 Rus.—Russian.
 Rus.P.—Russian Pharmacopoeia.
 SCI—Society of Chemical Industry.
 SGOT—serum glutamic oxaloacetic transaminase.
 SGPT—serum glutamic pyruvic transaminase.
 St. Andrew's Hosp., Billericay—St. Andrew's Hospital, Billericay, Essex.
 St. Bart's Hosp.—St. Bartholomew's Hospital, London.
 St. George's Hosp.—St. George's Hospital, London.
 St. John's Hosp.—St. John's Hospital for Diseases of the Skin, London.
 St. Mark's Hosp.—St. Mark's Hospital, London.
 St. Mary's Hosp.—St. Mary's Hospital, London.
 St. Thomas' Hosp.—St. Thomas' Hospital, London.
 Scand.—Scandinavian.
 Sheffield Roy. Infirm.—Sheffield Royal Infirmary.
 sp. gr.—specific gravity.
 Span.—Spanish.
 Span.P.—Spanish Pharmacopoeia.
 spp.—species.
 Supp.—supplement(s).
 Swed.—Sweden or Swedish.
 Swiss P.—Swiss Pharmacopoeia and supplements and amendments.
 Switz.—Switzerland.
 Tilbury Hosp.—(Tilbury Hospital, Essex.
 UCG—urinary chorionic gonadotrophin.
 UP—under proof.
 US and USA—United States of America.
 USAN—United States Adopted Name.
 U.S.N.F.—United States National Formulary and supplements.
 U.S.P.—United States Pharmacopoeia.
 USSR—Union of Soviet Socialist Republics.
 Uganda N.F.—Uganda National Formulary.
 United Birmingham Hosp.—The United Birmingham Hospitals.
 Univ. Coll. Hosp.—University College Hospital, London.
 u.v.—ultraviolet.
 var.—variety.
 vol.—volume(s).
 v/v—volume in volume.
 v/w—volume in weight.
 WHO—World Health Organization.
 Westminster Child. Hosp.—Westminster Children's Hospital, London.
 Westminster Hosp.—Westminster Hospital, London.
 w/o—water in oil.
 Women's Hosp., Liverpool—Women's Hospital, Liverpool.
 wt—weight.
 wt per ml—weight per millilitre.
 w/v—weight in volume.
 w/w—weight in weight.

Weights and Measures

Imperial Equivalents of Metric Weights and Measures

1 Nanogramme (1×10^{-9} g) (ng)	=	15.432×10^{-9} grain
1 Microgramme (1×10^{-6} g) (μ g)	=	15.432×10^{-6} grain
1 Milligramme (mg)	=	0.01543 grain
1 Gramme (g)	=	$\left\{ \begin{array}{l} 15.432 \text{ grains} \\ 0.03215 \text{ ounce (apothecaries')} \\ 0.03527 \text{ ounce (avoirdupois)} \\ 35.274 \text{ ounces (avoirdupois)} \end{array} \right.$
1 Kilogramme (kg)	=	$\left\{ \begin{array}{l} 2.2046 \text{ pounds} \\ 16.894 \text{ minims} \end{array} \right.$
1 Millilitre (ml)	=	$\left\{ \begin{array}{l} 35.1961 \text{ fluid ounces} \\ 1.75981 \text{ pints} \end{array} \right.$
1 Litre	=	$\left\{ \begin{array}{l} 1.75981 \text{ pints} \\ 0.21998 \text{ gallon} \end{array} \right.$

Metric Equivalents of Imperial Weights and Measures

1 Grain (gr)	=	64.799 milligrammes
1 Ounce (avoirdupois) (oz) (=437.5 grains)	=	28.350 grammes
1 Ounce (apothecaries') (=480 grains)	=	31.104 grammes
1 Pound (avoirdupois) (lb)	=	453.592 grammes
1 Minim (min)	=	0.05919 millilitre
1 Fluid Ounce (fl oz)	=	28.412 millilitres
1 Pint	=	568.25 millilitres

Equivalent Metric and Imperial Doses

All quantities of ingredients ordered in the Imperial system must be supplied in accordance with the following metric equivalents as set out in The Weights and Measures (Equivalents for dealings with drugs) Regulations 1970 (SI 1970: No. 1897). These equivalents are approximate only and are not accurate enough for analytical purposes.

grains	mg	grains	mg	grains	g	minims	ml	minims	ml
$\frac{1}{800}$	0.1	$\frac{1}{8}$	10	14-16	1	1	0.06	94-110	6
$\frac{1}{500}$	0.125	$\frac{1}{5}$	12.5	17-20	1.2	$\frac{1}{2}$	0.09	111-130	7
$\frac{1}{400}$		$\frac{1}{4}$	15	21-25	1.5	2	0.12	131-149	8
$\frac{1}{300}$	0.15	$\frac{1}{3}$	20	26-29	1.8	$\frac{2}{3}$	0.15	150-167	9
$\frac{1}{250}$	0.2	$\frac{2}{5}$	25	30-33	2	3	0.18	168-185	10
$\frac{1}{200}$		$\frac{1}{2}$	30	34-37	2.3	$\frac{3}{4}$	0.2	186-200	11
$\frac{1}{180}$	0.25	$\frac{3}{8}$	40	38-43	2.5	4	0.25	201-220	12
$\frac{1}{160}$	0.3	$\frac{3}{4}$	50	44-51	3	$\frac{4}{5}$		221-250	14
$\frac{1}{140}$		1	60	52-57	3.5	5	0.3	251-275	15
$\frac{1}{120}$	0.4	$\frac{1}{4}$	75	58-65	4	$\frac{5}{8}$		276-300	17
$\frac{1}{100}$		$\frac{1}{3}$	100	66-76	4.5	$\frac{6}{7}$	0.4	301-330	18
$\frac{1}{90}$	0.5	2	125	77-84	5	8-9	0.5	331-370	20
$\frac{1}{80}$		$\frac{2}{5}$	150	85-102	6	10-11	0.6	371-400	22
$\frac{1}{70}$	0.6	3	200	103-115	7	12-13	0.7	401-450	25
$\frac{1}{60}$		$\frac{3}{4}$	250	116-135	8	14-16	0.9		
$\frac{1}{50}$	1	4		136-150	9	17-18	1		
$\frac{1}{40}$	1.25	$\frac{4}{5}$	300	151-165	10	19-22	1.2		
$\frac{1}{30}$	1.5	5		166-180	11	23-27	1.5		
$\frac{1}{25}$	2	$\frac{5}{4}$	400	181-190	12	28-32	1.8		
$\frac{1}{20}$		6		191-220	13	33-37	2		
$\frac{1}{18}$	2.5	$\frac{6}{5}$	450	221-250	15	38-46	2.5		
$\frac{1}{16}$	3	$\frac{7}{4}$		251-275	17	47-55	3		
$\frac{1}{14}$		8	500	276-325	20	56-64	3.5		
$\frac{1}{12}$	4	9	600	326-350	22	65-74	4		
$\frac{1}{10}$	5			351-375	23	75-84	4.5		
$\frac{1}{8}$	6	10	800	376-400	25	85-93	5		
	7.5	11-13							

Atomic Weights of the Elements

$^{12}\text{C}=12$

Atomic Number	Name	Symbol	Atomic Weight	Atomic Number	Name	Symbol	Atomic Weight
89	Actinium	Ac	—	80	Mercury	Hg	200.59
13	Aluminium	Al	26.9815	42	Molybdenum	Mo	95.94
95	Americium	Am	—	60	Neodymium	Nd	144.24
51	Antimony	Sb	121.75	10	Neon	Ne	20.179
18	Argon	Ar	39.948	93	Neptunium	Np	237.0482
33	Arsenic	As	74.9216	28	Nickel	Ni	58.71
85	Astatine	At	—	41	Niobium	Nb	92.9064
56	Barium	Ba	137.34	7	Nitrogen	N	14.0067
97	Berkelium	Bk	—	102	Nobelium	No	—
4	Beryllium	Be	9.01218	76	Osmium	Os	190.2
83	Bismuth	Bi	208.9806	8	Oxygen	O	15.9994
5	Boron	B	10.81	46	Palladium	Pd	106.4
35	Bromine	Br	79.904	15	Phosphorus	P	30.9738
48	Cadmium	Cd	112.40	78	Platinum	Pt	195.09
55	Cesium	Cs	132.9055	94	Plutonium	Pu	—
20	Calcium	Ca	40.08	84	Polonium	Po	—
98	Californium	Cf	—	19	Potassium	K	39.102
6	Carbon	C	12.011	59	Praseodymium	Pr	140.9077
58	Cerium	Ce	140.12	61	Promethium	Pm	—
17	Chlorine	Cl	35.453	91	Protactinium	Pa	231.0359
24	Chromium	Cr	51.996	88	Radium	Ra	226.0254
27	Cobalt	Co	58.9332	86	Radon	Rn	—
29	Copper	Cu	63.546	75	Rhenium	Re	186.2
96	Curium	Cm	—	45	Rhodium	Rh	102.9055
66	Dysprosium	Dy	162.50	37	Rubidium	Rb	85.4678
99	Einsteinium	Es	—	44	Ruthenium	Ru	101.07
68	Erbium	Er	167.26	62	Samarium	Sm	150.4
63	Europium	Eu	151.96	21	Scandium	Sc	44.9559
100	Fermium	Fm	—	34	Selenium	Se	78.96
9	Fluorine	F	18.9984	14	Silicon	Si	28.086
87	Francium	Fr	—	47	Silver	Ag	107.868
64	Gadolinium	Gd	157.25	11	Sodium	Na	22.9898
31	Gallium	Ga	69.72	38	Strontium	Sr	87.62
32	Germanium	Ge	72.59	16	Sulphur	S	32.06
79	Gold	Au	196.9665	73	Tantalum	Ta	180.9479
72	Hafnium	Hf	178.49	43	Technetium	Tc	98.9062
2	Helium	He	4.00260	52	Tellurium	Te	127.60
67	Holmium	Ho	164.9303	65	Terbium	Tb	158.9254
1	Hydrogen	H	1.0080	81	Thallium	Tl	204.37
49	Indium	In	114.82	90	Thorium	Th	232.0381
53	Iodine	I	126.9045	69	Thulium	Tm	168.9342
77	Iridium	Ir	192.22	50	Tin	Sn	118.69
26	Iron	Fe	55.847	22	Titanium	Ti	47.90
36	Krypton	Kr	83.80	74	Tungsten	W	183.85
57	Lanthanum	La	138.9055	92	Uranium	U	238.029
103	Lawrencium	Lr	—	23	Vanadium	V	50.9414
82	Lead	Pb	207.2	54	Xenon	Xe	131.30
3	Lithium	Li	6.941	70	Ytterbium	Yb	173.04
71	Lutetium	Lu	174.97	39	Yttrium	Y	88.9059
12	Magnesium	Mg	24.305	30	Zinc	Zn	65.37
25	Manganese	Mn	54.9380	40	Zirconium	Zr	91.22
101	Mendelevium	Md	—				

Dissociation Constants

The pK_a values given are for some of the drugs and ancillary substances included in Parts 1 and 2. They are derived from official publications and published papers, but as they are largely unconfirmed they should be taken as approximate values only. Unless otherwise stated the values are those measured at 25°.

Acetazolamide	7.2	Chlorzoxazone	8.0
Adrenaline	9.0	Cinchocaine	8.9
	8.7	Clindamycin	6.9
	10.2	Cloxacillin	2.7
	12.0	Cocaine	8.6
Allobarbitone (20°)	7.7	Codeine	8.2
Alprenolol	9.5	Colchicine (15°)	1.9
Ametazole	2.2	Crystal Violet	9.4
	9.6	Cyclizine	8.2
Amethocaine	8.5	Cyclobarbitone (20°)	7.5
Amidopyrine	5.1	Cyclopentamine	10.5
Aminacrine	10.0	Cyclopentolate	7.9
Aminobenzoic Acid	2.4	Dapsone	1.3
	4.9		2.5
Aminocaproic Acid	4.4	Desipramine	10.2
	10.8	Dextromethorphan	8.3
Aminosalicic Acid	(—NH ₂) 1.8	Diamorphine (23°)	7.6
	(—COOH) 3.6	Dichlorophenoxyacetic Acid	2.6
Amitriptyline	9.4	Dicloxacillin	2.7
Amphetamine	9.8	Diethazine (20°)	9.1
Ampicillin	(—COOH) 2.5	Diethylcarbamazine	7.7
	(—NH ₂) 7.2	Dihydrocodeine	8.8
Amylobarbitone	7.9	Dihydroergotamine (24°)	6.8
Antazoline	2.5	Diodone	2.8
	10.1	Diphenhydramine	9.0
Apomorphine (15°)	7.2	Dipipanone	8.5
	8.9	Dopamine (20°)	8.9
Aprobarbitone (20°)	7.9		10.6
Ascorbic Acid	4.2	Doxylamine	9.2
	11.6	Emetine	7.4
Aspirin	3.5		8.3
Atropine (18°)	9.9	Ephedrine	9.6
Barbitone	8.0	Ergometrine (22°)	6.8
Benzocaine	2.5	Ergotamine	6.3
Benzphetamine	6.6	Ethacrynic Acid	3.5
Benztropine	10.0	Ethanolamine	9.4
Benzylmorphine (20°)	8.1	Ethbenecid	3.3
Benzylpenicillin	2.7	Ethiopropazine (20°)	9.6
Boric Acid	9.2	Ethosuximide	9.5
Brilliant Green	7.9	Ethylenediamine	6.9
Bromodiphenhydramine	8.6		9.9
Brucine	8.3	Ethylmorphine	8.2
Butacaine	9.0	Ethylnoradrenaline	8.4
Butobarbitone (20°)	7.9	Etilefrine	9.0
Chlorcyclizine	2.4		10.2
	7.8	Fencamfamin	8.7
Chlorocresol	9.2	Fenfluramine	9.1
Chloroquine	8.4	Fluopromazine	9.2
	10.8	Frusemide	3.9
Chlorothiazide	6.8	Glutethimide (20°)	4.5
	9.4	Guanethidine	8.3
Chlorpheniramine	9.1		11.4
Chlorphentermine	9.6	Harmine (20°)	7.6
Chlorpromazine (20°)	9.3	Heptabarbitone (20°)	7.4
Chlorpropamide	5.0	Hexobarbitone (20°)	8.2

