# The Royal Horticultural Society

# DICTIONARY OF Gardening

A PRACTICAL AND SCIENTIFIC ENCYCLOPAEDIA OF HORTICULTURE

Edited by

FRED J. CHITTENDEN, O.B.E., F.L.S., V.M.H.

Assisted by Specialists

SECOND EDITION

PATRICK M. SYNGE, M.A., F.L.S.

VOLUME I
A—CO

OXFORD: AT THE CLARENDON PRESS

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### FOREWORD

For the last fifty years, since I became of an age to take an intelligent interest in gardening matters, there has been one work which was indispensable, and that was Nicholson's Dictionary of Gardening. It was indispensable not only for its accuracy but for the fact that it referred to most plants grown in British gardens. Nicholson's Dictionary, however, has very naturally grown somewhat out of date with the passage of time. New plants have been introduced, firstly by collectors sent out by enterprising nurserymen to tropical countries to furnish our greenhouses, and later by collectors financed largely by amateurs, and horticultural and botanical societies who ransacked China and other countries for hardy plants. So a number of specialist books had to be acquired and consulted to supplement Nicholson.

Now gardening and botany cannot stand still, or can I put it that gardening cannot and botanical work will not stand still; and the Council of The Royal Horticultural Society formed the opinion that it would be an inestimable boon to gardeners and to botanists that the additional information available about cultivated plants and cultivable plants should be compiled on the most invaluable lines of Nicholson's Dictionary. In this great effort—for we knew that it would be a great effort—the Society was doubly fortunate in securing both the co-operation of the Oxford University Press, with whom we are proud to be associated in this joint enterprise, and also the editorial ability of Mr. F. J. Chittenden. Mr. Chittenden was a very remarkable man. I have long held the opinion that he had a greater knowledge of the cultivated plants of the world than any other man living. He was not, of course, a professional botanist, although he had a great and sound knowledge of that science. If you cross-examined him on an obscure group of plants, say on the grasses of Madagascar, a subject which comes to my mind, you might have found him deficient in his knowledge of it; but if you asked him for the name of a garden plant, whether grown indoors or outdoors, and whether species or hybrid—and the identification of hybrids is more difficult as a rule than the identification of species—he had no equal. It is a big step from being the best authority in your own particular environment to being the best in the world, and I make this judgement of Mr. Chittenden with all seriousness. To our very deep regret he died before his work was complete.

I remember going to a dinner given to Mr. H. G. Wells on his seventieth birth-day by admirers of his works, and in replying to the speeches he said that he felt like a little child playing with toys that he loved; that he had lots of plans and projects with these toys but felt at the age of seventy that bedtime was coming near, that the Great Nurse would soon come to take him off to sleep and that he only hoped he would be given leisure to bring to completion some of the games and some of the projects which were dear to his heart. Mr. Chittenden was taken from us when several of his tasks, and among them his great *Dictionary*, were incomplete. His death deprived the horticultural world of one of the most eminent of its experts, teachers, and practical gardeners. The Royal Horticultural Society in particular has lost the most knowledgeable and accomplished member of its staff since the days of Lindley and Wilks.

### **FOREWORD**

Our Editor's task started in the year 1939 and was carried on through those most difficult times when access to authorities was often unobtainable. Therefore certain revision work which Mr. Chittenden would doubtless have carried through himself has been put into the able hands of Mr. P. M. Synge, the Editor of The Royal Horticultural Society's publications, and of Mr. W. T. Stearn, the Society's Librarian. Both of them are botanists of repute. Botanical names, however, sometimes change with startling frequency and in the *Dictionary of Gardening* it has been decided not to make some less important alterations in nomenclature where the articles were already in type.

It is difficult to realize what a great advance has necessarily been included in the compilation of this work. Nicholson had 5 species of Abelia; the present work has 11, not including hybrids, while Abies had 26 and has now 40, not including the synonyms. Throughout the book similar comparisons may be made. Further species have been found, new hybrids have been made, genera have been reorganized.

We have had, of course, to recognize the rapid growth in the production of hybrids and forms of many genera, with the result that even this *Dictionary* must in this respect soon grow out of date. In these circumstances the Council of The Royal Horticultural Society decided that the first four volumes should, in regard to plants, deal with species and with such hybrids and forms as are long-established and widely grown, as well as, of course, with fundamentals. The fifth volume, besides referring to new plants introduced during the preparation of the *Dictionary*, will contain lists of recommended varieties of the principal kinds of plants which are constantly being improved by hybridization and selection; and this volume can be revised and reissued apart from the main work.

It is our intention that this shall be done periodically when opportunity will be taken to bring up to date the lists of recommended varieties, include and describe important new plants and hybrids, and summarize the improvements in methods of control of pests and diseases evolved in the progress of science. Changes in specific names, where changes of importance are necessary to avoid confusion and where they have been generally accepted, will also be included.

The illustrations in the work are designed to be helpful to the gardener rather than merely ornamental. For fine illustrations of garden plants one must perforce look elsewhere.

This Dictionary of Gardening—one might call it an Encyclopaedia—is designed to be of use not only to the gardeners of this country but, as far as possible, to gardeners the world over and especially to those of our American friends who have, notably in recent years, taken such a keen interest in the collection, hybridization, cultivation, and nomenclature of plants.

ABERCONWAY

President, The Royal Horticultural Society

### PREFACE TO SECOND EDITION

This second edition is issued concurrently with an extensive Supplement. Even so it has only been found possible to revise a small proportion of the genera, where suitable specialists were available and willing to undertake the work. These revisions will be found in the Supplement and not in the volumes of the main work. These have been printed from the type of the first edition and only minor amendments, involving no great alterations of spacing, have been permitted. However, extensive surveys have been made of the cross references in the Dictionary and also of the references to plates in the Botanical Magazine, and many of these revisions have been included in this edition as well as in the Supplement. Consequently, some of those who may use the Supplement in conjunction with this edition will find that a number of the amendments proposed there have already been made. In cases where the amendment was too extensive for inclusion an A printed in bold type has been inserted. In cases where a new entry has been made an  $A \rightarrow$  has been inserted at the place where the article would have been placed. It is hoped that the next edition may include a comprehensive revision in which all these articles will be included and revised where necessary.

It has unfortunately not been possible to include in this edition any new illustrations or alterations to existing ones.

As editor I would like to acknowledge the help of my colleague Mr. Lanning Roper.

PATRICK M. SYNGE

The Royal Horticultural Society November 1955

### PREFACE TO FIRST EDITION

### AN HISTORICAL NOTE ON THE DICTIONARY OF GARDENING

ONE of the greatest needs in gardening literature has always been the comprehensive book, describing plants in cultivation and giving their original habitats and the best means of growing them successfully. In 1629 John Parkinson published his celebrated *Paradisus*. About a hundred years later Philip Miller, the Curator of the Botanic Garden at Chelsea, published the first edition of *The Gardener's Dictionary*. The eighth and most frequently used edition appeared in 1768. This was far more than a dictionary in the strict sense; rather it was a many-sided and practical encyclopaedia for the use of both gardener and botanist. In Miller's time the garden at Chelsea was probably the most richly stocked in the world, and Miller had an immense knowledge of plants and their cultivation. He set a high standard which has influenced the form of subsequent horticultural encyclopaedias down to the present day. This was a work written by a man who was actually concerned with the growing of the plants.

In 1807 Thomas Martyn produced a new four-volume edition of Miller's work, entitled The Gardener's and Botanist's Dictionary . . . corrected and newly

arranged. Twenty years or so later the copyright holders of this work commissioned George Don the Younger to produce a new edition. Four volumes, with the title A General System of Gardening and Botany... founded upon Miller's Gardener's Dictionary, appeared between 1831 and 1838. Don had material in hand for two more volumes, but the publishers thought the cost of printing would be too high and the work was never completed.

Fifty years later between 1884 and 1888 The Illustrated Dictionary of Gardening, a practical and scientific Encyclopaedia of Horticulture, edited by George Nicholson, Curator of the Royal Botanic Gardens, Kew, was published by L. Upcott Gill. This first appeared in parts and was sold by subscription for the use of working gardeners as well as owners of gardens. Nicholson, with his colleagues at Kew and other experts, brought to the work their first-hand knowledge of the Kew collections, probably then the most extensive in the world, and drew on the magnificent library at the Royal Botanic Gardens for further information. In 1901 the extensive Century Supplement was published. Nicholson died in 1908.

The present Dictionary of Gardening has Nicholson's Illustrated Dictionary as its basis. It thus goes back, through the works of Don and Martyn, as indicated above, to Miller's great Gardener's Dictionary and to Parkinson's Paradisus. Taken together these works illustrate the great progress in horticulture made during the past three and a quarter centuries. Some methods of cultivation have remained unaltered since Miller's time, being based on sound observation of the needs of plants in the open garden. The nineteenth century saw the development of glasshouse cultivation and the introduction of innumerable beautiful but tender tropical and subtropical plants through European plant collecting in Africa, the Indies, Australia, and tropical America. More of them graced British gardens in Nicholson's time than today. The present half-century has been noteworthy in British horticulture for the introduction of many beautiful and hardy plants from eastern Asia, especially western China, through the journeys of E. H. Wilson, George Forrest, Reginald Farrer, Frank Kingdon-Ward, William Purdom, and Joseph F. Rock. The eastern Himalaya and adjacent Tibet, thanks to R. E. Cooper, Frank Ludlow, George Sherriff, and Kingdon-Ward, have also vielded many plants. The inclusion of notes on a large number of these introductions is an important feature of the present Dictionary of Gardening.

During the past sixty years Nicholson's *Illustrated Dictionary*, though growing ever more out of date in matters of nomenclature, pest control, &c., has remained for the British gardener the most practical comprehensive work available. In September 1936 on the initiative of Lord Aberconway, its President, the Council of The Royal Horticultural Society, appreciating both the worth of Nicholson's encyclopaedia and the demand for a new one to supersede it, set up a committee under the chairmanship of the late J. B. Stevenson to consider ways and means of preparing and printing a new edition. The task of preparing it began on 1 October 1938. It was entrusted to Frederick James Chittenden who was then the Society's Technical Adviser and Editor, and who had been from 1919 to 1931 Director of its Gardens at Wisley.

Chittenden thought that the preparation of the *Dictionary* would take him about four years. A survey of the original Nicholson's *Dictionary*, eliminating redundant matter, listing terms for definition, planning new articles, and negotiating

### **PREFACE**

with contributors occupied most of the first year. Chittenden then relinquished his other duties and retired to Dedham in Essex, to devote himself from October 1939 onwards wholly to the task of revision and editing. He died in August 1950, the work still incomplete, for the conditions prevailing during and after the Second World War, 1939 onwards, added greatly to the difficulty of preparing the *Dictionary* and of printing it. Access to libraries, herbaria, and gardens was limited and various people, whose contributions and criticism would have been valuable, were otherwise engaged. The Editor was therefore forced to undertake the writing of a remarkably large part of the work, far more than he originally envisaged. He was, however, fortunate in being able to obtain the assistance of a few leading British horticulturists known to grow plants well, to be familiar with their botany, and to be able to describe them concisely and intelligibly.

Among his band of principal contributors he enlisted the late W. J. Bean, formerly Curator of Kew Gardens, the same post as Nicholson had held, to write on Trees and Shrubs on which he was one of the leading authorities; the late E. C. Cooper, chief orchid-grower to Messrs. Sanders, on Orchids; W. Dallimore, also of Kew, on Conifers; Mrs. Vera Higgins, late Editor of The Cactus Journal and for a time Editor of the R.H.S. Journal and publications, on Cacti and Succulents; F. G. Preston, then Curator of the Cambridge Botanic Garden, on Greenhouse plants and Dr. Fred Stoker on Ericaceous plants. The late G. Fox-Wilson, the Society's Entomologist, and D. E. Green, the Society's Mycologist, contributed respectively the sections relating to pests and diseases. Although there were many more authorities who contributed individual articles and revisions, the above formed the nucleus of his band.

The contributors were requested to keep in the main to the scheme and style of the original Dictionary but to revise all the old matter and if necessary or desirable to replace it by new matter. The needs of horticulturists were to be kept in the forefront all through, and the descriptions of plants confined to salient features easily observed and to those characters which distinguish a species from its allies. The names adopted were to conform as far as possible to the International Rules of Botanical Nomenclature with regard to genera and species, and to horticultural nomenclature with regard to varieties and forms. The botanical families were in general to be those of Engler's system as given in his Syllabus der Pflanzenfamilien, 7th ed. (1909). At the Paris Horticultural Congress of 1932 general agreement had been reached as to the limits of certain genera, a list having been prepared of generic names recommended for use in horticultural literature, and these names were accordingly to be adopted; otherwise contributors were left to their own discretion. They tackled their tasks with zeal, leaving scarcely a paragraph unamended, and by October 1941 possibly three-fifths of the Dictionary had been revised. By June 1942 the Editor calculated that seven-tenths was ready for the press. The pace then became very much slower, chiefly through difficulties created by war conditions. The death of Dr. Fred Stoker in 1943 was a great setback. In December 1945 the Editor delivered the first batch of manuscript to the Oxford Press for setting. He clung manfully to the task of editing and completing the Dictionary unaided, but unfortunately he died on 1 August 1950, mourned as a great figure in British horticulture. He had passed to the Oxford Press all of the available text of the Dictionary and it was thought that nothing remained but to

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scrutinize the proofs for typographical errors. Unfortunately the text from 'SO' onwards, which was in galley proof, proved to be far from complete; the rest of the *Dictionary* was either printed off or in page proof. Only in the case of articles in page proof was it possible to make any amendments, and in fact only in the case of a few important genera were any extensive revisions made.

P. M. Synge, Editor of the Society's publications, took over the work in which he received very considerable assistance from W. T. Stearn, the Librarian. Their task would have been much harder and the completion of the *Dictionary* much delayed but for the willing co-operation of many experts, including several eminent American authorities, whose initials will mostly be found appended to their articles. Special acknowledgement is made to the authorities at the Royal Botanic Gardens, Kew, and the British Museum (Natural History) for working facilities and the co-operation of their staffs, more especially to C. E. Hubbard and V. S. Summerhayes who dealt with many queries relating to Gramineae and Orchidaceae respectively.

The engravings which illustrate Nicholson's *Dictionary* came from various sources, the best being of French origin, but were not available for this present work. The present illustrations are new line drawings made in as many cases as possible direct from the living plants by L. R. Brightwell, Mrs. Russell Cox, Mrs. M. Higgins, Mrs. Vera Higgins, Russell Leslie, Miss A. V. Webster, and A. J. Wise. During the war years living material often was not available and so a number of drawings were copied or adapted from plates in the *Botanical Magazine* and similar publications.

From the above notes it will be evident that most of the present *Dictionary* was prepared between October 1939 and June 1942, a period during which the dispersal of British botanical libraries and herbaria made impossible the consultation of much relevant botanical literature and the investigation of many problems of nomenclature and taxonomy. Fortunately, the horticultural matter in the work was hardly affected by this, as contributors drew largely upon their own extensive first-hand experience for cultural directions, &c., and Nicholson's information was in general so sound as often to require little but expansion. On the other hand it resulted in the employment of a number of botanical names no longer accepted as valid, and there is thus an occasional lack of harmony in nomenclature with some monographs, standard works, and special studies, especially those published in other countries and unknown or unavailable when the manuscript went to the press. These, however, concern only a very small part of the work as a whole and detract little from its horticultural value. A number of such points will be noted in the Supplement.

The extent to which the present *Dictionary* supersedes its predecessor becomes immediately evident when pages of the two are put side by side. Moreover, very many general articles on subjects untouched by Nicholson have been added. For this reason, though built upon the good foundation provided by Nicholson, the present work has not been issued as a new edition but as an independent work with a new title, *The Royal Horticultural Society's Dictionary of Gardening*, in the firm confidence that it will be no less useful to gardeners of a later generation than its illustrious predecessors.

# ABBREVIATIONS USED FOR TITLES OF WORKS CONTAINING ILLUSTRATIONS CITED IN THIS DICTIONARY

(Works are octavo unless otherwise mentioned)

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A.B,G.C.	CALCUTTA, ROYAL BOTANIC GARDENS. Annals. Calcutta. 1887–1936. Vols. 1–14, pt. i. Folio.		JOHN LINDLEY. 1829-47. 19 vols. Ref. to plate nos. for vols. 1-23 (1815-37), to vol. and plate nos. for vols. 24-47
A.B.R.	ANDREWS, HENRY C. The Botanist's Repository. London. 1797–1812. 10 vols. 4to. (For dates of publication, see J. Bot. (London), 54. 236; 1916.)	B.R.C.	(1838-49).  BRITTON, NATHANIEL LORD, and ROSE, JOSEPH NELSON. The Cactaceae: Descriptions and Illustrations of Plants of
ADD.	Addisonia: coloured Illustrations and popular Descriptions of Plants. New York. 1916 Vol. 1 Ref. to	B.T.S.	the Cactus Family. Washington, D.C. 1919–23. 4 vols. 4to. Ref. to vol. and plate or fig. nos.  BEAN, WILLIAM JACKSON. Trees and
A.G.	plate nos.  ANDREWS, HENRY C. Geraniums. London. 1805–24. 2 vols. 4to. Ref. to plate nos.	<b>D.1.5.</b>	Shrubs hardy in the British Isles. 1914. 2 vols. Vol. 3. 1933. Ref. to vol. and page.
A.G.S.B.	ALPINE GARDEN SOCIETY. Bulletin. Capel, Surrey, &c., 1930— . Vol. I— .	BAIRD, VIOL.	BAIRD, VIOLA BRAINERD. Wild Violets of North America. Berkeley and Los Angeles. 1942.
A.H.	and an Andrews, Henry c. The Heathery; or a Monograph of the Genus Erica. London. 1804–12. 6 vols. Ref. to plate	BULL. ALP. GARD. SOC.	See A.G.S.B. above.
	nos.	C.B.	CLINTON-BAKER, HENRY WILLIAM. Illustrations of Conifers. Hertford.
A.P.J.	TAKEDA, HISAYOSHI. Alpine Plants of Japan. Tokyo. 1938. Ref. to plate nos.		1909-13. 3 vols. 4to. Ref. to vol. and plate nos.
ANN. MUS. LUGDUNO-BAT.	MIQUEL, FREDERIK ANTON WILHELM. Annales Musei botanici Lugduno-Batavorum. Amsterdam, &c. 1863—9. 4 vols. Folio. (For dates of publication see J. Arnold Arb. 6. 212; 1925.)	C.B.J.	CLINTON-BAKER, HENRY WILLIAM, and JACKSON, ALBERT BRUCE. Illustrations of new Conifers. Hertford. 1935. 4to. Ref. to plate nos.
B.B.	BRITTON, NATHANIEL LORD, and BROWN, ADDISON. An Illustrated Flora of the	C.F.K.	COVENTRY, B.O. Wild Flowers of Kashmir. Calcutta, Simla, London. 1925–30. 3 vols.
	Northern United States, Canada, and the British Possessions from New-	C.H.P.	See H.I.H. below.
	foundland to Virginia. New York. Ed. 2. 1913. 3 vols. Ref. to vol. and page.	C.I.N.Z.	CHEESEMAN, THOMAS FREDERICK. Illustrations of the New Zealand Flora. Wellington, N.Z. 1914. 2 vols. 4to.
B.C.F.	schneider, george. The Book of choice Ferns. London. 1892-4. 3 vols.	D.C.PL.G.	Ref. to plate nos.  CANDOLLE, AUGUSTIN PYRAMUS DE.  Plantarum succulentarum Historia; ou
в.н.	La Belgique Horticole. Liége. 1851-85. 35 vols. Ref. to date and plate nos.		Histoire naturelle des Plantes grasses. Paris. 1798-1829. 2 vols. Folio. Ref.
B.J.O.	BOLUS, HARRY. Icones Orchidearum Austro-Africanarum extra-tropicarum.		to plate nos. (For dates of publication, see Cactus J. 7. 37; 1938.)
	London. 1893-1913. 3 vols. Ref. to plate nos.	D.J.C.	DALLIMORE, WILLIAM, and JACKSON, ALBERT BRUCE. A Handbook of Coni-
B.M.	Curtis's Botanical Magazine. London. 1787–1947. 164 vols. Ref. to plate nos.	E.B.	ferae including Ginkgoaceae. London. 1923. Ref. to pages.  SYME, JOHN THOMAS BOSWELL. English
B.M. n.s.	Idem 1948 Vol. 165 Ref. to plate nos.	· • • · ·	Botany. London. 1863–86. 12 vols. 8vo. Supplementary vol. (13) by
в.о.	BATEMAN, JAMES. A Monograph of Odontoglossum. 1864–74. Folio. Ref.		NICHOLAS EDWARD BROWN. 1891-2. Ref. to plate nos.
	to plate nos.	E.H.	ELWES, HENRY JOHN, and HENRY, AUGUSTINE. The Trees of Great
B.O.M.G.	BATEMAN, JAMES. The Orchidaceae of Mexico and Guatemala. London. 1843. Folio.		Britain and Ireland. Edinburgh. 1906–13. 7 vols. 4to. Ref. to plate nos.
B.R.	The Botanical Register by SYDENHAM EDWARDS. London. 1815–28. 14 vols. 8vo. Cont. as Botanical Register or Ornamental Flower Garden. Ed. by	E.L.	ELWES, HENRY JOHN. A Monograph of the Genus Lilium. London. 1877–80. Folio. Ref. to plate nos. (For dates of publication, see WOODCOCK, H. B. D., and STEARN, W. T., Lilies, 396; 1950.)

### ABBREVIATIONS USED FOR TITLES OF WORKS

	ABBREVIATIONS USED	FOR TILLE	5 OF WORKS
E.L.s.	GROVE, ARTHUR STANLEY, and COTTON, ARTHUR DISBROWE. A Supplement to Elwes' Monograph of the Genus Lilium. London. 1934–40. Folio. Ref. to plate nos.	G.C.	The Gardeners' Chronicle. London. 1841-3. 3 vols. 4to. The Gardeners' Chronicle and Agricultural Gazette. 1844-73. 30 vols. The Gardeners' Chronicle, new series. 1874-86. 26
E.R.G.	FARRER, REGINALD. The English Rock- garden. London. 1919. 2 vols. Ref. to pages.	GEN.	vols.; 3rd series. 1887— . Vol. 1— . Ref. to vol., date, and page. WILKIE, DAVID. Gentians. London.
F.A.O.	FITZGERALD, ROBERT DAVID. Australian		1936.
	Orchids. Sydney. 1875-94. 2 vols. Folio. Ref. to vol. and part.	GENTES HERB.	BAILEY, LIBERTY HYDE. Gentes Herbarum. Ithaca, N.Y. 1920 Vol. 1
F.&S.	Flora and Sylva; a monthly Review for Lovers of Garden, Woodland, Tree or Flower. Ed. by WILLIAM ROBINSON. London. 1903–5. 3 vols. 4to. Ref. to vol. and plate nos.	G.F.	Gartenflora. Erlangen. 1852–85. 34 vols. <i>Cont. as</i> Gartenflora, Zeitschrift, &c. 1886–1938. Berlin. Vols. 35–87. Ref. to plate nos., or to vol. and page.
F.B.A.	HOOKER, Sir WILLIAM JACKSON. Flora	G.I.	Gardening Illustrated. London.
	Boreali-Americana: or the Botany of the northern Parts of British America. London. 1829–40. 2 vols. 4to. Ref. to plate nos. (For dates of publication, see J. Bot. (London), 47. 106; 1909.)	GN.	The Garden: an illustrated weekly Journal of Gardening in all its Branches. London. 1871-1927. 91 vols. 4to. Ref. to vol., date, and page.
E D 7		GTF.	Gartenflora. See G.F. above.
F.B.I.	beddome, Richard Henry. The Ferns of British India. Madras. 1865–70. 3 vols. 4to.	H.B.F.	HOOKER, Sir WILLIAM JACKSON. The British Ferns. London. 1861. 8vo. Ref. to fig. nos.
F.C.	KNOWLES, GEORGE BEAUCHAMP, and WESTCOTT, FREDERIC. The Floral Cabinet and Magazine of exotic Beauty. London. 1837–40. 3 vols. 4to.	H.C.I.S.	HU, HSEN-HSU, and CHUN, WOON YOUNG. Icones Plantarum Sinicarum. Shanghai. 1927–9. Folio. 2 parts. Ref. by plate nos.
F.d.s.	Flore des Serres et des Jardins de l'Europe. Ghent. 1845-83. 23 vols. Ref. to plate nos.	H.E.F.	HOOKER, Sir WILLIAM JACKSON. Exotic Flora. Edinburgh. 1822-7. 3 vols. Ref. by plate nos.
F.G.	SIBTHORP, JOHN, and SMITH, SIR JAMES EDWARD. Flora Graeca: sive Plantarum rariorum Historia. London. 1806—40. 10 vols. Folio. Ref. to plate nos.	HENSHAW MT.W.FL.	HENSHAW, JULIA WILLMOTTE. Wild Flowers of the North American Mountains. London and New York. 1916.
FL.ATL.	DESFONTAINES, RENÉ LOUICHE. Flora Atlantica. Paris. 1798-9. 2 vols. 4to.	H.F.A.	HOOKER, Sir JOSEPH DALTON. Flora Antarctica. London. 1844-60. 2 vols. 4to. (For dates of publication, see
	Ref. to plate nos. (For dates of publication, see J. Soc. Bibl. Nat. Hist. 1. 147; 1938.)	H.F.T.	J. Bot. (London), 51. 356; 1913.)  HOOKER, Sir JOSEPH DALTON. Flora Tasmaniae. London. 1855-60. 2 vols.
F.M.	The Floral Magazine. London, 1st series 1861-71. 10 vols. 8vo. 2nd series 1872-81. 10 vols. 4to.	H.G.F.	4to. (For dates of publication, see J. Bot. (London), 51. 358; 1913.) HOOKER, Sir WILLIAM JACKSON. Genera
F.P.R.	BICKNELL, CLARENCE. Flowering		Filicum; or Illustrations of Ferns.
	Plants and Ferns of the Riviera and neighbouring Mountains. London. 1885. 4to. Ref. to plate nos.	н.і.н.	London. 1842. Ref. to fig. nos. HOOKER, Sir JOSEPH DALTON. Illustra- tions of Himalayan Plants. London.
F.P.S.A.	The Flowering Plants of South Africa. London &c. 1921-44. Vols. 1-24. Cont. as The Flowering Plants of Africa. Vol. 25 1945 Ref. to plate nos.	H.I.P.	1855. Folio. Ref. to plate nos. (For date of publication, see <i>Calcutta</i> , <i>R. Bot. Gard</i> , <i>Anniv. Vol.</i> , 115; 1942.) HOOKER, Sir WILLIAM JACKSON. Icones Plantarum. London. 1837-53. 10 vols. 8vo. <i>Cont. as</i> Hooker's Icones
F.S.A.	MARLOTH, RUDOLF. The Flora of South Africa: with synoptical Tables of the Genera of the Higher Plants. Cape Town and London. 1913-32.	H.S. H.S.F.	Plantarum under various editors. Ref. to plate nos.  HOOKER, Sir WILLIAM JACKSON. Species Filicum. London. 1846-64. 5 vols.
	Vols. 1-4. 4to. Ref. to plate nos.	** 0.0-	Folio.
F.S.I.	of Southern India; being Descriptions and Plates of the Ferns of the Madras Presidency. Madras. 1863-4. Ref. to	H.S.C.F.	HOOKER, Sir WILLIAM JACKSON. A Second Century of Ferns. London. 1860.
G.&F.	plate nos.	H.T.	HALL, Sir ALFRED DANIEL. The Genus Tulipa. London. 1940. Ref. to plate nos.
G.W.F.	Garden and Forest: A Journal of Horticulture, Landscape, Art, and Forestry.	HOOK.I.	See H.I.P. above.
	New York. 1888-97. 10 vols. 4to. Ref. to vol. and plate nos.	HOUSE, W. F.	HOUSE, HOMER DOLIVER. Wild Flowers of New York. New York. 1918. 4to.
	<b>.</b>	:	

### ABBREVIATIONS USED FOR TITLES OF WORKS

	ADDREVIATIONS USED	FOR TILL	SOUP WORKS
J.H.S.	HORTICULTURAL SOCIETY OF LONDON. Journal. London. 1846–55. 9 vols. Ref. to vol. and page.	P.F.G.	LINDLEY, JOHN, and PAXTON, Sir JOSEPH. Paxton's Flower Garden. London. 1850-3. 3 vols. 4to. Ref. to vol. and
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M.C.	MAW, GEORGE. A Monograph of the Genus Crocus. London. 1886. 4to. Ref. to plate nos.	R.L.	REDOUTÉ, PIERRE JOSEPH. Les Liliacées. Paris. 1807–16. 8 vols. Folio. Ref. to plate nos. (For dates of publication,
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## ABBREVIATIONS USED IN TEXT

A indicates entries to be found in the Additions, Part II of Supplement A→ indicates new headings to be found in the Additions, Part II of Supplement

cal.	calyx	lvs.	leaves
cau.	caudex (rootstock of ferns)	Mts.	Mountains
Cent.	Central	N.	North(ern)
cor.	corolla	NE.	North east(ern)
Dist.	Distribution	NW.	North west(ern)
E.	East(ern)	per.	perianth
FAM.	Botanical Family (formerly called Natural	pet.	petal(s)
	Order)	rhiz.	rhizome
fl.	flower(s)	S.	South(ern)
-fld.	-flowered	SE.	South east(ern)
fr.	fruit	sw.	South west(ern)
ft.	foot (approximately 30 cm.)	seg.	segment(s)
h.	high	sep.	sepal(s)
in.	inch (2·5 cm.)	sti.	stipe (leaf-stalk of ferns)
infl.	inflorescence	Syn.	Synonym
infruct.	infructescence	w.	West(ern)
Is.	Isle(s), Island(s)	*	of special merit
1.	leaf (leaves)	×	hybrid
Iflets.	leaflets	+	graft chimaera (graft hybrid)

The scale of illustrations is indicated by the line e.g. ——— which is included in each drawing and represents one inch.

The year given in many descriptions represents the date of first introduction of the plant to Great Britain as far as is known.



**a-.** In compound words from the Greek the initial a usually implies without: as aphyllus, without leaves; acaulis, without a stem, &c.

aaron'is -is -e, of Mt. Aaron, Asia Minor.

AARON'S BEARD. See Hypericum calycinum, Saxifraga sarmentosa, and Verbascum Thapsus.

AARON'S ROD. See Verbascum Thapsus.

ABACA. See under Musa; derived from M. textilis. abbrevia'tus -a -um, shortened.

ABELE. White Poplar. See Populus alba.

ABE LIA (in honour of Dr. Clarke Abel (1780–1826), Physician to Lord Amherst's Embassy to China in 1817, and author of Narrative of a Journey into China). FAM. Caprifoliaceae. A genus of about 20 species of very ornamental shrubs, natives of E. Asia, one in N. India, two in Mexico. Leaves deciduous, opposite, shortly stalked, small. Flowers on 1- or 2-flowered pedicels, axillary or terminal, sometimes forming terminal panicles or clusters; sepals 2 to 5, enlarging after flowering, persistent; corolla gamopetalous, tubular to campanulate, 5-lobed; stamens 4, 2 long, 2 short, at base of corolla tube. Ovary inferior, 3-celled. Fruit 1-seeded, leathery, crowned by sepals. Abelias are mostly hardy in S. England and grow well in good well-drained loamy soil. A. floribunda needs the protection of a wall in most parts of the British Isles. Propagation is easy by cuttings of ripe shoots put into sand under glass in July, and is more certain if a little mild bottom heat is given.

#### KEY

1. Nodes swollen, petioles dilated, hiding buds
1. Nodes not swollen, petioles not dilated at base
2. Peduncles 2-fid., at apex of short lateral branches
3. Peduncles 1-, rarely many-fid., axillary
3. Sepals 5
A. spathulata
3. Sepals 2
A. serrata

4. Sepals 5, stamens more or less exserted
4. Sepals 2, stamens shorter than corolla
4. Sepals 2 or 5

4. Sepals 2 or 5
 5. Infl. 2- to many-fld., in panicles, stamens longer than cor. segs.
 A. × grandiflora
 A. chinensis

than cor. segs.

5. Fl. solitary, axillary, in short terminal racemes; stamens shorter than cor. segs.

6. Lvs. acute or obtuse, not over 1 in. long

A. chinensis

A. floribunda

A. Schumannii

6. Lvs. acute or obtuse, not over 1 in. long
6. Lvs. acuminate, over 1 in. long
7. Fl. less than 1 in. long, cor. twice sepals
7. Fl. 1 in. or more long, cor. thrice sepals
8. Lvs. rather leathery, glabrous
8. Lvs. rather leathery, glabrous

8. Lvs. rather leathery, glabrous
8. Lvs. membranous, generally hairy
9. Sepals 5; fl. in terminal clusters
9. Sepals 4; fl. in pairs on short branches
A. uniflora
A. Graebneriana
A. triflora
A. Zanderi

A. chinen'sis. Deciduous shrub, 3 to 4 ft. h., spreading, young shoots minutely red-downy. l. ovate, \(\frac{3}{4}\) in. long, pointed, more or less rounded at base, toothed, downy near base of midrib beneath, nearly smooth above. \(\frac{\ell}{2}\) in dense terminal or axillary clusters, white, sweet-scented; sep. 5, rosy, obovate; cor. funnel-shaped, about \(\frac{1}{2}\) in. long, hairy within; stamens exserted. July to September. China. 1844. (B.R. 32, 8 as \(\frac{A}{2}\). rupestris.) Needs greenhouse in all but favoured districts. See \(\frac{A}{2}\). \* grandiflora. A

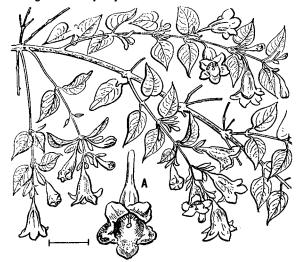
A. Engleria'na. Deciduous bushy shrub, 2 to 4 ft. h., young shoots downy at first. I. ovate to elliptic-lanceolate, \(\frac{3}{2}\) to 1\(\frac{1}{2}\) in. long, with few teeth, bright green and smooth above, glossy and paler beneath, with few scattered hairs on veins, margin bristly hairy. fl. in pairs at ends of short shoots, rose; sep. 2, narrowly oval, ciliate; cor. swollen at base, tubular below middle, bell-shaped at mouth. July. China. 1908.

A. floribun'da.\* Evergreen shrub, 3 to 5 ft. h. (taller in nature); young shoots reddish, downy. l. ovate to roundish ovate, \(\frac{1}{2}\) to \(\frac{1}{2}\) in. long, glossy green and smooth, teeth shallow, texture firm; stalk short. \(\frac{1}{2}\). Pendulous, at or near end of short twigs borne on wood of previous year; rose-red; sep. 5, green; cor. slenderly funnel-shaped, \(\frac{1}{2}\) to 2 in. long; stamens hairy. Mexico. 1841. Needs protection of wall. (B.M. 4316; B.R. 33, 55.)

A. Graebneria'na. Deciduous shrub to 10 ft. h., young shoots smooth or nearly so. *l.* ovate, long-slender-pointed, 1½ to 2 in. long, almost smooth above, downy on veins near stalk beneath, margins white-hairy. *fl.* solitary on peduncle, pink, yellow in throat, somewhat bell-shaped; sep. 2, narrow oblong. July. China. 1910.

A. × grandiflo'ra\* (A. chinensis × A. uniflora). Evergreen shrub to 5 ft. h., shoots arching, minutely downy. l. ovate, acute, 1 to 2½ in. long, glossy dark green and smooth above, paler shining green and downy near base of midrib beneath, shallow toothed. ft. 1 to 4 in l.-axils and at end of shoots of the year, slightly fragrant, white tinged pink; sep. 2 to 5, purplish; cor. bell-shaped, about ½ in. long, throat hairy. July to October. (Add. 49.) SYN. A. chinensis of gardens. Hardy in all but most severe winters.

A. longitu'ba. A synonym of A. Schumannii.



Abelia Schumannii. A, flower nat. size

A. Schumann'ii.\* Deciduous shrub to 5 ft. h. or more in sheltered places, shoots arching, purplish, downy at first. l. ovate,  $\frac{1}{2}$  to  $1\frac{1}{2}$  in. long, scarcely toothed, downy on midrib beneath. fl. solitary in axils of short shoots on previous year's wood; rosy-pink, 1 in. or more long, minutely downy outside; cor. broadly funnel-shaped, swollen towards base; sep. 2. June to September. China. 1908. (B.M. 8810 as A. longituba.) Somewhat tender in hard winters but survives and grows well.

A. serra'ta. Deciduous shrub, 3 to 4 ft. h., shoots slender, minutely downy. l. ovate to ovate-lanceolate, \(\frac{1}{2}\) to 1\(\frac{3}{2}\) in. long, teeth few or none, sparsely hairy above and on base of midrib beneath. \(flac{fl.}{1}\) in pairs at ends of short lateral shoots; dull white, yellowish, or pale pink; cor. \(\frac{1}{2}\) to \(\frac{3}{2}\) in. long, funnel-shaped, tapered to a tube; sep. 2. May, June. Japan. 1879.

A. spathula'ta. Deciduous bushy shrub, 3 or 4 ft. h., young shoots downy. l. oval-lanceolate to ovate, 1 to 2 in. long, unequally toothed, sparingly hairy; margins at first red. fl. in pairs at ends of short lateral shoots, white with yellow in throat, ½ to 1 in. long, widefunnel-shaped; sep. 5, rosy; stamens included. Japan. 1880. (B.M. 6601.) Hardy only in mild districts.

A. triflo'ra. Deciduous vigorous erect shrub or small tree to 12 ft., young shoots bristly; bark corrugated. I. ovate-lanceolate to lanceolate,  $1\frac{1}{2}$  to 3 in. long, dull dark green above, paler beneath, more or less hairy but becoming smooth. ft. fragrant, in erect clusters 2 in. across at ends of short shoots; peduncles often 3-fld.; sep. 5, reddish; cor. pale rosy white, tube slender, downy, with 5 lobes,  $\frac{1}{2}$  in. across at mouth. June. Himalaya. 1847. (Gn. 10 (1876), 58; B.M. 9131.) Hardy.

A. uniflo'ra. Evergreen shrub, 5 to 6 ft. h., shoots spreading and arching. l. ovate, with long point, 1 to 2 in. long, slightly toothed, smooth and dark glossy-green above, paler and downy on midrib beneath. ft. 1, 2, or 3 in terminal 1.-axils; cor. white-tinged pink, marked orange in throat, about 1 in. long, and 1 in. across lobes, wide tubular; sep. usually 2, sometimes 3 or 4. June. China. 1845. (B.M. 4694.) Hardy in all but most severe winters.

A. Zan'deri. Shrub to 6 ft., erect, shoots with few bristles near base. l. ovate-oblong to ovate-lanceolate, 1½ to 3 in. long, slender-pointed, sometimes toothed, slightly hairy. fl. 2 at ends of short shoots; cor. tube ½ in. long, lobes spreading; sep. oblong, nearly glabrous. China. 1910. Variable.

A. Engleriana

ABELIC'IA. A synonym of Zelkova.

ABELIOPHYL'LUM (leaves resemble those of Abelia). FAM. Oleaceae. A genus of a single Korean species allied to Fontanesia but with petals 4, joined into a tube as long as the spreading lobes; stamens 2; ovary 2-celled; ovules solitary; fruit flattish, winged all round, nearly 1 in. across. A hardy deciduous shrub with no special soil requirements but with flowers apt to be damaged by spring frosts. Increased by cuttings of half-ripe wood in a close frame.



Abeliophyllum distichum

A. dis'tichum.\* 2 to 3 ft. h., branches square, glabrous, twiggy. l. opposite, entire, ovate, 1 to 3 in. long, acuminate, hairs adpressed on both surfaces. fl. white, orange-centred, about \( \frac{1}{2} \) in. across, in short racemes from last year's shoots, fragrant. January to April. fr. compressed, roundish, surrounded by a wing. Korea. 1924. A

### ABELMOS'CHUS. Included in Hibiscus.

**aberrant,** deviating from the usual characters of its near relatives.

**ABE'RIA** (from Mt. Aber, Abyssinia, where the first species was found). Fam. *Flacourtiaceae*. A genus of about a dozen species of small trees or shrubs in Africa and Ceylon. Leaves alternate, simple, without stipules.

Flowers diœcious, small, petals absent; staminate flowers with 4- or 5-partite calyx and many stamens on a fleshy receptacle; pistillate with a 5- to 7-partite persistent calyx and a superior 1- to 6-celled ovary. Fruit fleshy, in some species edible. Not particularly ornamental but interesting for the fruit; needing greenhouse protection and ordinary soil.

A. caf fra. Kei Apple. Thorny, glabrous shrub or small tree. l. obovate, 1½ in. long, obtuse, wedge-shaped at base, entire; stalk short. fl. inconspicuous. fr. acid. S. Africa. (R.H. 1904, 256; G.C. 18 (1895), 737.) Grown as a hedge-plant in warm temperate regions. fr. acid, used in pickles and preserves.

A. Gard'neri. Small, branching tree to 20 ft. l. lanceolate or oval, 2 to 4 in. long, acute. ft. greenish, staminate in umbellate clusters, pistillate axillary. June. fr. 1 in. across, pale purple, edible. India, Ceylon. Syn. Doryalis hebecarpa.

A'BIES (abeo, to rise; alluding to the great height of some of the species). Silver Firs. FAM. Pinaceae. Nearly 40 species are distinguished but between some of them the differences are slight. They are widely distributed in mountainous regions in Cent. and S. Europe, Asia from the Himalaya northwards, Japan, and N. America. Confusion exists between the species of this and several other genera, particularly with Picea and Tsuga. Names under Abies not found here should be sought under these genera. Conspicuous differences are: Abies, leaves swollen at the base, leaving, when they fall, a disk-like scar; cones erect, the scales falling as soon as the seeds are ripe, and leaving an upright stick-like core on the branch. Picea, leaving when leaves fall a peg-like base on the branch which gives the bark a roughened surface; cones pendulous, not breaking up when the seeds are ripe, remaining on the tree for several months. Tsuga, leaf arrangement as in Abies but cones small, pendent and not breaking up when the seeds are ripe. The species of Abies are pyramidal or cylindrical evergreen trees with branches usually whorled, bark of young trees usually bearing resin blisters, leaves usually arranged on the sides or sides and surface of the branch, but sometimes all round the branch, cones solitary, erect, attractively coloured during growth, seeds ripening in the autumn after the new flowers appear. The winter buds of main shoots offer a definite character in the identification of species, as do the colour and surface of young shoots. Propagation is by seeds sown in spring, the commoner kinds in nursery beds, the rarer ones in light soil in a propagating house or cold frame. Increase of hybrids and varieties is by grafting. They need good, moist, but not waterlogged soil, and pure air. It is useless to plant them in or about industrial towns. They withstand moderate shade. The Chinese and Himalayan species are very susceptible to injury from late spring frosts. Possibly the worst enemies are aphides, species of Adelges. In the early stages of an attack, successive sprayings on several occasions, at intervals of a week, with either a paraffin or nicotine wash will check the pest, but there is no known cure for badly infested trees which may be diagnosed by the gouty, swollen appearance of the branches, or by trunks and branches being infested with insects which exude a white protective covering. (See also Aphis, Pineapple Galls.) The Silver Fir (Abies alba) may produce dense growths of small branches called Witches' Brooms, which are the result of attack by the rust fungus Melampsorella caryophyllacearum. This is the aecidial stage of the rust and the other stages are found on Stellaria media and Cerastium arvense. The witches' brooms arise from knot-like swellings and infected branches should be removed. There are, however, witches' brooms on Silver Firs which are not caused by this fungus but which may be hereditary in the tree. The timber of several species is of commercial importance, and Canada Balsam is an oleo-resin obtained from the bark-blisters of certain N. American species. heights given refer to well-developed trees in their natural habitat; in cultivation in this country such stature

is rarely attained. There are nevertheless many Silver Firs over 100 ft. high recorded in the Report of the R.H.S. Conifer Conference (Conifers in Cultivation), 1931, including many of A. alba (one 168 ft. h.), A. amabilis, A. cephalonica, A. concolor, A. concolor Lowiana, A. magnifica (nearly), many A. grandis and A. nobilis, several A. Nordmanniana and A. venusta, with A. numidica, A. Pinsapo, A. spectabilis, and A. Veitchii

### KI

<i>numiaica, A. Pinsapo, A. spectaoius,</i> an nearly as tall.	a A. Veitchii <b>A</b>
KEY	
<ol> <li>Lvs. regularly arranged round the shoots</li> <li>Lvs. not regularly arranged round the shoots</li> </ol>	2
2. Lus. shining green above, spine-pointed; line. below only	
2. Lvs. grey-green, blunt; lines of stomata on bo surfaces	
3. Lvs. not reflexed at maturity 3. Lvs. strongly reflexed at maturity	A. cephalonica
4. Shoots strongly grooved	A. recurvata
4. Shoots not or only slightly grooved 5. Shoots glabrous	A. homolepis
5. Shoots brown-hairy 6. Shoots slightly grooved	A. spectabilis
<ol> <li>Shoots not grooved</li> <li>Lvs. with 2 dull grey lines of stomata beneath,</li> </ol>	9
usually with 2 sharp points 7. Lvs. with white lines of stomata beneath	A. firma 8
8. Shoots yellowish; lvs. \(\frac{1}{4}\) to \(\frac{1}{4}\) in. long, silvery beneath	A. koreana
<ol> <li>Shoots greyish; lvs. up to 1½ in. long, grey- white beneath</li> </ol>	A. sachalinensis
<ol> <li>Shoots glabrous (sometimes hairy in A. cilici A. Delavayi, A. Fabri, A. Forrestii, A. Ge</li> </ol>	ca,
A. squamata) 9. Shoots hairy	10 23
10. Winter buds not resinous 10. Winter buds resinous	11
11. Lus. sharply pointed	A. venusta
11. Lus. notched or rounded 12. Lus. \( \frac{1}{2} \) in long, densely arranged 12. Lus. \( \frac{1}{2} \) in long	A. numidica
13. Lvs. notched \( \frac{1}{2} \) to $1 \\ \frac{1}{2} \) in. long$	13 A. Fargesii
13. Lvs. rounded or short-pointed, 1 to 1½ in. long 14. Lvs. not conspicuously white beneath	A. cilicica 15
14. Lvs. with white or glaucous bands 15. Buds slightly resinous; lvs. more or less pecti-	16
nate; cones green 15. Buds resinous; lvs. directed forward; cones	A. chensiensis
purple	A. Pindrow A. concolor
<ul> <li>16. Lvs. grey-green or glaucous on both sides</li> <li>16. Lvs. with 2 white or glaucous bands beneath</li> <li>17. Bark of older shoots peeling in thin flakes,</li> </ul>	17
purplish red 17. Bark not flaking	A. squamata
18. Lmargin revolute	18 19
18. Lmargin not revolute 19. Lvs. up to 1 in. long, stiff	20 A. Delavayi
19. Lvs. longer, less rigid 20. Lvs. pectinate, 1 to 2 in. long	A. Fabri A. grandis
20. Lvs. not markedly pectinate, \(\frac{1}{2}\) to 1\(\frac{1}{2}\) in. long 21. Lvs. \(\frac{1}{2}\) to 1\(\frac{1}{2}\) in. long A	21 22
22. Bracts of cone exserted to a variable extent	sutchuenensis A. Forrestii
22. Bracts of cone longer, glaucous, margins brown toothed	A. Georgei
23. Winter buds not resinous 23. Winter buds resinous	24 26
24. Stomatic bands not conspicuous 24. Stomatic bands conspicuous	A. nephrolepis
25. Lus. pectinate	A. alba Nordmanniana
26. Lvs. without conspicuous white or grey bands 26. Lvs. with white or glaucous bands	A. holophylla 27
27. Lvs. greyish green or glaucous with stomata on 27. Lvs. with 2 white or glaucous bands beneath	both sides 28
28. Buds very resinous; lvs. flat 28. Buds slightly resinous with free scales at base	A. lasiocarpa 29
29. Lvs. grooved above, concealing shoot	A. nobilis
29. Lvs. not grooved above, not concealing shoot 30. Lvs. not notched at top	A. magnifica A. religiosa
30. Lvs. more or less notched at tip 31. Lvs. with a few stomata above near tip	31 32
32. Upper lvs, directed forward, 11 to 11 in, long	33   A. sibirica
32. Lvs. spreading upwards and outwards, \(\frac{1}{2}\) to 1 in.	A. balsamea
33. Down on shoots grey-brown 33. Down on shoots reddish	A. amabilis
34. Lvs. yellow-green above 34. Lvs. grooved above	35 36
35. Cone ovoid	A. Mariesii

 Cone cylindrical 36. Lvs. bright green 36. Lvs. dark glossy green A. Kawakamii A. Faxoniana A. Veitchii

A. ajanen'sis. A synonym of Picea jezoensis.

A. ajanen'sis. A synonym of Picea jezoensis.

A. al'ba. European Silver Fir. Tree of 150 ft. Shoots slightly hairy. Winter buds not resinous. l. in 2 comb-like ranks, linear, to 1 in. long, dark glossy green and grooved above, 2 silvery bands of stomata beneath, apex blunt and slightly notched, or, on old trees and coning branches, often stiff, erect and entire. Cones short-stalked, cylindrical, 6 to 8 in. long, 1 to 2 in. wide, green when young, brown later; scales fan-shaped, bracts narrowly spoon-shaped, ending in a reflexed point. Cent. and S. Europe. 1603. (D.J.C. as A. pectinata.) A. alba of Link is Picea glauca to which belong vars. aurea and coerulea. var. acutifo'lia, l. sharppointed. Syn. A. Borisii-regis; compac'ta, dwarf roundish bush, broader than h., compact, branches crowded, l. very shiny green. Rock-garden; fastigia'ta, is of stiff erect habit; pyramida'lis, has a pyramidal head. a pyramidal head.

A. Albertia'na. A synonym of Tsuga heterophylla.

A. albertia'na con'ica. A variety of Picea albertiana.

A. Alcocquia'na. A synonym of Picea bicolor and P. jezoensis.

A. ama'bilis.\* Red Silver Fir. Tree in wild of 250 ft. Shoots greyish-brown, clothed with dense, short greyish-brown hairs, giving like l., when bruised, a tangerine orange-like odour. Winter buds very small, resinous. l. densely arranged on sides and upper buds very small, resinous. I. densely arranged on sides and upper part of shoot, lower at right angles to the stem, upper curved, pointing forwards and hiding the bark, 1 to 1½ in. long, dark shining green above, 2 broad silvery bands of stomata beneath, apex blunt, slightly notched. Cones 3½ to 6 in. long, 2 to 2½ in. wide, purple when growing, brown later, scales about 1 in. long and wide, hiding the bracts. Mts. of British Columbia to Oregon and Washington. 1830. (D.J.C. 85; E.H. 220; J.R.H.S. 41, 24.) Syn. Picea amabilis. Forms a small, handsome, pyramidal tree in the British Isles but is subject to injury by aphis. var. glau'ca, a very attractive form with rich. blue-green l. attractive form with rich, blue-green l.

A. Apol'linis. A variety of A. cephalonica.

A. arizon'ica. A variety of A. lasiocarpa.

A. atlan'tica. See Cedrus atlantica.

A. balsa'mea. Balsam Fir. Balm of Gilead. Tree of 25 to 60 ft. A. balsa'mea. Balsam Fir. Balm of Gilead. Tree of 25 to 60 ft. Shoots smooth, downy, bark of young trees beset with resin blisters. Winter buds small, rounded, resinous. 1. variable in size on different parts of the same tree, \( \frac{1}{2} \) to 1 in. long, in 2 horizontal sets separated by a V-shaped division, dark green above with scattered greyish stomata near tips, and 2 silvery bands of stomata beneath. Cones ovoid or cylindrical, 2 to 4 in. long, 1 to 1\( \frac{1}{2} \) in. wide, purple when young, brown later, some bracts protrude beyond the scales. One of the commonest trees of N. America extending to Arctic regions, 1697, but rarely successful here. (C.B. 2, 6; G.C. 17 (1895), 423.) Canada Balsam is the oleo-resin obtained from the bark blisters. var. hudso'nia, a bush of spreading habit with dense branches, rarelys. hudso'nia, a bush of spreading habit with dense branches, rarely more than a few feet high; rare. Syn. A. hudsonia; macrocar'pa, has larger cones and l. than type; na'na, habit of var. hudsonia but l. not straight, smaller, edges yellowish, not deep green beneath. Syn. var. globosa. Often confused with the rare var. hudsonia. Rockgarden.

A. barboren'sis. A synonym of A. numidica.

A. Beissneria'na of Mottet. A synonym of A. x insignis Beis-

A. bi'color. A synonym of Picea bicolor.

A. bi'fida. A synonym of A. firma.

A. Bori'sii-regis. A synonym of A. alba acutifolia.

A. brachyphyl'la. A synonym of A. homolepis.

A. brachyty'la. A synonym of Picea brachytyla.

A. bractea'ta. A synonym of A. venusta.

A. Breweria'na. A synonym of Picea Breweriana.

A. Brunonia'na. A synonym of Tsuga dumosa.

A. campylocar'pa. A synonym of A. magnifica.

A. canaden'sis. A synonym of Tsuga canadensis.

A. cephalon'ica. Tree up to 100 ft. Shoots smooth, light brown, glabrous. Winter buds conical or ovoid, resinous, scales free at tips. *l*. spreading round shoot but densest on upper side, \(\frac{1}{2}\) to 1 in. long, \(\frac{1}{2}\) to \(\frac{1}{2}\) in. wide, upper ones shorter than lower, dark glossy green above, 2 silvery stomatic bands beneath, apex a stiff, sharp point. Conex cylindrical, 6 in. long, 1\(\frac{1}{2}\) in. wide, light brown with golden-brown reflexed bracts protruding well beyond scales. Mts. of Greece. 1824. (D.J.C. 133; E.H. 214; B.M. 8691; C.B. 2, 9.) SYNS. A. reginae-Amaliae, Picea cephalonica. The sharp-pointed l. separate it from A. Pinsapo which has a similar leaf arrangement var. Apol'linis, has thicker, broader, shorter-pointed l., less regularly arranged on the shoot. (C.B. 3, 69.) Both are liable to injury by spring frosts. glabrous. Winter buds conical or ovoid, resinous, scales free at by spring frosts.

A. chensien'sis. Shoots yellowish-grey, glabrous. Winter buds resinous. *l.* dark glossy green above with 2 silvery stomatic bands beneath, 1 to 2½ in. long, apex with 2 short points. *Cones* broadly