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The Hunt Institute for Botanical Documentation, a research division of Carnegie Mellon University, specializes in the history of botany and all aspects of plant science and serves the international scientific community through research and documentation. To this end, the Institute acquires and maintains authoritative collections of books, plant images, manuscripts, portraits and data files, and provides publications and other modes of information service. The Institute meets the reference needs of botanists, biologists, historians, conservationists, librarians, bibliographers and the public at large, especially those concerned with any aspect of the North American flora.

Hunt Institute was dedicated in 1961 as the Rachel McMasters Miller Hunt Botanical Library, an international center for bibliographical research and service in the interests of botany and horticulture, as well as a center for the study of all aspects of the history of the plant sciences. By 1971 the Library's activities had so diversified that the name was changed to Hunt Institute for Botanical Documentation. Growth in collections and research projects led to the establishment of four programmatic departments: Archives, Art, Bibliography and the Library.

Compliments of the author.

CONTRIBUTIONS FROM THE DEPARTMENT OF BOTANY OF
COLUMBIA UNIVERSITY, NO. 338.

**A STUDY OF PROGRESSIVE CELL PLATE
FORMATION**

BESSIE GOLDSTEIN

NEW YORK

1925

Reprinted, without change of paging, from BULLETIN OF THE TORREY BOTANICAL
CLUB 52: 197-220, pl. 6. 9 Je 1925

Library of the National Archives for Research and Documentation

On pages 9 & 15, what embold conclusions, must be wrong
see note at beginning of previous volume.

A. Arber
52 Huntingdon Rd
Cambridge.

See end of last paper (unpublished), 1901-1902

Agnes Arber. 1917-1922

1. (1917) On the Occurrence of Intrafascicular Cambium in Monocotyledons. Ann. Bot. Vol 31, pp 1-45, 5 text-figs.
2. (1918¹) Further Notes on Intrafascicular Cambium in Monocotyledons. Ann. Bot. Vol 32 pp 87-89, 4 text-figs.
3. (1918²) The Phyllode Theory of the Monocotyledonous Leaf, with special Reference to Anatomical Evidence. Ann. Bot. Vol 32, pp 465-501, 32 text-figs.
4. E. A. Newell Arber (Obituary Notice) Gard. Mag. Dec. VI Vol 2 pp 20-31, Sept. 1918
5. E. A. Newell Arber Journ. Bot. Nov 1918.
6. (1919¹) The Vegetative Morphology of Pistia & the Lemnaceae. Proc. Roy. Soc. B Vol 91, pp 96-103, 8 text-figs.
7. (1919²) On Atavism & The Law of Irreversibility. Amer. Journ. Sci. Vol 48 pp 27-32.
8. (1919³) The Law of Loss in Evolution. Proc. Linn. Soc. Seriem 131, 1918-19, pp 70-78
9. (Jointly with Rudolf Beer) On the Occurrence of Multinucleate Cells in Vegetative Tissues. Proc. Roy. Soc. B. Vol 91. 1919, pp 15-17, 1 pl, 2 text-figs.
10. Ethel Sargant (Obituary) New Phyt. Vol 18, pp 120-123, 1 text-fig, 1919
11. Agnes Arber & Rudolf Beer. The Significance of their Systematic Distribution. Journ. Bot. Vol 57, pp 83-86, 1919
12. On the Law of Age-Ataxia, in relation to the extinction of species. Ann. Bot. Vol 33 pp 211-213
13. On Helicophyly in Water Plants. The Amer. Naturalist. Vol 53, 1919, pp 272-278
14. (Prior) Garcia de Ota "Colloques on the Simples & Drugs of India," transl. by Sir Clements Markham. Jour. Vol II 1919, pp 415-418
15. (1919⁵) Studies on Intrafascicular Cambium in Monocotyledons (III & IV). Ann. Bot. Vol 33, pp 454-465, 7 text-figs
16. Studies on the Binucleate Phase in the Plant Cell. Journ. Roy. Micro. Soc. 1920, pp 1-21, 1 pl, 2 text-figs
17. (Jointly with Rudolf Beer) On Multinucleate Cells: An Historical Study (1879-1919). Journ. Roy. Micro. Soc. 1920, pp 22-31
18. (1920¹) Leaf-base Phyllodes among the Liliaceae. Bot. Gaz. Vol 69, pp 337-340, 4 text-figs.
19. (1920²) Tendrils of Smilax. Bot. Gaz. Vol 69. pp 438-442, 1 pl.
20. (1920³) On the Leaf Structure of certain Liliaceae, considered in Relation to the Phyllode Theory. Ann. Bot. Vol 34, pp 447-465, 38 text-figs.
21. Plants & Flowers in Chinese Poetry. Gard. Chron. Apr. 2, 1921
22. The Draughtsman of the 'Herbarium Viride Elicoris'. Journ. Bot. Vol 54, 1921, pp 136-2.

11A. Arber, A (1919) C.

- 22 (1921¹) The Leaf Structure of the Iridaceae, considered in Relation to the Phyllode theory. Ann. Bot. Vd 35 pp 301-326, 66 text figs.
- 23 (1921²) Leaves of the Heliconiaceae. Bot. Gaz. Vd 72, pp 31-38, 1 pl.
- 24 (1921³) Leaves of certain Amaryllido. Bot. Gaz. Vd 72, pp 102-105, 8 text figs.
- 25 (1922¹) On the Leaf-tips of certain Monocotyledons. Ann. Soc. Journ. Bot. Vd 45 pp 467-476, 14 text figs.
- 26 (1922²) On the Development & Morphology of the Leaves of Palms. Proc. Roy. Soc. B. Vd 93, pp 249-261, 7 text figs.
- 27 (1922³) Studies on Intravascular Cambium in Monocotyledons. I. Ann. Bot. Vd 36, pp 251-256, 8 text figs.
- 28 (1922⁴) On the Nature of the 'Blade' in certain Monocotyledonous Leaves. Ann. Bot. Vd 36, pp 324-351, 29 text figs.
- 29 (1922⁵) Leaves of the Farnoseae. Bot. Gaz. Vd 74, pp 80-94, 3 pls.
30. (Review) The Old English Herbaria. E. S. Rhode. Times Literary Supplement. Nov 23. 1922.

Arber A., 1920⁴.
 (Water Plants: a Study of Aquatic Angiosperms.
 xvi + 236 pp, figures & 17 text figs. Camb. Univ.
 Press 1920)
 belongs also this 6 years.

1917 1.

ARBER, AGNES
ON THE OCCURRENCE OF INTRAFASCI-
CULAR CAMBIUM IN MONOCOTYLEDONS

Digitized by Hunt Institute for Botanical Documentation

(1918')

ARBER, AGNES
FURTHER NOTES ON INTRAFASCICULAR
CAMBIUM IN MONOCOTYLEDONS

Digitized by Hunt Institute for Botanical Documentation

ARBER, AGNES
THE PHYLLODE THEORY OF THE MONO-
COTYLEDONOUS LEAF, WITH SPECIAL
REFERENCE TO ANATOMICAL
EVIDENCE

Digitized by Hunt Institute for Botanical Documentation

4.
1919') 6.
E. A. NEWELL ARBER.

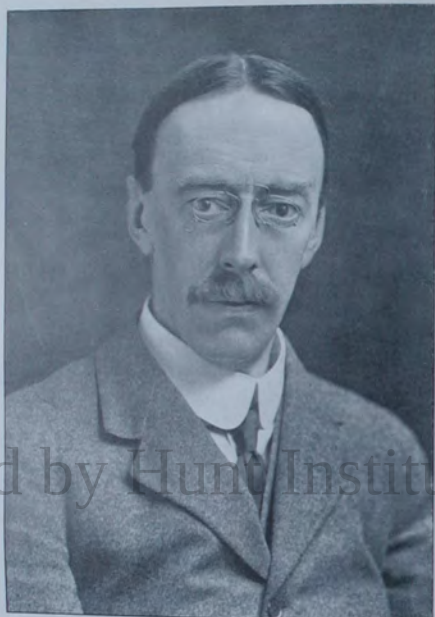
M.A., Sc.D., F.G.S., F.L.S.

(OBITUARY NOTICE.)

Digitized by Hunt Institute for Botanical Documentation

Reprinted from the Botanical Magazine, n.s., Decade VI, Vol. V,
pp. 326-31, September, 1918.

LONDON: DULAU & CO., LTD., 37 SOHO SQUARE, W.



Elliot & Fry, Photo.

Ride, Sims and Davidson, Ltd.

Yours sincerely
E. A. Newell Arber

[Extracted from the GEOLOGICAL MAGAZINE, Decade VI, Vol. V,
 No. 651, pp. 426-31, September, 1918.]

E. A. NEWELL ARBER,
 M.A., Sc.D., F.G.S., F.L.S.

BORN AUGUST 5, 1870.

DIED JUNE 14, 1918.

(WITH A PORTRAIT, PLATE XV.)

EDWARD ALEXANDER NEWELL ARBER was born at No. 5 Queen Square, Bloomsbury, in 1870. His father was Edward Arber, afterwards Professor of English at Mason's College, Birmingham, and known as the editor of many English classics. His mother (*née* Marion Murray), the daughter of a Glasgow publisher, was the niece of Dr. John Sutherland, an early authority on army sanitation, who was closely associated with Florence Nightingale's work in the Crimea.

Newell Arber had much illness in early boyhood, and at the age of fifteen he was sent, for the sake of his health, to Davos, where he spent more than a year. It was during his first Swiss summer that he awoke to the fascination of botany; his interest in geology was aroused later, apparently at the beginning of his Cambridge career. In 1895 he came up to Trinity College, and after an undergraduate period broken by ill-health, he took the two parts of the Natural Sciences Tripos in 1898 and 1899, specializing in Botany and Geology.

In 1899 Professor T. McKenny Hughes nominated Newell Arber to a Demonstratorship in Palaeobotany in the Woodwardian (afterwards Sedgwick) Museum. This post, which he held for the rest of his life, involved the curating of the palaeobotanical collections, as well as elementary and advanced lectures and demonstrations in fossil botany. Newell Arber threw himself enthusiastically into museum work, and during his tenure of the Demonstratorship about 5,000 plant fossils were added to the collections, almost entirely through his instrumentality. Between 1901 and 1906 he was also responsible—in the first year, under Dr. Henry Woodward, and after that, under his successor, Dr. Arthur Smith Woodward—for the naming and arrangement of the palaeobotanical specimens in the Geological Department of the British Museum (Nat. Hist.). He consolidated his knowledge of fossil plants by repeated visits to most of the principal museums in Europe in which important collections are to be found.

Research flourished in Newell Arber's laboratory, where, in

** He had been formally invited with sanction of the
 Trust etc. in 1901 & wrote such time as he could spare
 to the reorganisation of the vast collection of fossil plants belonging to that
 institution which for many years past had been entirely neglected.
 (It was not seen of the same for which I took this note)*

1919' 6

5 1919' 6

FROM THE
JOURNAL OF BOTANY

November, 1918

EDWARD ALEXANDER NEWELL ARBER
(1870-1918)

BY
AGNES ARBER

LONDON
TAYLOR AND FRANCIS
RED LION COURT, FLEET STREET.

Digitized by Hunt Institute for Botanical Documentation

(1919')

6.

[From the PROCEEDINGS OF THE ROYAL SOCIETY, B, VOL. 91, 1919.]

The Vegetative Morphology of Pistia and the Lemnaceae.

By AGNES ARBER, D.Sc., F.L.S.

Digitized by Hunt Institute for Botanical Documentation

(1919²) 7

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[FROM THE AMERICAN JOURNAL OF SCIENCE, VOL. XLVIII, July, 1919]

ON ATAVISM AND THE LAW OF
IRREVERSIBILITY.

By AGNES ARBER, D.Sc.

Digitized by Hunt Institute for Botanical Documentation

LINNEAN SOCIETY OF LONDON.

GENERAL MEETING.

7TH NOVEMBER, 1918.

The 'Law of Loss' in Evolution.
By AGNES ARBER, D.Sc., F.L.S.

[Abstract.]

In the course of a comparative study of aquatic Angiosperms, extending over a number of years, the author has been led to recognize a certain minor principle which seems operative in some phases of evolution. It appears to be a general rule that a structure or organ once lost in the course of phylogeny can never be regained; if the organism subsequently has occasion to replace it, it cannot be re-produced, but must be constructed afresh in some different mode. The author proposes to term this principle the 'Law of Loss.' This law is obviously not susceptible of direct proof, but an attempt is made to show that, if used as a working hypothesis, it throws light on a number of structural features whose interpretation presents difficulties on other theories. Some time after the author had deduced the 'Law of Loss' from a comparative study of living plants, she learned that zoologists had already arrived at very similar conclusions regarding Vertebrates from a study of their paleontological history. Dollo's 'Law of Irreversibility' covers much the same ground as the 'Law of Loss.' The fact that the same principle has been recognized independently for plants and for animals—in the one case through a study of comparative morphology and in the other through a consideration of actual historical evidence derived from fossil records—seems to be an indication of the validity of the law.

The 'Law of Loss' in Evolution. By AGNES ARBER, D.Sc.,
F.L.S., Fellow of Newnham College, Cambridge.
[Read 7th November, 1918.]

DURING the last eight years I have been making a special study of aquatic Angiosperms. These plants are of particular interest from the evolutionary standpoint, since there is a firmer basis for speculations as to their ancestry than is generally available in the case of groups concerning whose history we have no fossil evidence. There is good reason to believe that the Flowering Plants were originally a terrestrial stock, and we are thus justified in concluding that the aquatic Angiosperms of the present day are ultimately derivable from ancestors which were land plants. As compared with their terrestrial relatives, the most obvious changes which aquatics have suffered lie in the direction of structural reduction. This is fully recognized, and has indeed become a text-book platitude. The consideration of this reduction, and of some phenomena which seem to be its sequels, has led me to formulate, under the name of the 'Law of Loss,' a certain minor principle which appears to be operative in various phases of plant evolution. The expression 'Law of Loss' is meant

[From the PROCEEDINGS OF THE ROYAL SOCIETY, B, VOL. 91, 1919.]

On the Occurrence of Multinucleate Cells in Vegetative Tissues.

BY RUDOLF BEER, B.Sc. F.L.S., AND AGNES ARBER,
D.Sc., F.L.S.

ETHEL SARGANT.¹

October 28, 1863—January 16, 1918.

[WITH TWO FIGURES IN THE TEXT.]

[Reprinted from THE NEW PHYTOLOGIST, Vol. XVIII, Nos. 3 & 4, March & April, 1919.]

ETHEL Sargent was the daughter of Henry Sargent, barrister-at-law, and his wife, Catherine Emma Beale. She was educated at the North London Collegiate School under Frances Mary Buss, at a time when schools of this type represented an adventurous experiment. From 1881 to 1885 she studied natural science at Girton College, Cambridge, but nearly all her subsequent work was carried out at home, where domestic ties involved continuous demands upon her time and vitality, and often interrupted her own private pursuits for long periods together. The conditions of her life made any professional undertaking—in the sense of a teaching post—impossible for her, but she was far from regretting this disability, since she was convinced that lecturing and demonstrating would, in her case, have paralysed the faculty for original work. She was in her element, however, in initiating research students into the methods of discovery, and to those who from time to time worked under her direction in her little laboratory, she gave a unique training. We are here concerned with her rather as a botanist than in her human relations, so we must be content with a bare allusion to a single aspect of her wise and helpful attitude towards younger workers—an aspect which found expression in her advice to a student who was hesitating on the threshold of research, discouraged by the renunciations to which those who embrace that life must be prepared to commit themselves. If after a year of tackling some biological problem "you find yourself," she wrote. "restless, dissatisfied, half-starved, don't attempt to follow up that line—'Look in your heart and write' as Sidney said 300 years ago The question is not whether any work you may take up will not atrophy some faculties to some degree. It is almost bound to do so. But if you have sufficient taste for the work to delight in it, appetite will come as you eat, and you will develop not only the faculties you use but your whole being through their exercise.

¹ Since Ethel Sargent's death, the following notices of her life and work have appeared:—by Dr. D. H. Scott, *Annals of Botany*, Vol. 32, 1918, pp. i-v; see also letter by Dr. Scott in *Times Literary Supplement*, Thursday, Jan. 31, 1918, reprinted in *Journal of Bot.* Vol. 56, 1918, pp. 115-6; by Dr. E. N. Thomas, *Proc. Linn. Soc.*, 130th Session, Oct. 1918, pp. 41-42; by the present writer in *The Cambridge Magazine*, Vol. 7, Jan. 26, 1918 p. 361, reprinted in *The Common Cause*, Vol. 9, 1918, p. 567; see also *Nature*, Vol. 101, 1918, pp. 428-9. *References may also be made to forthcoming articles by the present writer.*

² *Ethel Sargent, 1863-1918. A study of the mind of a morphologist*, in *Studies in the History of Science*, edited by Dr. C. Singer, Vol. 14.

FROM THE
JOURNAL OF BOTANY

April 1919

Price 1s. 8d.; Annual Subscription Sixteen Shillings
post free

LONDON
TAYLOR AND FRANCIS
RED LION COURT, FLEET STREET.

[Annals of Botany, Vol. XXXIII, No. CXXX, April, 1919.]

degree of specialization. It must also be remembered that the more primitive Angiosperms, which entered the water at an early period, had merely to take possession of an undisputed field, whereas plants embarking on an aquatic life at the present day are exposed to acute competition from the numerous well-established hydrophytes with which the fresh waters of the world are already so fully stocked.

Balfour Laboratory, Cambridge.

(1919⁴)

ARBER, AGNES

ON THE LAW OF AGE AND AREA, IN RELATION TO THE EXTINCTION OF SPECIES

Digitized by Hunt Institute for Botanical Documentation

[Reprinted from THE AMERICAN NATURALIST, Vol. LIII., May-June, 1910.]

Digitized by Hunt Institute for Botanical Documentation

ON HETEROPHYLLY IN WATER PLANTS

THE occurrence of two or more different types of leaf upon one individual, which is so frequently characteristic of water plants, has long attracted the interest of botanists. The most usual case is that in which the submerged leaves are finely divided while the floating or aerial leaves are relatively simple. Lyte's Herbal (1578) contains a vivid description of this type of heterophylly in the water buttercup. Since this description is also noteworthy for its insistence on the influence of external conditions, it may be cited here.

Amongst the fleeting [floating] herbes, there is also a certayne herbe whiche some call water Lyverworthe, at the rootes whereof hang very many hearie strings like rootes, the which doth oftentimes change his uppermost leaves according to the places where as it groweth. That whiche groweth within the water, carrieth, upon slender stalkes, his leaves very small cut, much like the leaves of the common Cammomill,

apologize. « You must », he says « pardon my prolixity, for when once a man begins to chatter, he is apt to do so a good deal ».

Sir CLEMENTS MARKHAM has translated GARCIA's work in an easy, colloquial style which is well suited to the purpose. The book includes an explanation of the value of the coins and weights and measures of the period, and a useful index of drugs and place-names, and of persons mentioned, with biographical notes. The list of the plant-names, with their modern scientific equivalents, would have been more satisfactory if the authority had always been given in the case of the modern name.

The reproductions of wood-cuts which illustrate the book are not taken from ORTA's original work, which was unillustrated, but from a volume published at Burgos by CHRISTOVAL ACOSTA in 1578, under the title of « Trata de las drogas y medicinas de las Indias Orientales con sus plantas », which was practically a Spanish translation of ORTA's work, somewhat altered and including a few additional plants. The wood-cuts in question are quaint and decorative, but in most cases they are inferior botanically to the best herbal illustrations of the period. It is rather curious that they should have been resuscitated to illustrate a twentieth-century edition of ORTA's book, for CHARLES DE L'ECLUSE, who published a Latin translation from ACOSTA in the sixteenth century, discarded them as quite unworthy! In the dedication of his translation he writes, « As for the figures which he [ACOSTA] repeatedly boasts to have drawn from the life... I have rejected them, since they were obviously ridiculous (*plane ineptae*), and were anything rather than representations of the actual plants ». He reproduces one of them, however, — the picture of a tree bearing cloves, — in order that the reader may judge for himself of their inaccuracy. ACOSTA's despised pictures have, nevertheless, considerable charm, which, unfortunately, they lose to some degree when reproduced on the very smooth-faced paper employed in the present edition. The artistic unity of the book would also have been enhanced if the ornamental initial letters had been chosen with more regard for their harmony with the old wood-cuts. But these are perhaps hypercriticisms and do not detract from our admiration of the work which Sir CLEMENTS MARKHAM has done in rendering accessible to English readers a document of permanent historic value. AGNES ARBER. (Cambridge)

Crucé, Émeric [Paris, v. 1590-1648]. — *Le nouveau Cynée*, réimpression du texte original de 1623, avec introduction et traduction anglaise par THOMAS WILLING BALCH, xxxi + 363 p. (28 × 18). Philadelphie, ALLEN, LANE and SCOTT, 1909.

Cette publication date déjà de cinq ans, mais par exception, j'en veux parler longuement dans *Isis*, car elle mérite — en ce moment plus

(1919) 5/4

ARBER, AGNES
STUDIES ON INTRAFASCICULAR CAMBIUM
IN MONOCOTYLEDONS (III AND IV)

Studies on the Binucleate Phase in the Plant-cell.

By AGNES ARBER, D.Sc., F.L.S., Kedley Fletcher-Warr Student
of the University of London.

(Read February 18, 1920.)

ONE PLATE AND TWO TEXT-FIGS.

REPRINTED FROM THE

Journal of the Royal Microscopical Society

CONTAINING ITS

TRANSACTIONS AND PROCEEDINGS

AND A RECORD OF CURRENT RESEARCHES RELATING TO

INVERTEBRATA, CRYPTOGAMIA, MICROSCOPY, &c.

INCLUDING

EMBRYOLOGY AND HISTOLOGY GENERALLY

16 920')

On Multinucleate Cells: An Historical Study (1879-1919).

By RUDOLF BEER and AGNES ARBER.

(Read February 18, 1920.)

REPRINTED FROM THE

Journal of the Royal Microscopical Society

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INCLUDING
EMBRYOLOGY AND HISTOLOGY GENERALLY

Digitized by Hunt Institute for Botanical Documentation

(1920')

LEAF-BASE PHYLLODES AMONG THE LILIACEAE

(WITH FOUR FIGURES)

AGNES ARBER

Digitized by Hunt Institute for Botanical Documentation

Reprinted for private circulation from
THE BOTANICAL GAZETTE, Vol. LXIX, No. 4, April 1920

(1920²) 18

TENDRILS OF SMILAX

(WITH PLATE XXII)

AGNES ARBER

Digitized by Hunt Institute for Botanical Documentation

Reprinted for private circulation from
THE BOTANICAL GAZETTE, Vol. LXIX, No. 5, May 1920

(1920³) 19

ARBER, AGNES
ON THE LEAF STRUCTURE OF CERTAIN LILIACEAE,
CONSIDERED IN RELATION TO THE PHYLLODE
THEORY

Digitized by Hunt Institute for Botanical Documentation

APRIL 2, 1921.

PLANTS AND FLOWERS IN CHINESE POETRY.

In an article under this heading in the *Gardeners' Chronicle* for March 5, G. H. P. cites a number of references to plants in the Odes of Confucius, but tells us that he has failed to find any mention of the Chrysanthemum, although His Excellency the Japanese Ambassador, in a recent speech indicated that this flower played a part in Chinese poetry. Few of us can turn to the original sources, but, luckily for the unlearned, quite a large body of Chinese lyrical poetry has now been rendered into English, so that it is easy to carry the search for references to flowers a little further, and I give a few examples below.

In *Chinese Poetry in English Verse* (H. A. Giles, 1938) there are many incidental allusions to plants—Maple leaves, Peach blossoms, Lilies, Bamboos, Hibiscus, Pine cones, Willow catkins, and the "pink-flowered Almond spray." But two recent books by A. D. Waley (*A Hundred and Seventy Chinese Poems*, 1918, and *More Translations from the Chinese*, 1919) are richer from our present point of view. These versions are unrhymed and convey the impression of being more literal than those of Professor Giles; many of them have a peculiarly subtle charm.

Cypresses, White Aspens, Lotus flowers, Marsh Mallows, Wistaria, Paulownia, and numbers of other plants are mentioned. Some of the poems are very early, and in one which dates from the fourth century B.C., there is an allusion to "Orchids and Sandal trees." The Chrysanthemum does not seem to be often named, but in a poem by the Emperor Wu-ti (157-87 B.C.) the following line occurs:—
"Orchids all in bloom; Chrysanthemums smell Sweet."

There is also a reference in a ninth century poem to Chrysanthemums flowering in the late autumn.

Mr. Waley's anthologies give one the feeling that plants must always have filled a prominent place in Chinese thought. In some lines belonging to the first half of the ninth century, the writer even manages to invest with poetry the Bamboo shoots which he is in the act of cooking for his meal:—

For two farthings, I buy a whole bundle.
I put the shoots in a great earthen pot
And heat them up along with boiling rice.
The purple nodules broken—like an old brocade;
The white skin opened like new pearls.

20

THE GARDENERS' CHRONICLE.

Another poem by the same author—Po Chü-i, who lived from A.D. 772-846—is of special interest to gardeners. His lines, describing the flower market in the Paocny season, make one realise that a passionate enthusiasm for the growing of flowers is no new thing in the history of the world:—

The cost of the plant depends on the number of blossoms.

For the fine flower—a hundred pieces of damask;
For the cheap flower—five bits of silk.

Above is spread an awning to protect them;
Around is woven a wattle fence to screen them.

If you sprinkle water and cover the roots with mud,
When they are transplanted, they will not lose their beauty.

And the poet realises, too, the extravagant side of the Paocny cult, for he puts into the mouth of an old farm labourer the wistful murmur:—

A cluster of deep red flowers

Would pay the taxes of ten poor houses.

But perhaps the intense feeling of the Chinese for flowers is brought home to us most vividly in a short poem dating from about two hundred years before the birth of Christ and written on the morning of his departure to the battleground by a general who had just been summoned to the wars. It is addressed to his wife, and gives certain directions for her observance during his absence, the chief of which is:—

With all your might enjoy the spring flowers.
Agnes Arber.

[Extracted from THE JOURNAL OF BOTANY.—Vol. 59,
May, 1921.]

THE DRAUGHTSMAN OF THE 'HERBARUM
VIVÆ EICONES.'

By AGNES ARBER, D.Sc., F.L.S.

IN a paper on "Brunfels and Fuchs" in this Journal for 1919 (lvii, 236) Dr. A. H. Church discusses the identity of the draughtsman responsible for the illustrations in the famous *Herbarum vivæ eicones* of Otto Brunfels, published by Schott, of Strassburg, in 1530, and concludes that "from internal evidence it may be sufficiently assumed that Brunfels draw the figures himself." In 1912 I had written (*Herbals*, p. 171) that "the illustrations in Brunfels' herbal were engraved, and probably drawn also, by Hans Weiditz, or Guiditius, some of whose work has been ascribed to Albrecht Dürer." Dr. Church criticizes this passage in the following terms:—"Arber naively suggests that the engraver drew them—so used are we to the inferiority of the artistic profession; but there is no reason why they should have been so done, any more than modern work is left to the printer or process-engraver."

In the light of Dr. Church's criticism, I have reconsidered the question, but a further study of the subject leads me to reaffirm my former belief that Weiditz not only engraved but also drew the splendid series of illustrations which give the *Herbarum vivæ eicones* its epoch-making character. Since Dr. Church relies mainly on internal evidence, we may first look at the subject from this point of view. These woodcuts have a marvellous sureness and decision of line, and show a virility of handling, which to me suggest the work of a man who is engraving his own design, rather than interpreting someone else's drawing, and, further, these pictures have in every way the look of the finest type of professional work; whereas, if Brunfels, as Dr. Church suggests, did them himself, they must have been merely amateur efforts. Brunfels, who was for many years

headmaster of a grammar-school at Strasburg, eventually became town physician at Bern; he also produced copious theological writings, which must have consumed much time and energy. If these occupations left him the leisure to become an artist of the calibre of the draughtsman of the *Herbarum vivae eicones*, he must have been indeed an Admirable Crichton!

But in this problem we are fortunately not obliged to rely only on internal evidence. When Dr. Church suggests that to identify the wood-engraver of the *Herbarum vivae eicones* with the draughtsman is like confounding the process-engraver with the artist in the case of modern work, I think he is both forgetting the position which certain wood-engravers occupied in the sixteenth century, and ignoring what we know about Weiditz himself. Heinrich Röttinger's critical monograph—*Hans Weiditz der Petrarkemeister*, published in 1904—has put us into possession of a mass of detail about his work. He was by no means an obscure craftsman, but a wellknown illustrator who was responsible for the figures in a long series of books. After discussing the woodcuts in the *Herbarum vivae eicones*, Röttinger concludes that Weiditz must "be expressly honoured as the draughtsman of the plant-figures." He founds this opinion more particularly on a passage in the introduction to the German edition of Brunfels's herbal which was produced by Schott in 1532 under the title *Contrafayt Kreüterbuch*: in this passage the plants are described as "delineated and portrayed by the highly illustrious master Hans Weiditz of Strasburg." I think the verbs used—"gerissen, und contrafayt"—are open to no other interpretation than that Weiditz himself was the draughtsman as well as the engraver.

(1921') 22

ARBER, AGNES

THE LEAF STRUCTURE OF THE IRIDACEAE,
CONSIDERED IN RELATION TO THE
PHYLLODE THEORY

(1921²) 23

LEAVES OF THE HELOBIEAE

(WITH PLATE I)

AGNES ARBER

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LEAVES OF CERTAIN AMARYLLIDS

(WITH EIGHT FIGURES)

AGNES ARBER

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LINNEAN SOCIETY OF LONDON.

GENERAL MEETING.

3RD FEBRUARY, 1921.

On the Leaf-tips of certain Monocotyledons.

By AGNES ARBER, D.Sc., F.L.S.

Abstract.

In the present paper the leaves of Monocotyledons are studied from the standpoint of the Phyllode Theory—that is to say, it is assumed that these leaves include no region equivalent, morphologically, to the lamina of the Dicotyledon.

It is concluded, on the evidence of comparative morphology and anatomy, that, in the case of simple Monocotyledonous foliage leaves terminating in a solid apex, and also in the case of spathe leaves ending in a similar tip, the main part of the leaf is of leaf-sheath nature, while the apex represents a vestigial petiole.

In the case of those more complex Monocotyledonous leaves, which are differentiated into sheath, stalk, and "blade," certain cases are known in which the "blade" terminates in a solid apex. It is provisionally suggested that such apices represent the unexpanded tip of the petiole: in other words, the main part of the distal region of the leaf-stalk has developed into the "pseudo-lamina," while the extreme tip has remained relatively unmodified, retaining its solid petiolar character.

[Extracted from the LINNEAN SOCIETY'S JOURNAL—BOTANY,
vol. xlv., March 1922.]

On the Leaf-tips of certain Monocotyledons By AGNES ARBER, D.Sc.,
F.L.S., Kedley Fletcher-Warr Student of the University of London.

(With 14 Text-figures.)

[Read 3rd February, 1921.]

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INTRODUCTION.

It has long been known that a number of dorsiventral leaves among Monocotyledons are slightly hooded at the tip of the limb, and terminate in a solid cylindrical apex, sometimes of considerable length, but sometimes so short as to escape general attention. The question of the biological value of the leaf-apices of Monocotyledons has been considered by various authors in connection with "drip-tips" * and with the extrusion of water †, while Goebel ‡, who has made a special study of certain of those cylindrical apices with which we are here more particularly concerned, regards them as organs serving for bud-closure ("plug-tips") and also for respiration. But although in their teleological aspect these structures have received so much notice, their morphological interpretation seems never to have come under discussion. In a recent paper §, as a result of studying the leaves of certain Liliaceae from the standpoint of the Phyllode Theory, I have suggested that, in *Tulipa sylvestris* and one or two similar cases, the main part of the leaf is of leaf-sheath nature, while the solid apex is to be regarded as a vestigial petiole—the lamina being altogether unrepresented. The interpretation was based upon a comparison with the bud-scales of the Dicotyledon, *Fatsia japonica*, Decne. & Planch. In this plant, among the transitional leaf-forms between the bud-scales, which are of leaf-base nature, and the mature foliage-leaves, we find sheathing leaves terminating in a

* Jungner, J. R. (1891), Stahl, E. (1893).

† Volkens, G. (1883), Minden, M. von (1899), etc.

‡ Goebel, K. (1901) and (1905).

§ Arber, A. (1920).

(1922²) 26

[From the PROCEEDINGS OF THE ROYAL SOCIETY, B, VOL. 93, 1922.]

On the Development and Morphology of the Leaves of Palms.
By A. ARBER, D.Sc., F.L.S.

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(1922³ f)

ARBER, AGNES
STUDIES ON INTRAFASCICULAR CAMBIUM IN
MONOCOTYLEDONS. V

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(1922⁴) 28

ARBER, AGNES

ON THE NATURE OF THE 'BLADE' IN CERTAIN
MONOCOTYLEDONOUS LEAVES.

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(1922⁵)

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LEAVES OF THE FARINOSAE

(WITH PLATES I-III)

AGNES ARBER

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THURSDAY 1922

OLD ENGLISH HERBALS.

THE OLD ENGLISH HERBALS. By ELEANOR SINCLAIR ROHDE. (Longmans, 21s. net.)

The manuscript treatises dealing with herbs and their use in medicine, which have come down to us from mediæval and earlier times have an inexhaustible fascination for the student. The sources whence the herbal lore in these manuscripts was derived, the relation of different texts to one another, and the history of the curious and often beautiful illustrations which they sometimes contain offer a delightful field for research—a field which is at present imperfectly explored.

Our knowledge, indeed, is still so incomplete that it may be doubted whether the time is yet ripe for a popular presentation of the subject. One is thus inclined to regret that Miss Rohde, in her book, "The Old English Herbals," should have attempted to deal with the Anglo-Saxon manuscripts, instead of confining herself with the easier task of discussing the history of the herbal since the invention of printing. She tells us that to understand these old writers, "It is not 'much learning' that is required, but sympathy and imagination"; but, alas, sympathy and imagination, unless controlled by critical scholarship, are dangerous guides to the labyrinth of mediævalism. In reading Miss Rohde's account of the Anglo-Saxon herbals, a point which will probably strike those interested in the subject with some surprise is her assumption that these treatises are, at least to a large extent, a native product of the Anglo-Saxon mind, and that they throw direct light upon the life and mythology of our Saxon ancestors. One only wishes that this were so; for the herbals would then yield us invaluable help as documents bearing on the early history of the people of Britain. But the trend of recent work all goes, unfortunately, to support an entirely different view—namely, that the Anglo-Saxon herbals are derivative both as regards text and illustrations, and that it is in the literature of Greece and Italy that their sources can be traced. Another claim made by Miss Rohde, to which it is doubtful whether mediævalists would assent without qualification, is that "Bartholomew the Englishman ranked with thinkers such as Roger Bacon, Thomas Aquinas, and Albertus Magnus," and that he was "one of the greatest men of his century." He was certainly a remarkable figure in the history of his time, and his encyclopedia, "De Proprietatibus Rerum," had an immense and prolonged influence; but it was essentially a compilation based on the work of Dionysius the Areopagite, Aristotle, Pliny, Isidor of Seville, various Arab writers and others. Miss Rohde speaks of the section of his work dealing with plants as an "original treatise," but though no doubt it contains original elements, it was probably compiled in the same manner as the rest of the work.

And, even where Bartholomew's writings show some degree of originality, they cannot be said to furnish any evidence that he deserves to be coupled, as a thinker, with Roger Bacon. But whatever view be taken of Miss Rohde's general estimate of Bartholomæus Anglicus, the reader will find that what she quotes from his "De Herbis" is lively and pleasant. He gives all kinds of miscellaneous information, such as a reference to the custom of mixing cooked beans with flour "to make the brede the more hevy"—a phrase which recalls the experiences of our war years! Again, anyone who has watched the sap of a cut hirc trunk exuding in spring, and being eagerly tasted by a swarm of insects, will be interested to hear that in the Middle Ages "men useth . . . in sprayyngs tyne . . . to slay the ryndes and to gader ye humour that comyth oute therof and drynkyth in stede of wyn."

When Miss Rohde leaves the manuscripts and passes to the printed herbals, she enters on a well-beaten track where pitfalls are fewer. She seems, however, sometimes scarcely to grasp the relation between the incunabula and the mediæval manuscripts which preceded them. She points out that in two famous early herbals printed in Germany—"Herbarius Moguntinus" (1484) and "Herbarius zu Teutsch" (1485)—the number of plants recorded is small as compared with those named in Anglo-Saxon herbals of antiquity, and she regards this and other facts as pointing to the conclusion that the Continental writers were inferior to our English ancestors in their knowledge of plant lore. But the relatively restricted character of the earlier printed herbals is probably to be attributed to quite another cause. When printing was in its infancy, to set up a book in type and to print it off was so slow a process that there was a general tendency—at least as far as herbals were concerned—to reduce and simplify both text and illustrations in order to minimize labour and expense. We know, for instance, that the early printed French herbal, on which our English "Grete Herball" was founded, was itself a much abbreviated translation of a manuscript known as "Circa instans," of which numerous mediæval copies are extant, and which had a wide circulation in the Middle Ages.

In some ways the most interesting of the earlier English printed herbals is a little book, generally called "Banckes's Herball," which opens with the words "Here begynneth a newe mater." This book, which was first published in 1525, ran into numerous editions, the unravelling of which has formed a complicated chapter in bibliography. Miss Rohde quotes largely from Banckes's herbal, and also from another book printed by William Copland, who was perhaps responsible for one of the editions of Banckes's herbal—"The booke of secretes of Albartus Magnus." From this little work she culls some striking information about the magical

