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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.

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Après Arbo. 1929-1933 + 1934.

1. Studies on the Gramineae VI. 1. *Stipa torbata*. 2. *Thymochloa*.
Ann. Bot. vol. XLIII, 1929, pp. 55-53, 7 text figs.
3. *Ichneanthus*. On *Habenaria* + *Panicum*, with notes on
Nepetal Barley. Ann. Bot. vol. XLIII, 1929, pp. 527-533, 9 text figs.
4. Studies on the Gramineae VII. On the Organization of the Flower in
the Poaceae. Ann. Bot. vol. XLIII, 1929, pp. 705-722, 2 text figs.
5. Studies on the Gramineae VIII. 1. The Nodal Plicae. 2. Amphivasal
Bundles. Ann. Bot. vol. XLIV, 1930, pp. 593-620, 13 text figs.
6. Studies on the Gramineae IX. 1. Penninatum, *Staria* + *Cenchrus*. 2.
Hypericum. 3. *Lepturus*. Ann. Bot. vol. XLV, 1931, pp. 601-620.
7. Root & Shoot in the Angiosperms: a study of morphological categories. Near
Phyt. vol. XXIX, 1930, pp. 297-315.
8. Studies in Floral Morphology. I. On some structural features of the Cruciferae
Flowers. New Phyt. vol. XXX, 1931, pp. 11-41.
9. Studies in Floral Morphology II. On some normal + abnormal Cruciferae
with a discussion on teleology + atavism. New Phyt. vol. XXX, 1931, pp.
172-203, 13 text figs.
10. Studies in Floral Morphology III. On the Fumariaceae, with
special reference to the *Androsace*. New Phyt., vol. XXXI, 1932, pp.
318-354, 15 text figs.
11. Studies in Floral Morphology IV. On the Hypericaceae, with special
reference to the *Androsace*. New Phyt. vol. XXXI, 1932, pp. 145-173,
with 16 text figs.
12. Studies in Floral Morphology V. On the *Digitaria* + *Impatiens* L.
Ann. Bot. vol. XLVI, 1932, pp. 1-13, 6 text figs.
13. Floral Anatomy + Morphological Interpretation. New Phyt. vol. XXXII,
1933, pp. 251-262.
14. "Ves. and Ves. D." *Androsace* + *Quercus*. April 6, 1929, pp. 239-240.
15. "Obtuse, M. Day. *Quercus*. May 25, 1929.
16. "Stigma A.C. *Androsace*. Nov. 19, 1929.
17. "You *Androsace* *Quercus*. Feb. 6, 1930.
18. Review of *Androsace*. The Principles of Plant Systematics. Notes, *Quercus*, April 1931.
19. Review of *Androsace*. The Principles of Plant Systematics. Notes, *Quercus*, April 1931.
20. Edmond Sponner. *Lythrum* + *Nicotiana* + *Scorpioides*. T.L.S. May 21, 1931.
21. Review of *Lythrum* + *Nicotiana* + *Scorpioides*. T.L.S. May 21, 1931.
22. "A *Androsace* *Quercus*. M. Sponner. T.L.S. Aug 6, 1931.
23. "Plants. A.C. Sponner. The *Androsace*. May 25, 1932.
24. "Thymus *Androsace* by H. Wells + H. C. Parrell. T.L.S. Jan. 5, 1933.
25. On *Androsace*. P. Allen. T.L.S. Feb. 1, 1933.
26. A *Androsace*. *Quercus*. T.L.S. March 2, 1933.
27. Review of *Thymus* + *Androsace*. H. Wells + H. C. Parrell. *Quercus*. Feb. 26, 1933.
28. Morphological Interpretation of Floral Anatomy. *Nature*. Nov. 5, 1933.

Sept. 1934. The Gramineae: a study of Cereals + Grass.
Cambridge University Press, 1934.

ARBER, A.

STUDIES IN THE GRAMINEAE.

VI. 1. STREPTOCHAETA. 2. ANOMOCHLOA.
3. ICHNANTHUS.

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ARBER, AGNES.

STUDIES IN THE GRAMINEAE.

VII. ON HORDEUM AND PARIANA, WITH NOTES
ON 'NEPAUL BARLEY'.

ARBER, AGNES.
STUDIES IN THE GRAMINEAE.
VIII. ON THE ORGANIZATION OF THE FLOWER
IN THE BAMBOO.

ARBER, AGNES.

STUDIES IN THE GRAMINEAE.

IX. 1. THE NODAL PLEXUS. 2. AMPHIVASAL
BUNDLES.

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ROOT AND SHOOT IN THE ANGIOSPERMS: A
STUDY OF MORPHOLOGICAL CATEGORIES

BY
AGNES ARBER

FROM THE NEW PHYTOLOGIST, VOL. XXIX, No. 5, DECEMBER 8, 1930

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THE NEW PHYTOLOGIST

A BRITISH BOTANICAL JOURNAL

EDITED BY

A. G. TANSLEY, M.A., F.R.S.

SHERARDIAN PROFESSOR OF BOTANY IN THE UNIVERSITY OF OXFORD

THE NEW PHYTOLOGIST was founded in 1902 to afford a medium for the publication of original papers, critical articles and reviews, especially in those branches of botany undergoing rapid current development. The journal is well illustrated, and is issued each year in five numbers. The standard size of the annual volume is 320 pages 8vo. Annual subscription price £1.5s. post free. Separate numbers 7s. 6d. each.

Vols. 1-7, 9-14, 16-22 are out of print. Vols. 8, 15, 23-28, £1. 5s. each.

THE JOURNAL OF ECOLOGY

EDITED FOR THE BRITISH ECOLOGICAL SOCIETY

By A. G. TANSLEY

THIS JOURNAL, which was founded in 1913 as the organ of the British Ecological Society, was the first periodical devoted exclusively to ecology. It has recently been followed by the *American Ecology*.

The *Journal of Ecology* contains original contributions dealing with ecology, both of animals and plants, and with vegetation: also reviews and notices of publications on the same subjects; and reports of the meetings and work of the British Ecological Society.

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STUDIES IN FLORAL MORPHOLOGY

I. ON SOME STRUCTURAL FEATURES OF THE CRUCIFEROUS FLOWER

BY

AGNES ARBER, M.A., D.Sc.

FROM THE NEW PHYTOLOGIST, VOL. XXX, No. 1, 1931



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STUDIES IN FLORAL MORPHOLOGY

II. ON SOME NORMAL AND ABNORMAL CRUCIFERS: WITH A DISCUSSION ON TERATOLOGY AND ATAVISM

BY

AGNES ARBER, M.A., D.Sc.

FROM THE NEW PHYTOLOGIST, Vol. XXX, No. 3, 1931



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STUDIES IN FLORAL MORPHOLOGY

III. ON THE FUMARIOIDEAE, WITH SPECIAL
REFERENCE TO THE ANDROECIUM

BY

AGNES ARBER

FROM THE NEW PHYTOLOGIST, Vol. XXX, No. 5, 1931



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IV. ON THE HYPECOIDEAE, WITH SPECIAL
REFERENCE TO THE ANDROECIUM

BY

AGNES ARBER

FROM THE NEW PHYTOLOGIST, Vol. XXXI, No. 3, 1932



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ARBER, AGNES.

STUDIES IN FLOWER STRUCTURE.

I. ON A PELORIA OF DIGITALIS PURPUREA, L.

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FLORAL ANATOMY AND ITS MORPHOLOGICAL
INTERPRETATION

BY
AGNES ARBER

FROM THE NEW PHYTOLOGIST, VOL. XXXII, No. 3, 1933

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WOODALL

CAMEO GLASS PLAQUES

FROM A COLLECTOR

IN 1907 a leading art journal said that future generations might see a fight of millions for the possession of a Woodall (cameo glass) plaque. To a certain extent this has become so, for cameo glass has attracted the attention of collectors for comparatively modern times. It has perhaps become most widely known through the remarkable products of the revival of its manufacture in the Stourbridge district of Worcestershire late in the nineteenth century.

The Portland Vase in the British Museum is the best known example of ancient cameo glass. It acted as a challenge to the ingenuity of John Northwood (1836-1902), who made a replica of it (1873-76), now in the possession of Philip Fargate. Northwood did almost all the work of his cameo work with steel pointed chisels. Various sizes, carefully chosen, being used for the hard layers of opal glass. It was after the names of George Woodall (1850-1926) and his brother Thomas (1849-1926), which have become especially associated with this late Victorian art.

Watchoful Eye of Unle

Born at Kings Norton in Staffordshire, the brothers' early education was under the watchful eye of their uncle Thomas Bott (1829-70), who was at first synonymous with the decoration of Worcester porcelain. The Woodalls were set out as a thimble at the glass

works of Thomas Webb, and the proprietor, Thomas Wilkes Webb, sent George Woodall to the Continent on many occasions to study in various museums. After a certain amount of work in collaboration with the talented Bohemian glass engraver William Fritzsche (1853-1924), the brothers turned to cameo work, with production of a floral or geometrical description of a scene.

These early efforts met with extraordinary success, and the work survives in some production particularly in America. The manufacture of some of it, however, was mainly in the technique

"Moses and his People" by G. Woodall.



FROM A COLLECTOR

of mass production—Woodall stated in 1912 that he was assisted by some 70 craftsmen—and it bears no relation to the fine figure-plaques and vases which the Woodalls created. For this they worked with half a dozen or so highly skilled craftsmen of the standing of J. T. Fereday (1834-1942), Harry Davies (1862-1937), Tom Farmer, and William Hill.

Revered Position

George Woodall's finest plaque, "Moses and his People," is illustrated here. It should be borne in mind that too deep an impression with the graver or cutting wheel would expose the different coloured layers of glass composing the object being decorated, and this would often waste many weeks of work but Woodall, working at a time when the pre-Raphaelite movement held sway, and basing much of his work on classical motifs, achieved a supremacy which has given him a revered position in the history of glass manufacture.

He early exploited the discovery of X-rays to establish whether there were any flaws in the object to be decorated. This was necessary, in a glass object made up of two or three layers at a time when the degree of oxidation and annealing were less scientific and controlled. There is a happy thought here for those collectors who like comparative rarities, to examine glass of this quality will not be produced again.

APRIL 6, 1929.

NOTES AND QUERIES.

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Literary and Historical Notes.

"YE VASE AND YE DSS."

THE present widespread interest in the fate of the Portland Vase brings into sharp contrast the quiet, informal, almost casual way in which it changed hands in 1784. Fortunately we know something of the circumstances of the transaction, from the entries in a diary kept by the Hon. Mary Hamilton, Maid of Honour to Queen Caroline, and niece of Sir William Hamilton, printed in 1862 in connexion with the biography and letters of Mrs. Delany, which six solid volumes; but no one can regret the number or their solidity, since they are shot through with sparkling insights upon the life of the eighteenth century. For Mrs. Delany was born in 1700, and, in the course of a long life, her friends included people as remote from one another in date as Dean Swift and Fanny Burney; Swift, indeed, had lost his health and spirits by the time they corresponded, and he lamented, "why did you not later?" One of Mrs. Delany's longest and most intimate friendships was with the Dowager Duchess of Portland, and the diary-entries with which we are concerned relate to a period immediately after a visit which Miss Hamilton paid to the Duchess's country house, where Mrs. Delany was also staying; here the Duchess showed her young miniature of Sir Walter Raleigh and his nephews of W. R. and E. are still remaining." On Jan. 3, 1784, Miss Hamilton writes: "Mrs. Delany came and told me she must come to speak to me after dinner, for she had a secret message to me from ye Ds De Portland. . . Mrs. D. came to us, and then Delany to her bed-room and to look for a book took me to do, viz., to purchase ye V. of my friend Wm, etc.

The same day Sir William Hamilton came to tea, and the diary continues: "I took him down to ye parlour under promise of showing him ye pictures, and then told ye Ds wish'd abt ye vase. . . he told me we think upon wch ye Ds had said.

After one or two further meetings between Sir William and his niece the matter was brought to a successful conclusion, and on Thursday, Jan. 15, the diary records: "went at ye Ds of Portland's. My uncle Wm came three; they talk'd over and settled ye affair ring, ye Hercules." The same day we find Fanny Burney, through Mrs. Delany, petitioning for a sight of the Vase:—

She hopes Mrs. Delany will have the indulgence to admit her some day in next week, though she dare not hint at such wish for the Vase, lest it should be impracticable.

The Duchess of Portland was an indefatigable collector with a catholic taste; she was as much attracted by shells, "fungus's" and flowers as she was by works of art. Mrs. Delany describes a botanical excursion from Welbeck to Creswell Crags which she enjoyed in company with the Duchess and "her fair flock." The party included "two pioneers" were laid flat, paths cut through thickets of brambles and briars, and bridges made in swampy places; the length of the way computed at about two miles and a half. A resolution was taken on setting out not to delay the walk by *simpling*, so was only way and staid it in our black apron-pockets to observe upon at our return round the tea-table.

It was the Duchess of Portland's passion for botany which encouraged Mrs. Delany to carry through the remarkable "paper mosaic work" which she began when she was well past seventy and continued until she was over eighty. She produced representations of plants and flowers in which each part was cut out of coloured paper and pasted on a dark background. One would suppose that such a process could have nothing but distressing results, but the examples of her work preserved at the British Museum show that the effect produced often had a surprising charm. At the beginning of the first volume Delany speaks of the inspiration she has received from the "most generous, steady, and she has enjoyed" of the Duchess, which This friendship was also immortalised in an ivory box, upon whose white satin lid two old trees overreaching above a little lamb, were represented in wonderful hair-work. The lamb symbolised Mrs. Delany's little great-

niece, to whom the box was given, while the protecting trees, with their branches meeting, were emblematic of Mrs. Delany and the Duchess. This "conceit" may not be to the taste of the twentieth century, but the thing which called it into being—the friendship of these two great ladies—was an affair of the heart, and so dates.

AGNES ARBER.

A noteworthy feature of the dialect is the number of "paralogues" or "doublets" of certain verbs which occur, all of Germanic origin. The local forms are "non-unlaut," and are difficult to account for.

blawt beside bleat.
clawk " cleck, s.
quawdle " queedle.
scrawk " screech.
squawk " squeak.
streak " streak.
(=retch).

DIALECT NOTES.

THE TIMES THURSDAY APRIL 25 1946

On this note selectic Mar local, Wright are ac No to an as n from an as- These bo of e. "Ad Fr. nt has on the wd "napr this v acide

THE PORTLAND VASE

The Portland Vase has been bought for the British Museum through funds left by the late Mr. James Rose Valentin, it was disclosed yesterday. The purchase was made in 1945. The price has not been disclosed. The vase, which was deposited on loan in the British Museum in 1810, was sent to Christ's by the Duke of Portland to be sold in 1929, but it was withdrawn at 29,000 guineas and given again to the care of the Museum. In 1845 a demented visitor smashed the vase to fragments. Its repair was executed so well that the cracks appeared only as minute capillaries. The vase was on view to the public when the British Museum reopened yesterday, after being closed since 1939.

Final "distillation" as in "winch" (vinice) and "leach" (quidus). "Chale" in Nottingham usage, shows a figurative aspect of Fr. *chauffer* L.L. **cofacer*. "Gaw" and "gammy" are apparently related to Fr. *gauche* and *jambe*, the former having possibly descended from a Celtic type **uoladon* or **uandkos*, with the original meaning of "defective," "weak" (cf. W. *gwalld*, *gwall*, *gwan*). "Mange" shows a figurative development of *manger*, analogous to Eng. "fret," which is cognate with Ger. *fressen*.

The first element of "mail-cart" is from M.E. *mail*, a bag (now a post-bag). This word, coming immediately from Fr. *malle*, is ultimately Celtic, cf. Ir. *mal*. "Pawm" suggests an obsolete Fr. **paumer*, L.L. **pal-mare* from *palma*; "ride," to wrinkle is from Fr. *ride*.

The words "proon" and "rowt" suggest early borrowing into English, by reason of their pronunciation, which is Middle English would be *φ. prōn*, *rūt*.

known... characteristic is the quantitative in "scuft" (cf. A.S. *scufan*); "waft" (cf. A.S. *sveftan*), and "thrafft" (A.S. *þraftan*).

Vocabulary.

skern, s. acorn.
itchbone, s. the bone in a cut of beef taken from the rump.
apprentice. asphalt.
*unstable, wobbly, loose. bamboo.
*bamboo. crooked; bandy-legged.
*bandy-legged. cotton for "tacking," or rough sewing.
loaf of bread. by the when.
*by the when. suppliant person.
*suppliant person. hog-wash, brew.
hog-wash, brew. broken.
*broken. to drink hard.
to drink hard. odds and ends.
odds and ends. to shout; cry out; weep; blab out.
to shout; cry out; weep; blab out. one who lets out secrets.
one who lets out secrets. blawt-in-cow, s. brawler; one who makes a fuss about little.
brawler; one who makes a fuss about little. to "dare up" in a temper.
to "dare up" in a temper. Bladdy, adj. an oath (=bloody).
an oath (=bloody). Blether-headed, adj. reckless, empty-headed, idiotically rash.
reckless, empty-headed, idiotically rash. Bibber, v. to weep as a child.
to weep as a child. Blonde, s. blouse.
blouse. Blowbells, s. bellows.
bellows. Blower, s. hoister, siren.
hoister, siren. Blue-buttons, s. small, round-headed mushrooms.
small, round-headed mushrooms. Bluff, s. protector for the eyes.
protector for the eyes. "bluff." Board, on-, adv. served up, on the table.

THE TIMES, SATURDAY, MAY 25, 1929.

OBITUARY.

MRS. DAY.

The death in Kensington on May 23, in her 80th year, of Mrs. Lewis Foreman Day breaks a link with the 19th-century renaissance of the arts of design.

Her husband played a large part in this movement, and though he had something in common with William Morris and Walter Crane, his contribution was individual. Lewis F. Day, who could claim descent from John Day, the Elizabethan printer, exerted a wide influence on designers, both by his own work and by lecturing and writing on all branches of the ornamental arts, but especially on the subject of a sympathetic memoir by Miss D. M. Ross in the *Journal of the British Society of Master Glass-Painters*. In 1873 Lewis F. Day married Ruth Emma Moriah. Even before his marriage he had begun to collect embroideries, and since his death, in 1910, Mrs. Day, who in every way identified herself with his work, had continually enlarged and developed the collection; it is understood that she has bequeathed it to various national museums in her husband's memory. Interest in embroidery was only one facet of her enthusiastic appreciation of art. She had an especially wide knowledge of pictures and a remarkable memory for everything connected with them. But to those who knew her it is remembered but as a connoisseur that she will be remembered, but as a woman with a unique gift for entering sympathetically into the lives of her countless friends. To those who did not come under her influence no words can suggest the warmth of her unquenchable vitality and of her glowing affections; to those who loved her and have lost her the world will be for ever a colder place.

THE TIMES, TUESDAY, NOVEMBER 19, 1929

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ITALIAN ART EXHIBITION

Your article on the forthcoming Exhibition of Italian Art at Burlington House concludes with the words: "It is intended to reproduce many of the more famous works as picture postcards." May I enter a plea for a wider range than is suggested by the expression "the more famous works," and above all, for pictures of better quality than were available at the Dutch Exhibition? Many of these—were conspicuously poor and inadequate. The modern methods which you, Sir, can surely provide something less unworthy of so great an exhibition.—*AGNES ARBER, Cambridge.*

THE TIMES, TUESDAY, FEBRUARY 4, 1930

"YOUR OBEDIENT SERVANT"

Does not the last word as to the use of this and kindred phrases rest with Dr. Johnson, who said to Boswell: "My dear friend, clear your mind of rant. You may talk as other people do. You may say to a man, 'Sir, I am your most humble servant.' You are not his most humble servant. . . . You may talk in this manner; it is a mode of talking in Society; but don't think foolishly."—*DR. AGNES ARBER, Cambridge.*

Russian Biology

The Plant in Relation to Water: A Study of the Physiological Basis of Drought Resistance. By N. A. Maximov. Authorised English Translation. Edited by R. H. Yapp. George Allen & Unwin. 21/-.

The output of Russian work in biology has been remarkable in recent years not only for its quantity but also for its fine quality. It is grievous that so much of this research remains a dead letter to the rest of the world, owing to the insuperable language difficulty. In a few fortunate instances, the translation of a Russian book upon one of the broader aspects of biology has not only brought the writer's research to the knowledge of students in other countries, but has also given them a key to the general content of the Russian literature bearing on the subject. This was notably the case with L. S. Berg's stimulating book on the evolutionary process—*Nomogenesis*—and we have now another welcome example in Maximov's *The Plant in*

Relation to Water, which has recently appeared under the editorship of R. H. Yapp. This volume has a sad interest for British botanists, since its preparation was the last piece of work which Professor Yapp achieved; though he was able, despite severe illness, to complete the correction of the proofs, he died before the book was published. It represents a line of thought and investigation with which Yapp was closely in sympathy, and his revision of the text was the labour of love of a fellow worker in the same field. He retained a life-long interest in the relation of vegetation to the water content of the soil—an interest which was originally aroused in his Cambridge days by the plants of Wicken Fen.

Though the sub-title explains the scope of Maximov's book, the title itself—*The Plant in Relation to Water*—is somewhat misleading, since it indicates a much wider field than that actually covered. The discussion is in practice confined to the water relations of land plants, with special reference to drought resistance; such physiological problems as those presented by aquatic plants are altogether ignored. The first two parts of the book deal with absorption of water and its loss by transpiration. These parts are preliminary to a consideration of water balance, leading on to a discussion of xerophytism in which the argument culminates. Xerophytes (plants capable of living in an environment in which the water supply is deficient) are often described in text-books as being specially adapted by their morphological and anatomical peculiarities to life under dry conditions. Maximov shows, however, that such plants are not, in fact, drought-loving, though they are constitutionally capable of resisting drought, which is a different matter. An exact analysis of drought resistance is not only a desideratum of pure science—it is also a matter of vital importance to agriculture. Maximov believes that the capacity for enduring wilting is the chief factor which enables plants to withstand water deficiency. This endurance of wilting depends in the last resort upon the internal physico-chemical properties of the protoplasm. Hence it is to colloid chemistry that we must look for further light upon those problems of xerophytism which the work of Maximov has done so much to define.

AGNES ARBER

The first of these is the fact that the
 of the British is a great deal better than the
 of the American. The second is the fact that
 the British is a great deal better than the
 of the American.

We have a more and more and more
 of the British is a great deal better than the
 of the American.

On the other hand, it is not to be forgotten that the
 of the British is a great deal better than the
 of the American.

W. G. S. S. S.

The Film Guild: "C. S. D." (Sovlino)

Long and weary was the Central Hall in the belief that
 of the British is a great deal better than the
 of the American.

Long and weary was the Central Hall in the belief that
 of the British is a great deal better than the
 of the American.

Long and weary was the Central Hall in the belief that
 of the British is a great deal better than the
 of the American.

CHEVISAUNCE

Sir,—Is not the most convincing identification of the flower "chevisaunce" in the April Eclogue of Spenser's "The Shepheardes Calender" (*The Times Literary Supplement*, February 5 and March 19) that given long ago by R. C. A. Prior? In his "Popular Names of British Plants" (third Edition, 1879) he connects it with the word in Chaucer's "Romant of the Rose" (L. 3337), which is variously read as "cherisaunce" or "chevisaunce," and is said to mean comfort, or ease of heart. Prior believes that Spenser had in mind the wallflower (*Cheiranthus Cheiri*, L.), which was called heartease before this name was usurped by the pansy. I think that Prior's identification is strengthened by the fact that in "A Niewe Herball" (Lyte's translation of Dodoeus's Herball) the chapter called "Of Pances, or Hartes ease" is immediately followed by "Of the Wallflower," for which "Hartes ease" is given as an alternative name. And within the next half-dozen pages we meet with "Giloflowres," "Soppes in wine," "Pinckes" and "Coronations," all of which are referred to by Spenser in the same stanza as "Chevisaunce." Now Spenser is known to have been in London in 1578, the very year in which "A Niewe Herball" was dedicated "To the most High, Noble, and Renowned Princesse, our most dread redoubted Soverayne Lady Elizabeth"; and it was in the next year, 1579, that "The Shepheardes Calender" appeared. Is it not possible that, when Lyte's Herball was fresh from the press, Spenser turned over its enchanting pages, and was thus led to associate a sequence of flowers brought together by Lyte, and to couple

The pretie Pancee

And the Chevisaunce?

AGNES ARBER.

The Library.

The Principles of Plant Biochemistry. Part 1. By Muriel Wheldale Onslow. (Cambridge University Press. 16s. net).

THE University Lecturer in Plant Biochemistry at Cambridge has, in the present book, given students an invaluable work of reference. The sugars, the cell-wall, oxidising and reducing systems, the plant proteins, nitrogen metabolism and respiration are treated in turn, and no less than eleven special bibliographies are provided. Other sections of the wide field of plant biochemistry will be discussed in a second volume. The text contains a mass of condensed information, and all possible help towards its understanding is given by means of diagrams. But the general reader cannot but regret that the subject of plant biochemistry has now reached such a pitch of technical complication as to be incomprehensible to those who have not had a highly specialised training in chemistry. This regret is naturally enhanced by the memory of Mrs. Onslow's admirable biography of her husband, the Hon. Huia Onslow, which revealed her gift for vivid and sympathetic narrative — a gift for which the present book can provide little scope. But to complain of the technical difficulties which the reader has to surmount in studying 'The Principles of Plant Biochemistry' is to complain of difficulties which are inherent in the subject in its present exploratory phase. The structure of Mrs. Onslow's book bears witness, on the one hand, to the immense volume of detailed research which has been done in plant chemistry, and, on the other hand, to the relative lack, hitherto, of synthetic and co-ordinating work. Writing about the carbohydrates, Mrs. Onslow says that "the published evidence does not cohere into a rational system." This criticism will recur again and again to the reader's mind as he reviews the different sections of the subject whose present position is ably disentangled in succeeding chapters. And despite the formidable array of facts which the researches of recent years have brought to light, the reader may well be depressed when he observes the mists of uncertainty that still involve so many regions of biochemistry—when he finds, for instance, that so important a substance as the lignin of wood still has to be described as "of unknown constitution." But he may take

heart again when he looks backward in time, and realises how young the subject is, and how far it has moved since its relatively recent beginnings. Its early history does not come into Mrs. Onslow's purview, but we may recall that in 1661 Sir Kenelm Digby described an experiment in which he calcined nettles and exposed to frost the water in which the ash had been, as far as possible, dissolved. He tells us that when the water congealed, "there appeared to be abundance of Nettles frozen in the ice. They had not the colour of Nettles. . . . But otherwise, it is impossible for any Painter to delineate a throng of Nettles more exactly." He believed that he had obtained the "fixed Salt" in which "a main part of the Essential substance of a Plant is contained." Fantastical as this experiment sounds to us now, it represents a groping after the principles of plant biochemistry — a definite if childish attempt to grasp the essence of that "complex of interacting chemical systems," of which, in Mrs. Onslow's words, "the plant is the outward expression."

Literary and Historical Notes.

EDMUND SPENSER AND LYTE'S
'NIEVE HERBALL'

THE poem allotted to "April" in Spenser's 'Shepherd's Calendar,' with its lyrical praise of Elizabeth, is to many readers the most fascinating of the *Æglogues*; in a recent notice of two new editions of the 'Calendar' (*Times Literary Supplement*, Feb. 5, 1931, p. 95) it is claimed that it is the only one "reckoned immortal by posterity." The reviewer draws special attention to the names of flowers in the stanza:—

Bring hether the Pincke and purple Cullam-
bine,
With Gelliflowres:
Bring Coronations, and Sops in wine,
Worn of Paramoures.
Strowe me the ground with Daffadowdillies,
And Cowslips, and Kingcups, and loused
Lillies:
The pretie Pawnee
And the Cherrisaunce
Shall match with the fayre flowre Delice.

Some of these flower names are explained in the "Glosse" by "E.K.," which is incorporated with the first and later editions of the poem, but no explanation is offered of the enigmatic word, "Cherrisaunce." The same word occurs elsewhere in Spenser in the sense of "enterprise": the line "Fortune, the Ice of famous cherrisaunce" (*The Faerie Queene*, Book II, Canto ix, 8) may be taken as a typical example of its use. But as a flower-name it is unknown, and the reviewer whom I have cited goes so far as to say, "we are driven to suspect that no such flower existed." This despairing conclusion elicited a letter from A. S. Herbert (*Times Lit. Suppl.*, March 19, 1931) suggesting that "Cherrisaunce" might be a corruption of "Chèvre-Plaisance," comparable with "Chèvrefeuille"; it would thus mean Honey-suckle. But linguistically such a derivation presents difficulties, and moreover, Spenser uses "Caprifle" for Honey-suckle (*The Faerie Queene*, Book III, Canto vi, 44). A more plausible suggestion seems to be that made by Prior;² his view was that the

1. Glossary to 'The Poetical Works of Edmund Spenser,' edited by J. C. Smith and E. de Selincourt, Oxford, 1929.
2 R. C. Prior, 'Popular Names of British Plants,' 3rd edition, 1879.

"Cherrisaunce" of the April *Æglogue* is a misprint for "Cherrisaunce," a word which occurs in the English version of 'The Romaunt of the Rose' (l. 3337). Spenser was so much influenced by Chaucer that there is no improbability in the idea of his reviving a term which he regarded as Chaucerian. As "E.K." says, "he hath laboured to restore, as to theyr rightfull heritage such good and naturall English words, as haue ben long time out of vse and almost cleare discherished." The fact that Chaucer is no longer believed to have been the translator of this part of 'The Romaunt of the Rose' is beside the point, for there is no reason to suppose that its authenticity was doubted in Spenser's day. In the first edition of Chaucer's works, printed in 1532 by William Thynne, the passage (in which I have italicised the line that concerns us) runs as follows:—

Than dismayed I lefte al soole
Forwey, forward as a foole
For I ne knewe no cherrisaunce
Than fel in to my remembraunce
How Love bade me to purvey
A felow, to whom I might sey
My counsell and my prynte
For that shuldq moche avayle me

My frende hath seyd me so wyl
That he me eased hath somdel
And eke alegged of my turnment.

The whole passage bears out Prior's suggestion that the translator used "cherrisaunce" in the sense of "comfort" or "ease of heart." When we turn to the French of Chaucer, which the English translator has based on, we find that the line which corresponds to:

For I ne knewe no cherrisaunce

is the following:—

Que ne soi de moi cherrisaunce.

Now it is obvious that the writer of the English version, carelessly or perhaps deliberately, mistranslated the French line, and wholly changed its sense. Skeat altered back

3 See p. xxx. 'The Works of Geoffrey Chaucer and others.' Facsimile of the first collected edition, 1532. Introduction by W. W. Skeat. Oxford, n.d. (1905).

4 In the 1542 edition "cherrisaunce" is repeated, but in the Glasgow MS., published in the book cited in the next footnote, the spelling is "cherrisaunce," as it is in the 1561 edition; I have not seen the 1550 edition referred to in 'The Oxford Spenser,' p. xxiii. Skeat was mistaken in giving "cherrisaunce" as the form used in the 1532 edition (*The Oxford Chaucer*, p. 731).

5 'Le Roman de la Rose.' Edited by Max Kalrus, Part. 1. Chaucer Society, 1891.

more problems than it has solved.

Theoretic questions are not on a level with the descriptive sciences. The treatment of general problems has the great merit of freedom from dogmatism, but the argument is sometimes loosely knit, and reveals little constructive and independent thought.

marthen now, but Mr. Lewis and some of the leading men are cross with him because he preaches something which they call Arminianism, but some speak warmly on his behalf, especially of the young people. Father sides with Mr. Lewis and says that Arminianism is nearly as bad as Popery. This has caused a good deal of disagreement in the church.

Sarah, the daughter of Gelli Fahren has failed to live with her drunken husband and been obliged to come back to her father, along with her little daughter. Oh! it was hard for her, after going out through the window and marrying unknown to her father and mother, to have to come back again in such a poor fashion, with hardly a shift to her back and nearly starving.

An event has taken place in the neighbourhood lately which has caused very strange feelings. Macdonald the Scotchman came to the district one day with a very full pack. He had called at several houses, and the news had spread that he had come into the district, and he was expected everywhere. He went very late to Blaen-y-cwm, and it is very likely that he agreed to stay the night there. Anyhow he was never seen afterwards anywhere in the whole district. The last seen of him was going up towards the house at Blaen-y-cwm, and it is whispered throughout the district that something awful happened to him there. I understand that Shaci, a servant at Eeny-allt, saw something strange that night near Blaen-y-cwm, when returning from courting. I am not sure what he saw, but he has told father many things quietly, and father wanted to go at once to Llywd of Bronwydd for a warrant to arrest Evan Blaen-y-cwm, but mother was almost beside herself when he spoke of it, saying, "Remember Dafydd Pant-y-brwyn's horse,"³ and so nothing has been done, and Evan continues to walk about the world as bold as anybody. Shaci has told his tale quietly to others, and there is a strange murmur throughout the neighbourhood but none ventures to say anything plainly, and there is only talking through the fog. It is noticed that the family at Blaen-y-cwm has had an abundance of new clothes this year, and that Evan is swaggering about fearfully with his pockets full of money. He often calls at the tavern of Nani Dan-y-rallt with plenty of money

² Courting was done very late, after the old people had gone to bed.

³ Dafydd Pant-y-brwyn's horse, which Evan was reputed to have mutilated.

always, and he is a great man in all the fairs of the country. It is impossible for me to make you understand the feeling that this event has caused throughout the whole neighbourhood, and I am sorry in my heart that mother stopped father getting a warrant for Evan, because I believe it is full time for the old scrub to be hanged, but do not mention anything about it when writing back.

Mali of Allt Goch was buried about a month ago. Poor thing! she never mended after Cati Twm Tincer bewitched her. I am moved every time I see Cati, and I feel angry enough with her to scratch the eyes out of her head, and I get as hot as the Old Boy himself when I see mother giving the old villain a great bowl-full of meal every time she comes to our house, for fear of her.

Beti, our servant, saw Mali of Allt Goch about three weeks before she died. Beti was going towards her father's house on a pretty dark night. She was going along the road which leads from Allt Goch to the church, feeling brave enough, and singing.

Gweni went to Frenni fair
To buy a pot of earthenware, etc.

Suddenly everything grew dark around her, and she felt herself being strangely pressed and lifted up and carried forward, so that her feet scarcely touched the ground. She stopped singing at once, and was in a horrible fright. She could see nothing more than if she had been in a cow's belly, but she was conscious and heard some strange murmuring and chirping around her. After a good while she struck against something and understood that she was beside the churchyard gate. She sank to the ground terrified and she could see between her and the sky men passing by in a procession, and soon a bier borne of four, with a crowd after. Thereupon she brought up the whole of her supper and then she tried to rise and drag herself towards her father's house. She had been carried more than a mile along the road. She found it very hard to reach her father's house, and after going into the light, she fainted and was insensible for about a quarter of an hour. She was ill for three days before she returned to us. We were afraid the first day that she had gone with the fairies like Gweni Blaen-y-cwm.

⁴ Not in the flesh. Some people were supposed to have a prophetic vision of funerals. My mother knew a lame man, who died in 1830, who attributed his lameness to an experience like Beti's.

⁵ Fe aeth Gwen i fair y Frenni.
Eisieu crochan pridd oedd arni, etc.

THE FLORAS OF THE PAST

PLANT LIFE THROUGH THE AGES. A Geological and Botanical Retrospect. By A. C. SEWARD. (Cambridge University Press. 30s. net.)

Professor Seward's palaeobotanical text-book—"Fossil Plants"—is an indispensable work of reference to the geologist, and to every botanist whose interest is not confined to the vegetation of the present day. In the preface to the fourth and concluding volume, the hope was held out that the author might eventually give us a general survey of the floras of the past, which would be more intelligible to the layman. This survey has been eagerly awaited, since Professor Seward is at home both in the geological and botanical fields; he is thus one of the few writers who are fitted to achieve a general review of the borderland subject of palaeobotany. In "Plant Life Through the Ages" he has redeemed his promise, and given us a book which contains so much detailed information and is so fully documented that it will be at least as useful to the student as to the general reader, for whom it is described as primarily intended. It differs from the earlier work in being constructed on a geological instead of a botanical framework; the plants are dealt with in the sequence of their appearance in the rocks, instead of being grouped according to their botanical relationships. This geological arrangement gives the opportunity for a description of each of the successive great floras which have peopled the world. The subject is thus viewed from a different standpoint from that adopted in "Fossil Plants," so that the two treatises are complementary to one another.

The book opens with a geological introduction, which is followed by an account of the mode of preservation of plants as fossils, and then by a chapter on botanical classification, giving a useful descriptive summary of the sub-divisions of the vegetable kingdom. Then comes the main body of the work, containing an account of the vegetation of each successive epoch. The chapter on Devonian plants will be specially valued for its summary of the work of Dr. Kidston and Professor Lang on the petrified peat-bed discovered in 1913 near Rhynie, in Aberdeenshire. The age of this peat-bed has been estimated at about 380,000,000 years, and yet the intimate cellular structure of some of its plants is exquisitely preserved. Botanically these early fossils are of profound significance, but the work done upon them has, so far, suggested more problems than it has solved.

Leaving the Devonian, we pass through the Permian to the Carboniferous, to whose rich flora more than a hundred pages are allotted. Here interest will perhaps be centred in the Pteridosperms—those extinct forms which had fern-like leaves, but reproduced themselves by seeds, after the manner of the higher plants. In considering the Carboniferous flora, Professor Seward gives an abstract of the pioneer work of Mr. David Davies in the South Wales coalfield. This observer has made a statistical investigation of the plants associated with twenty-nine different coal seams; in all he has dealt with nearly 400,000 specimens. His analyses reveal a recurrent shifting of balance between the different classes and genera at different horizons; he interprets these changes as evidence of fluctuations in the relative height of the land above sea-level. His work represents a new and hopeful type of intensive palaeobotanical study.

We have been fortunate in England in possessing a supply of "structure anatomy" of Carboniferous plants—the so-called "coal-balls" of the coal measures, in which the plants survive with even the most delicate features of their anatomy still preserved. It has been customary to examine their structure by cutting slices by machinery and then grinding them down until they are thin enough to be inspected under the microscope by transmitted light. But Professor Seward describes a technique—simple, accurate, and cheap—recently devised by Professor Walton and Dr. Koopmans, by means of which fifty "films," suitable for examination under the microscope, can be obtained from 2mm. of coal-ball. The application of this technique promises greatly to promote our knowledge of Carboniferous plant anatomy.

We must pass over Professor Seward's account of the vegetation of the more recent rocks, making mention only of one relatively new line of research to which he alludes when considering the Quaternary Period. This is the study of the pollen-grains, numerical proportions of the pollen-grains belonging to different trees are determined. Such pollen statistics have revealed many new facts bearing on plant distribution. It is found, for instance, that the pollen of the Scotch fir is preserved in peat-beds in England and parts of France where this tree no longer exists in the wild state. A limit could not easily be set to the number of interesting pieces of information that might be extracted from the accounts of the successive floras. Where so much is given, criticism becomes an ungrateful task. It must, however, be confessed that the discussions of theoretic questions are not on a level with the descriptive sections. The treatment of general problems has the great merit of freedom from dogmatism, but the argument is sometimes loosely knit, and reveals little constructive and independent thought.

CALIBRATED MEASURES

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The illustrations to Professor Seward's book are of marked excellence. Numerous maps and diagrams, in which colour is occasionally introduced, aid the understanding of the text, and the photographs, both geological and botanical, are unusually successful. One which might be singled out for special mention is Dr. Cotton's attractive picture of thrift (*Armeria maritima*) growing fraternally in company with a seaweed (*Fucus vesiculosus* var. *muscoides*). A word also must be said as to the amusing device on

the cover, which is derived from a Japanese painting by Kiosai. It represents two frogs triumphantly waving leaves of the maidenhair tree, *Ginkgo biloba*, which is unknown to-day in the wild condition, but owes its survival to immemorial cultivation about temples in the Far East. Professor Seward has made this living fossil peculiarly his own, and his readers will welcome this entertaining little design, both for its own sake and for its associations.

But—to turn again to the book itself—the chief glory of the illustrations consists in a set of restorations of landscapes and vegetation in the different geological periods, drawn by Mr. Edward Vulliamy. Those who know this artist's water-colours will recognize that his almost meticulous clarity of statement, and his simplification—which does not preclude an interest in delicate detail—are admirably suited to the task he has undertaken.

In the text itself there are frequent quotations from Nicholas Culpeper, the astrological herbalist, who, in the seventeenth century, published a piratical translation of the *Pharmacopoeia*. For instance, under "Alkanets," the only entry under the heading "Medicinal Action and Uses" is a long quotation from Culpeper beginning "It is an herb under the dominion of Venus, and indeed one of her darlings." Again, under "Honeysuckle" he is cited as saying that the plant "is a herb of Mercury, and appropriated to the lungs; the celestial Crab claims

If it were not for the medical claims of "A Modern Herbal," it would be unnecessary for me to write this way upon its demerits; butaucracy and lack of discrimination cannot lightly be condoned in a work that is professedly medical. Its medical aspect is a well-illustrated complication, containing all sorts of interesting and important information about herbs. Probably its best features are the notes on herb cultivation, which Mrs. Grieve, as a practical herb grower, is able to give in a first hand. And the reader who is grateful to her for her recollections of such Whitsun Roses as "The Golden Rose, Pixie Pears & Cuckoo's of the Road for Hawthorn berries, Red Foxglove or Rose-a-rubie for the Phosorus Eye, and Kit-run-about for the Phosorus Eye." In some cases it is the exclamation rather than the name that is the attraction. She tells us that the Water Figwort is called Fiddler's name because, when its waxy leaves are rubbed together, they make a sound like the scraping of a bow. The reader will also find of the northern "foxglove" that bad fairies gave the name of the Foxglove to the fox, so that he might put them on his toes to follow him, instead when he prowled about in the night. In the name Poor Man's Treacle, there is a sense other than the word "treacle" which is a corruption of "theriac," a wise obsolete word. Danewort—a name for the plant Enderwort—often found growing among ruins—recalls "old, unhappy, far-off things,"

And battles long ago," for the plant owes its name to the tradition that it sprang originally from the blood of slaughtered Danes. Among other names recorded in "A Modern Herbal" examples are to be found of that curious process—unreasonably called "rationalizing"—by which words whose meaning is not understood are converted into terms already familiar. The process never seems to receive any check from the fact that the result is generally senseless. Cinquefoil, for instance, becomes "Sunkfield," while "Easter-mangeant"—a name for the Bistort which is an ingredient of herb pudding—has suffered corruption into "Easter Giant."

The earlier herbalists seem to have credited plants with a more sentient life than we are inclined to allow them to-day. Long ago, as Mrs. Grieve tells us, the Chamomile was looked upon as the "Plant's Physician," and there was a belief that nothing contributed so much to the health of a garden as the presence of this herb. If another plant were drooping or sickly, it was held that it would recover if a Chamomile were placed near it. Such beliefs, which may possibly have some chemical basis, lead on to those which lie wholly within the province of folk-lore, such as the group of superstitions associated with the Elder. The belief that Julius Cæsar hanged himself upon an Elder tree is alluded to by *Brown* in *Labour's Lost*, while, according to another tradition, the Cross of Calvary was made from the wood of the Elder or Bour tree. It is addressed in an old rhyme as:—

Bour tree—Bour tree; crooked rong
Never straight and never strong;
Ever bush and never tree
Since our Lord was nailed on thee.

It seems that even now hedge-cutters sometimes refuse to touch it, and gypsies and gleaners of firewood avoid it. All kinds of curative powers are, however, attributed to it. The fact that the juice of the berries would banish neuralgic pain was discovered in an odd way. It was found that inferior port wine cured neuralgia, while genuine port was valueless for the purpose! On investigation the difference proved to be due to the fact that the inferior port was profusely doctored with Elderberry wine.

There is much else that one would like to linger over in Mrs. Grieve's collection, such as the picturesque account of "wassailing" the Apple trees, but one more quotation must suffice. We read in the 1619 translation of "Le Petit Albert" that if a mixture of the herb Centaury and the blood of a female lapwing be put into the fire, "when the starrs shine it shall appeare yt the sterres run one agaynste another and fyghte"—words which bring to mind Francis Thompson's lines,

All things by immortal power,
Near or far,
Hiddenly
To each other linked are,
That thou canst not stir a flower
Without troubling of a star.

Plants. By A. C. Seward. Cambridge Press. 4s. 6d.

This book is of an altogether different type from the average botanical text book. It is intended for those whose school work has been mainly classical or literary, and it aims at arousing interest in the fundamental principles of biology, while confining descriptive detail within narrow limits. Readers who know Professor Seward as the author of standard works on fossil botany, might perhaps expect to find him less perfectly at home in the world of living plants. But this expectation is agreeably falsified. For more than half the book is physiological, and gives a peculiarly vivid picture of the plant as a living, functioning organism—responding to stimuli; breathing; using the carbon dioxide of the air for the manufacture of sugar and starch with the aid of the radiant energy of sunlight; and absorbing water from the soil and transpiring it into the atmosphere. Such chemical and physical concepts as are necessary for an elementary understanding of these processes are introduced and explained with unusual skill. The reader who has not hitherto concerned himself with plant behaviour will scarcely have realised the extent of a tree's water consumption; it is startling to learn that vapour equivalent to eighty gallons of water may be given off in a day from the leaves of a single birch tree. Moreover, many of the figures given in this book bring home to one in the most striking way that the principal chemical phenomena in the plant are large scale processes. For instance, an elm tree of average size

is said to expose to the sun a total area of no less than five acres of leaf surface, while the microscopic green corpuscles which are responsible for starch production are so numerous that their areas—though individually infinitesimal—exceed, in sum, 147 square miles!

The keynote of Professor Seward's book is the idea of the essential unity of animal and vegetable life, and many of his readers will owe to him an enhanced perception of the degree to which plants approach animals in their rich and various vitality. We may cite a single instance in which the plant refuses to adopt the passive attitude which we are apt to expect of a vegetable. The root tips of seedlings have an inherent tendency to grow vertically downwards. If an experimenter cruelly fixes the tip of the root horizontally, the free part of the seedling makes violent efforts to restore the tip to its natural position; it contorts itself with the exertion, and may even tie itself into a knot in the agonies of frustration. Could the most temperamental human being do more?

HERBARIST AND ROYALIST

THOMAS JOHNSON: BOTANIST AND ROYALIST.
By H. WALLIS KEW and H. E. POWELL.
(Longmans. 8s. 6d. net.)

It is as the apothecary and botanist who edited the greatly improved second edition of Gerard's "Herball" that Thomas Johnson is chiefly remembered. Despite his importance in the history of British botany, and the gallant part which he played in the Civil War, no comprehensive study of his life has hitherto been attempted. The task, as Mr. Wallis Kew and Mr. Powell point out in the book before us, presents special difficulties. At the outset every student of Johnson is confronted by the disheartening fact that the combination of two such common names makes all identifications precarious. Even when the field is limited to contemporaries of the same profession, we find that the Court Book of the Society of Apothecaries, for 1617-1651, includes five Thomas Johnsons, one of whom practised within seven minutes' walk of our Johnson's Snow Hill house; there was also a barber-surgeon of the same name with whom he has sometimes been confused. The consciousness of such stumbling-blocks as these increases our gratitude to the authors of "Thomas Johnson" for having given us a work in which all authentic records of the botanist's activities have been laboriously collected.

It seems probable that Thomas Johnson was born about the beginning of the seventeenth century. In 1628 he became a free brother of the Society of Apothecaries, and in the succeeding year he published a relation of his plant-hunting excursions — "simpling voyages," as he called them — into Kent and to Hampstead Heath. This was the first printed account of such expeditions to appear in this country. On the journey into Kent, the party, which consisted of Johnson and nine companions, travelled in two boats from St. Paul's to Gravesend, encountering a storm on the way. At Queenborough their journey was delayed by the Mayor, who desired their attendance so that he might learn the business of so large a group of travellers in those parts. Fortunately his Worship accepted their explanations, and the interview ended with the drinking of healths in excellent ale. On the Kentish expedition more than 250 species of plants were collected, while seventy-two were obtained from Hampstead Heath and the country round.

The "Herball" of John Gerard had been published in 1597, and in the succeeding thirty-five years there had been no new edition, nor had any subsequent book taken its place. It contained many errors, which were partly accounted for by the fact that the text was a translation from Dodonæus, rearranged according to the method of de l'Obel, and illustrated by a collection of figures which had been used by a third herbalist, Tabernaemontanus. In 1632 the successors of the original publisher, becoming alarmed by the idea that a competing herbal by Parkinson was about to appear, commissioned Johnson to prepare a new edition of Gerard's book, allowing him only one year for the work. This was a formidable undertaking. Not only was it necessary to correct Gerard's errors and add original matter, but, to illustrate the book, an entirely different and more numerous collection of figures had to be fitted into the text; this was a set of 2,766 wood blocks previously used in the famous series of herbals published by Plantin, of Antwerp. One can but marvel at the high standard which Johnson attained, though working under such pressure. Indeed, in the scholarly scrupulousness of his editorial methods he was far in advance of his generation.

We have so little knowledge of Thomas Johnson's personal life that it is pleasant to find that there is in existence a letter, relating to the "Herball," which indicates, that a friendship existed between him and Sir Henry Wotton. The letter in question is addressed "To my verie loving and learned friend Mr. Johnson Apothecarie, at his howse on Snowe hill, London." Wotton explains that he is sending his servant with the request that Johnson will tell him "where he may buy one of your Gerrards, well and strongly bound: Next, where I may have for my monye, all kinde of coloured Pynkes to sett in a Quarter of my Garden or any such flowers as perfume the Ayre." We can easily guess what directions Johnson would have given to Wotton's servant, for in the herbal, after describing "Gilliflowres, Pinks and the like," he recommends "such as are addicted to these commendable and harmlesse delights" to "repaire to the garden of Mistresse Tuggy . . . in Westminster, which in the excellencie and varietie of these delights exceedeth all that I have seene."

When the Civil War broke over England it put an end to Johnson's scientific activity. He joined the Royalist forces at Oxford and was sent to Basing House, where he played a distinguished part in the long defence. "When a dangerous piece of service was to be done this Doctor (who publicly pretended not to Valour) undertook and performed it." In the autumn of 1644 Thomas Johnson received a shot wound and died from the resulting fever, "no less eminent in the Garrison for his valour and conduct, as a Soldier, than famous through the Kingdom for his excellence as an Herbalist and Physician."

THE TIMES TUESDAY FEBRUARY 21 1933

MISS PHOEBE ALLEN

Miss Phoebe Allen, who died on Saturday at Ryde, I.W., in spite of long-continued physical suffering, was a most industrious writer. Her novel "Gilmory" was published in 1876, when she was still a girl, and was followed by a succession of stories, one of which, "Minton," appeared in a new edition in 1930. Another, "The Mystery of Grestly," was republished in 1928. A life of adventures with smugglers was founded on actual episodes in the boyhood of her grandfather, the son of a large landowner in the neighbourhood of Ryde. She had also a gift for conveying solid information in a light and readable fashion, and her popular introductions to botany, gardening, heraldry, architecture, and philology were much in demand. Her versatility as a linguist led to employment as a translator from various languages, and her ardent study of Hebrew was only stopped in recent years by her failing eyesight. She contributed to Colonel C. N. French's "A Countryman's Day Book," a collection of weather lore and country sayings formed by her grandmother. She kept in touch with an unusually large group of relations, and her letters were the delight of a wide circle of attached friends.

(almost reduced)
by Allen

THURSDAY FEBRUARY 23 1933

A STEVENSON QUERY

Sir,—I wonder whether some Stevenson collector can solve a small problem which has been vexing me for some days. The problem is whether there is a misprint in the first paragraph of the third chapter of "The Beach of Falesa" in "Island Nights' Entertainments." The sentence reads: "She was a long whale-boat painted white; a bit of an awning astern; a native pastor crouched on the wedge of the poop, steering; some four-and-twenty puddles flashing and dipping, true to the boat-song; and the missionary under the awning, in his white clothes, reading in a book, and set him up!" Now what, I have asked myself, do the last four words mean? I cannot make head or tail of the phrase. One allows for the fact that Wiltshire, the narrator, a trader, cannot be expected to use literary English; but even then the words seem to me to mean nothing in this place and in this connexion.

Yours faithfully,

GRANT RICHARDS.

8, Regent Street, London, S.W.1.

THURSDAY MARCH 2 1933

A STEVENSON QUERY

Sir,—I can assure Mr. Grant Richards that there is no misprint in the passage he quotes from Stevenson's "Island Nights' Entertainments." "And set him up" is excellent and familiar Scots and may be roughly rendered—"And isn't he proud of himself too!" In Wright's *Dialect Dictionary* "Set one up" is described as "an ironical phrase used in contempt of any one; only used in imperative," and the following parallel quotations are given: "Which makes me keener for your company, Mr. David Balfour of the Shaws, and set ye up" (Stevenson, "Catriona" (1893), XI), and "Set him up for confectioner" (Scott, "St. Ronan's Well" (1824), II).

Your obedient servant,

MACMILLAN.

44, Millbank, Westminster, S.W.1.

Sir,—There is no need to invoke a misprint to account for the passage in "The Beach of Falesa" which Mr. Grant Richards cites. The expression, "and set him up!" no doubt seemed to Stevenson a natural finale to the trader's description of the missionary "in his white clothes, reading in a book"—a description which is confessedly seasoned with envy. This is clear from "Weir of Hermiston," in which Stevenson himself was at pains to explain this expression for the benefit of the reader. When Kirstie entered the kitchen her Glasgow clothes "the sight of her white raised in the breasts of her rivals" a storm of varying emotion, from the mere unenvious admiration that was expressed in a long-drawn "Eh!" to the angrier feeling that found vent in an emphatic "Set her up!" Whether the trader, Wiltshire, who was not apparently Scottish, would have used this form of words, or, indeed, have talked of reading in a book, is another matter.

Yours faithfully,

AGNES ARBER.

52, Huntingdon Road, Cambridge.

THOMAS JOHNSON

Thomas Johnson: Botanist and Royalist. By H. Wallis Kew and H. E. Powell. Longmans, Green & Co. 1932. 8/6 net.

The most famous of the English herbals, that of John Gerard, was printed in 1597 and held the field without a competitor for more than a generation. Though the book was full of errors, no later version appeared during this time; it was not until rumours arose that John Parkinson would soon produce a new herbal to take its place, that the successors of Gerard's original publisher were brought to the point of undertaking a second edition. In 1632 they commissioned Thomas Johnson, a well-known London apothecary and botanist, to carry out the work, with the proviso that it must be completed in a year. This was a heavy task. It not only included the correction of Gerard's frequent mistakes, and the incorporation of an entirely different set of over 2,500 wood blocks from Antwerp (which had formerly illustrated the works of Dodoens, de l'Ecluse and de l'Obel) but also the writing of a comprehensive historical introduction. Johnson achieved all this with remarkable success. His editorial methods show a scholarly feeling which strikes one as surprisingly modern; he evolved an elaborate system of marking the text to distinguish the degrees to which he had altered or rewritten Gerard's descriptions, while those accounts of plants which he had received from his friend Goodyer, were printed in a form which made them readily recognisable.

His edition of Gerard, alone, was sufficient to establish Johnson's reputation, but his independent botanical work was, in reality, even more significant. His accounts of his plant-collecting excursions are the earliest attempts to record all the plants of England and Wales with their localities, and but for his early death in the Civil War, there is little doubt he would have carried out his intention of writing (in conjunction with Goodyer) a descriptive and illustrated British flora, of a type which did not actually come into being until the 18th century.

The fact that Thomas Johnson has hitherto lacked an adequate biography is partly accounted for by the extreme difficulty of tracking down the history of a man with so indistinctive a name. Mr Wallis Kew and Mr Powell have earned the gratitude of botanists by the way in which they have tackled this and other problems, and by the labour they have expended in exploring systematically every direction which might be expected to yield facts about Johnson's life. Though their researches have afforded little information about this 'herbarist' as a private individual, they have placed his botanical activity in a clear light. Those who are interested in the history of British botany will be stimulated by the book to a renewed study of Johnson's own work, and to a renewed appreciation of the scientific character of the man, who, in Fuller's words, was "of such modesty, that *knowing so Much, he would own the knowledge of Nothing*."

A. A.

Morphological Interpretation of Floral Anatomy

In the recent issue of the *New Phytologist*¹, Mrs. Agnes Arber, in a paper dealing with the above subject, raises certain points which are of fundamental importance to all plant morphologists. She discusses the use of anatomical evidence in phylogenetic morphology and comes to conclusions which are directly opposed to one of the well-established doctrines of modern comparative morphology. To the question, "Are we to consider it proven that the vascular bundles are more 'conservative' than the external form, so that vestigial organs may be represented by their bundles, when all external trace of these organs has disappeared", her answer is that "we have no alternative but to discard the doctrine of the conservatism of the vascular bundles". Proceeding further, she says, "there seems to be no escape from the conclusion that there is a complete absence of positive evidence for the vestigial survival of vascular tissue after the organ which it supplied has ceased to exist". She admits that the general nature of the vascular scheme may have a certain systematic value and may serve to some extent as an indicator of trends in phylogeny, but in her opinion there appears to be no basis, say, for the statement of Bower² that "anatomical characters and of the vascular system are apt to tardily follow evolutionary progress and therefore to persist as vestigia" (italics mine).

Mrs. Arber appears to be partially right in this, especially because an unintelligent use of the above doctrine has sometimes led to the formulation of peculiar hypotheses, like the theory of carpel polymorphism, but her whole argument seems to be too much exaggerated. In her evidence she takes into consideration some highly specialised grasses, like

Luciola Spruceana, Papaveraceae like *Hypocyon* and *Corydalis*, and genera like *Antirrhinum* and *Diphalis*, on which she has happened to work. She has consulted some old works on the Primulaceae wrongly interpreted by the previous authors and on the theory of solid carpel and carpel polymorphism, in which no one believes except its author, but makes no mention of some other recent works, especially from the United States. A reference to these would have shown her that evidence for the conservatism of vascular bundles is not so entirely lacking as she believes and that vestigial organs even in the flowers of angiosperms are represented in several instances by their vascular bundles. The Salicaceae are an example. Fisher³ has shown that the simplicity of reduction, and a vestigial vascular supply is present in many instances to organs now greatly reduced or entirely lacking. During the study of the scheme, Chute⁴ has found that sometimes there are abortive ovules without vascular supply, but in other instances an ovular trace is found to a suppressed ovule. Investigating the floral anatomy of the Urticales, Bechtel⁵ finds in several species vascular traces of suppressed perianth leaves, stamens and carpels. In this order the carpel is mostly bicarpellary, but there is a great tendency to the suppression of one carpel. In some instances it almost becomes unilocular, but vestigial bundles are always present to show the existence of the second carpel. In some cases the inner whorl of perianth has entirely disappeared, in other instances vestiges of its vascular supply remain. In *Stellera Chamaejasme* (Thymelaeaceae), a plant I have studied, the corolla is entirely absent. There is, however, near the base of the flower a small reduced disc-like structure. The vascular supply of this clearly indicates it to be a part of much reduced corolla.

All these examples are from the anatomy of the flowers of angiosperms, with which Mrs. Arber deals. As is well known, there are many more instances from other groups of vascular plants.

The position seems to be that it is not always essential for vestigial organs to be represented by their vascular bundles, but in many instances they are, and this seems to have been correctly stated by Bechtel in 1921. "In plant organs suffering reduction, the vascular system either disappears in advance of the organs, or persists as abortive bundles after the organs have disappeared."

Department of Botany,
Hindu University, Benares.
Oct. 1.

A. C. JOSHI.

¹ Arber, A., "Floral Anatomy and its Morphological Interpretation", *New Phyt.*, 32, 221, 1933.

² Bower, T. G., "The Ferns (Filicales)", vol. 1, Cambridge, 1923.

³ Fisher, M. J., "The Morphology and Anatomy of the Flowers of Salicaceae, I and II", *Amer. J. Bot.*, 13, 397, 1926.

⁴ Chute, H. M., "The Morphology and Anatomy of the Achene", *Amer. J. Bot.*, 17, 703, 1930.

⁵ Bechtel, A. L., "The Floral Anatomy of the Urticales", *Amer. J. Bot.*, 8, 336, 1921.

Is common with other botanists whose student life began in the nineteenth century, I was brought up to believe that, in the flowering plants, an individual vascular bundle might survive after the complete disappearance of the organ which it supplied in some ancestral stage. In my earlier papers I subscribed to this belief; it is only gradually—and, I may say, with reluctance—that I have come to the conclusion that its foundations are insecure. On reading the work of those who still hold to it, one's

first impression may well be that it is supported by ample evidence, but on analysis one finds that this impression is due to the fact that the existence of a lost, ancestral organ is postulated whenever, in the writer's view, it is required.

It is true that, in the paper which Prof. Joshi criticises, I have discussed the question mainly on the basis of my own observations; I have done this deliberately, because there are so many pitfalls in the study of 'vestigial' structures, that it is scarcely possible to arrive at a considered opinion about them, except at first hand. All students of floral anatomy are, of course, acquainted with the memoirs by Prof. A. J. Eames and the long series of papers by research workers at Cornell University who have been inspired by him. In the three papers from this series which Prof. Joshi cites, the idea that certain individual bundles may survive after the *total* disappearance of the organs which they once supplied—that *entire* floral structures—*is* throughout implicit. The writers tend to treat it, not as a hypothesis upon which further argument can safely be based. The question, which I have tried to raise, is whether there is sufficient positive evidence to make this assumption valid. Though my own experience has led me to think that there is not, critical study carried over a wider field may show that I am wrong. I hope that Prof. Joshi's letter may lead to a re-examination of the problem by other workers.

Cambridge,
Oct. 26.

AGNES ARBER.

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