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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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To this note & card also belongs:-

Herbar. Thae. Organ. Evolution. A Chapter in the History of Botany
A new edition rewritten & enlarged. Camb. University Press 1930-1938
1938. Publ. May 13, 1938

1. Review of further. Great Herbar. of Descriptions. Times. Nat. Sup. March 1, 1934
2. The Nomenclature of *Asplenium* with special reference to *A. Sprengeri* Reg. Ann. Bot. Vol. 49, April 1935
3. Review of Botany Primitive Land Plants. Camb. Review. May 10, 1935
4. " " Lady Rockley's Wild Flowers of the Great Dominions. Camb. Rev. Jan 31, 1936
5. " " Lady Rockley's Wild Flowers of the Great Dominions. Camb. Rev. Jan 31, 1936
6. A Recent Discovery in Sixteenth Century Botany. Nature Vol. 137, Feb 15, 1936
7. Studies in Flower Structure. II. On the vascular supply of the petal of *Ranunculus*. Ann. Bot. Vol. 50, April 1936
8. Studies in Flower Structure. III. On the 'corona' & androecium in certain *Asymmetria*. Ann. Bot. N.S. Vol. I. April 1937
9. The Interpretation of the Flower: a study of some aspects of morphological theory. Bot. Rev. Vol. 12, 1937
10. Remarks in discussion on Dr. Miss Sprague's paper on the Herbar. Valerian. C. B. & P. Proc. Linn. Soc. Lond. Session 1936-7 (Sept 1937) pp 158-9.
11. A Holiday through a Window. Sept. 1937. Times. Sept 16, 1937
12. Studies in Flower Structure. IV. On the gynoecium of *Papaver* related genera. Ann. Bot. N.S. Vol. II. July 1938
13. A Further Note on the Causing of Tumor. Camb. Rev. March 4, 1938
14. Herbar. Vol. 12, 1938
15. Herbar. Vol. 12, 1938
16. Review of *Heimann's* in *Antony Schimper's*. New Phytologist Vol. 37, 1938, p. 100
17. Studies in Flower Structure. V. On the interpretation of the petal & corona in *Lychnis*. Ann. Bot. N.S. Vol. III. April 1939
18. Review of *Pumilio's* of *Palaestina* by *Darrak*. New Phytologist
19. Miss D. F. M. P. Orling. Times. March 9, 1939
20. Miss Darrak. F. M. P. Orling. Nature Vol. 145, April 8, 1939
21. The Collection of Sixteenth Century Herbar. Nature. Vol. 145, May 25, 1940
22. An Asplen. Herbar. Nature Vol. 146, August 1940
23. Studies in Flower Structure. VI. On the Rosed. Vascular Tissue in the Apices of *Ranunculus* Shoots, in Special Reference to *Lilium* & *Anthriscus*. Ann. Bot. N.S. Vol. IV. July 1940
24. On grasses in Herbar. Evolution. Darwiniana. T. 5. (de homenaje a Darwin) R. Parodi. Buenos Aires. 1941
25. On the history of European Botany (Dijon) *Chimica Botanica*. VI. 8. 1941
26. The relation of *Nicholas* & *Marcello Malpighi*. *Chimica Botanica*. VI. 17/18, 1941
27. Terminology of *Nicholas* (1641-1711) Nature. Vol. 147, May 24, 1941
28. On the morphology of the proto-leaves in *Helianthus*, *Sarcocolla*, *Daphniphyllum*. *Cephalanthus*. *Repenster*. Ann. Bot. N.S. Vol. 5, 1941
29. *Nicholas* & *Marcello Malpighi*. Proc. Linn. Soc. London Session 1940-41, Nov 1941
30. The Interpretation of leaf & root in the *Asplenium*. Bot. Rev. Vol. 16, 1941, p. 11
31. Studies in Flower Structure. VII. On the gynoecium of *Rosella* with a consideration of parasitism. Ann. Bot. N.S. Vol. VI. Jan. 1942
32. *Nicholas* & *Marcello Malpighi* (1641-1711) & *Marcello Malpighi* (1628-1694): an essay in comparison. I. 1942, Summer number 1942.

Agnes Arber, 52 Huntingdon Road, Cambridge

THURSDAY MARCH 1 1934

AN EARLY HERBAL

THE GREEK HERBAL OF DIOSCORIDES. Illustrated by a Byzantine, A.D. 512. Englished by JOHN GOODYER, A.D. 1655. Edited and first printed, A.D. 1933, by ROBERT T. GUNTHER. (Oxford, printed for the author at the University Press. £3 3s. net.)

In the first century of the Christian Era Dioscorides of Anazarba, in Cilicia, compiled a great work on medical botany, which remained the standard for such studies in Western Europe for a period of some fifteen hundred years. It was translated and retranslated; and before the invention of printing it had assumed a variety of forms, some of which had become degraded out of all recognition. In the Library of Trinity College, Cambridge, there is a manuscript of the fourteenth century which appears to have been based upon a Hebrew version of an Arabic translation of Dioscorides; the copying and recopying of the accompanying illustrations have produced surprising results, some of which are worthy of Lear's "Nonsense Botany." The flowers of delphinium, for instance, have been converted into engaging blue fishes with red eyes, while the leaves of certain plants are given the form of a square, a crescent or a Maltese cross, and coloured green, red, blue and yellow in patches.

Side by side, however, with these debased manuscripts there were others of a more serious character, which preserved the writings of Dioscorides and his school until the invention of printing. The first printed versions were treated with the utmost reverence by the herbalists of the Renaissance and of later times—a reverence which was, in great measure, misplaced. When one examines the lengthy accounts of the medical qualities of the herbs with which the pages of Dioscorides are filled, it at once becomes clear that these "virtues" are often purely imaginary. Even in the seventeenth century, though the force of authority in matters of science was beginning to wane, the merits of this ancient *materia medica* were still being extolled. In 1633 Thomas Johnson, in his emended edition of Gerard's "Herball," spoke of Dioscorides as having reached "that perfection, that few or none since his time have attained to, of the excellence of his worke, which is as it were the foundation and ground-worke of all that hath been since delivered in this nature."

A botanical friend of Johnson's, John Goodyer, of Petersfield, had an admiration for Dioscorides which could not rest satisfied with merely praising him like Johnson; between the years 1652 and 1655 he copied out the whole of the Greek text and made an interlined translation into English, his manuscript occupying 4,540 quarto pages. This monument to his erudition and industry was not published during his lifetime, but it was bequeathed with his botanical library and notes to Magdalen College, Oxford. There it rested undisturbed until Dr. Gunther, who had already done much for Goodyer's memory, decided to bring it into the light at long last. He has not aimed at making a critical contribution to the study of Dioscorides; he offers the book rather as "a Greek work of the first century as understood in Hampshire in the sixteenth (sic) century." The source of Goodyer's Greek version is not stated, but presumably it was the Aldine Dioscorides of 1499, of which, according to Dr. Gunther's former work, "Early British Botanists," Goodyer possessed a copy. To what degree printed versions, such as this, represent the actual writings of Dioscorides is a difficult question, into which Dr. Gunther does not enter; historically the essential point is that such versions were in fact regarded as authoritative by the botanists of the seventeenth century.

Goodyer's translation reveals the mixture of scientific insight and of superstitious credulity which one might expect to find in a work which is probably mutilated and composite. In his preface Dioscorides points out that anyone who wishes to be a skillful herbalist must observe each plant at every stage of its growth and in various localities—advice which is often overlooked even to-day. Here and there in the text there are evidences, also, that he approached botany in a spirit of healthy scepticism. He notes, for instance, that "some have related that if one having beaten ramnes hornes in pieces do bury them, Asparagus comes up, which yet is incredible to mee." In other passages of Goodyer's translation, however, it is credulity which is uppermost. We read, for instance, that "The old leather of old soles of shoes, beeing burnt, beaten to powder, and soe layed on do help . . . gallings occasioned by wearing of shoes," and that those bitten by a mad dog use "the dogge tooth of that dogge which did bite, putting it into a bagge, and soe tying it to the arme."

THE TIMES LITERARY SUPPLEMENT

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The greater part of the text relating to each plant deals with its medicinal "virtues," the actual descriptions being meagre. Almost any paragraph would serve to illustrate the lack of scientific exactness in the descriptions, which often have a certain charm. As an example chosen at random we might take the account of the Wood Germander: "It is a small shrub, a span long, having little leaves, like in shape and in ye jagging to an oak, bitter, ye flower of a pale purple, little." Other herbs are indicated more picturesquely, but still without precision. One of the plants described as Geranium, for instance, has "slender little stalks, downy, 2 spans long, leaves like Mallows, and on ye tops of ye wings certain excrescencies looking upward, as ye heads of Cranes with ye beaks or ye teeth of dogs." It is clear that the detailed identification of

plants described on such lines presents overwhelming difficulty; but, in the past, the lack of clear particulars has not been the only pitfall. The fact that even to-day the naming of the plants of Dioscorides remains in a confused and imperfect state is mainly attributable to the defects in the descriptions, but it may also be due, to some extent, to the incompleteness of our knowledge of the Greek flora.

The difficulty of determining exactly what plants Dioscorides had in mind lends a special interest to the earlier illustrated manuscripts of his *materia medica*. The most renowned of these is the Codex prepared at Constantinople in the sixth century A.D. for presentation to Juliana Anicia, a patrician lady whose father, Flavius Anicius Olybrius, was for a few months the Emperor of the West. This manuscript contains a series of plant drawings of varying quality, of which the best are naturalistic and remarkably beautiful. It is probably safe to assume that these drawings were not done direct from nature, but belonged to a school of traditional art which originated in the first century before Christ, or perhaps much earlier. Dr. Gunther has illustrated his book by means of reproductions of the Juliana Anicia pictures, reduced in various degrees. Though these drawings, which are the work of Miss F. A. Borsari, are of a delightful quality, the fact that the delicate paintings of the original have been freshly rendered into vivid black and white, recalling early woodcuts, and sometimes even into silhouettes, to some extent detracts from their documentary value. Those who wish to arrive at a critical appreciation of the character of the illustrations in the Codex Aniciae Julianae will still find it necessary to turn to the magnificent facsimile published at Leyden in 1906, which also includes a detailed study of the Codex from various standpoints. These great volumes can only be a possession, however, for the favoured few, and the series of nearly four hundred figures which Dr. Gunther has provided in this more accessible form is sufficient in itself to secure to his book a warm welcome.

ARBER, AGNES
THE 'NEEDLES' OF ASPARAGUS, WITH SPECIAL
REFERENCE TO A. SPRENGERI REG.

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PRIMITIVE LAND PLANTS

Primitive Land Plants also known as the Archegoniatae. By
F. O. Bower, Sc.D., LL.D., F.R.S. Macmillan & Co., Ltd.
1935. 30/-

Professor F. O. Bower, the doyen of British botanists, is able to look back over a lifetime of research, which, though it has involved publication extending through more than half a century, forms, from first to last, a unified and consistent whole. The scope of the present book, in which his work finds its most recent expression, is much wider than its main title may seem to suggest. It provides an account of the morphology of all the groups of the vegetable kingdom which lie between the thallophytes and the seed-plants. The amount of detailed information which it contains gives it great value as a work of reference.

The author explains that *Primitive Land Plants* is not to be regarded as a second edition of *The Origin of a Land Flora*, published in 1908. The new facts about the floras of the Devonian, which have been brought to light within the last twenty years, have so markedly enriched the material coming within his survey, that he has felt the necessity for a fresh treatment of the entire field. He considers that, while the gulf between the algae and the archegoniatae remains as wide as ever, certain of the more recently revealed fossil types "can hardly be read otherwise than as synthetic," and as bridging the gulf between "mosses" and "ferns." From his point of view, the immense range of forms which he takes as his province thus presents an aspect of greater coherence than in 1908.

An important respect in which *Primitive Land Plants* differs from *The Origin of a Land Flora* is in the stress laid upon the Principle of Similarity—a principle which Professor Bower discussed, with special reference to the conducting tracts, in his book on *Size and Form in Plants* (1929). Since physiological interchange is conducted through limiting surfaces, the relation of the area of these surfaces to the masses which they have to serve becomes of crucial importance, for growth in size, which involves a constantly decreasing ratio of surface to bulk, may easily lead to physiological inefficiency. Professor Bower regards many of the external and anatomical complexities associated with increased size, as modes of "levelling up the proportion of surface to bulk." In the present book he analyses the part played by the "Size-Factor" within the archegoniatae.

It is interesting to compare Professor Bower's book with Professor Zimmermann's *Die Phylogenie der Pflanzen* (1932), in which many of the same topics are treated. Bower makes use of the set of conceptions associated with Zimmermann's word "telome," though he does not accept these ideas in their entirety. He adopts the term "telome" because of its advantages in "crystallising out" the spore-bearing unit, and also because it encourages that approach to evolutionary problems which starts from the earliest known plants and works upwards—thus avoiding the recognised dangers of the reverse method. But despite this convergence, the attitude of the two authors is widely different, especially towards the fundamental problem of alternation of generations. Zimmermann, after a full discussion of the question, concludes that the probabilities favour the view that the generations were originally similar, while Bower, on the other hand, treats the sporophyte as an "interpolation" in the life history; he thus still maintains the "antithetic" view with which his name has been for so long associated. But even those who cannot accept "interpolation" as affording a picture of an actual evolutionary process, may well admit, on reading *Primitive Land Plants*, that this hypothesis has its use in providing a continuous thread upon which the innumerable facts brought together by the author can be strung in orderly fashion.

A. A.

AT A HARVEST FAIR

OLD CORNISH WRESTLING

FROM A CORRESPONDENT

In the little town in the far west of Cornwall the last fair of the year was in full swing. From the high road we looked down over the cattle market—a medley of cows, calves, sheep, and men. The main street was lined with stalls for toys and eatables and every kind of odd-coming, short, including dolls made of straw bundles tied appropriately and roughly dressed.

A notice of Old Cornish Wrestling drew us to a field behind one of the inns. The roped-in ring was a rectangle of irregular pasture land, from which the ground sloped up to form a natural amphitheatre. A crowd, numbering five or six hundred, gradually gathered round the ring—a crowd that was almost silent throughout the afternoon, except for an occasional cry of "Hold'er!" or "Dig in!" Some

of the elder onlookers were not wholly satisfied with the prowess of the present generation. The chief complaint seemed to be that they did not hold on hard enough—"When they get'm they leave'm go," grumbled an old man beside me.

In Cornish wrestling feet must be either bare or stockinged, and in addition to shorts each wrestler wears a loose white canvas jacket with half-sleeves, open but with two cords across the chest, which gives the figure a Japanese look. After the first wary handshake each man generally tries to roll and grasp his opponent's jacket, but "break" is called if the pull draws the jacket right over the head. A fall must be on the back, and either two hips and one shoulder blade, or two shoulder blades and one hip, must touch the ground simultaneously. Any kind of brutality is outlawed, and during this match three "sticklers" circled constantly round the wrestlers as they moved about the ring, so that the slightest infringement of the code would have been detected at once. But the good humour of the wrestlers and their loyalty to the conditions were such that scarcely any interference was necessary.

As the champion of Cornwall was taking part, we were able to see the game in its perfection as well as in its more rudimentary form. In the less sophisticated bouts the wrestlers used their shoulders and arms almost exclusively, but in the more advanced contests the body and all the limbs came harmoniously into play. The champion was a young man with a pale, serious face, who might have been a Greek athlete but for his Cornish profile. The game was in his blood, for his father had been a wrestler before him. The other combatants, when they threw a man, did so with apparent effort, and it was often a question whether the conditions for a fall had been exactly fulfilled. But the champion picked up his man with unruffled serenity and laid him squarely, but with surprising gentleness, upon the ground. It was like seeing a struggling baby dumped on its back upon a mattress by a father who remains sympathetic though he will stand no nonsense.

When the champion was pitted against the man who was most nearly his equal, the wrestling showed approaches to a ritual dance. It became static, the active movements were interrupted by pauses broken only by the slight tense ripple of muscle, and by vibrations which were felt rather than seen.

After four hours or so the wrestling drew to a close. We wandered again through the fair and then trudged home. As we turned out of the high road we met the last of many latecomers—a man driving a mettlesome donkey in a tiny gaily-painted trotting car, all wheels and scat. With shouts that came eerily through the twilight he encouraged her to take him quickly to the harvest fair.

January 31, 1936

The Cambridge Review

EMPIRE FLOWERS

Wild Flowers of the Great Dominions of the British Empire.
By the Lady Rockley, C.B.E. Macmillan & Co. 16s.

The author of this book is better known as the Hon. Alicia Amherst, whose "History of Gardening in England," first published forty years ago, achieved immediate and lasting popularity. A later volume—"London Parks and Gardens"—appeared, for the confusion of bibliographers, under the name of the Hon. Mrs Evelyn Cecil. The present book has arisen out of the author's botanical experiences in the Dominions. Her first expedition was to Rhodesia, where, in 1899, she collected over forty species which were previously unknown; and plant-hunting object has been Oversea Settlement work. She has set herself to describe, within one manageable volume, the plants of Canada, Australia, New Zealand, South Africa, Rhodesia and Kenya. In the condensation, which such a task demands, she has been somewhat handicapped by a flowery pen, which turns to favour and to prettiness, and which slips readily into the quotation of indifferent verse. But although many pages of the book are little more than an ecstatic catalogue, the author succeeds in transmitting her enthusiasm, and in presenting a vivid picture of the floras with which she deals.

There is no need to discuss the book from the purely botanical standpoint, since it is based upon well known works, which are enumerated. It is by the inclusion of much entertaining detail that it is made readable. Lady Rockley shows, for instance, that the Dominions are rich in popular flower names, attractive examples from Canada are Single Delight, Shooting Star, Moccasin Flower, and Tow-headed Baby. The South African name, Pig Lily, for the White Arum, seems inappropriate until one learns that it is so called because its root-stocks are eaten by porcupines, which the early settlers called pigs. Among "rationalisations" are recorded; *Anthylaea* in South Africa becomes "Aunt Eliza," while, in Australia, *Banksia* has been cited in "Bohemia tree." The latter is not the only example familiar. "African Marigold," for instance, is in reality a Mexican plant (*Tagetes*). *Yallota purpurea*, again, which grows between Cape Town and Port Elizabeth, has long been known in England as the "Scarborough Lily," because the first bulbs to reach this country were washed ashore from a wreck on the Yorkshire coast in 1774: the crimson *Nerine*, another South African plant, owes its name of "Guernsey Lily" to the fact that it was first cultivated in the Channel Islands from bulbs shipwrecked there in 1659. Some of the useful plants, of which Lady Rockley tells, recall the opportune discoveries of the Swiss Family Robinson. There was the bush, for instance, of which the Dutch settlers in South Africa boasted to Carl Thunberg in the eighteenth century, of a substance conveniently grew "caps, gloves, worsted stockings, etc." a huge Umbellifer, whose basal leaves were covered with a downy coat, which could, with a little assistance from dexterous scissors, be moulded into the articles named. Another hairy plant, the Mutton-bird shrub of New Zealand (related to our Groundsel) has strong leaves with their undersides so thickly covered with buff coloured down, that tourists to-day use them as postcards on which to scratch messages. And it is not only human needs which Lady Rockley considers. She tells us, for instance, that a *Clematis* which grows in Kenya has roots which, when crushed, emit a strong pungent smell, and that the natives use these roots as "smelling salts."

One of the author's aims has been to give to those, whose lot is cast in one corner of the Empire, an opportunity of appreciating the plant world which forms the background of other regions. Her sketches and flower studies, reproduced in colour, will contribute towards this end; they are freely handled, and some of them are of unusual charm.

A. A.

A Recent Discovery in Sixteenth Century Botany

By DR. AGNES ARBER

WHEN, a few years ago, Prof. Walther Rytz of the University of Bern was reviewing the collections in the Botanical Institute, he brought to light a herbarium in nine folios, the existence of which had been forgotten for more than a century. The history of these volumes, so far as it could then be traced, was that in 1806 they had been received by a bookseller in Bern from an antiquary in Zurich who owed him four *louis d'or* which he was unable to pay; six years later, the Bern dealer sold the nine folios for a single *louis d'or* to a botanist, through whom they came into the possession of the Institute. Since the collection was obviously a remarkable one, and appeared to be of early date, Dr. Rytz examined it minutely. His researches and their results make a fascinating story, which is now set out in fully illustrated form.

Of the nine folios, the herbarium occupies eight, while the ninth contains illustrations alone. The herbarium is far from complete; there is reason for believing that about ten more volumes may await some future happy discovery. Even in its incomplete form the collection contains 813 species drawn from a wide geographical area—Switzerland, Italy, France, Spain and Egypt. It also indicates activity of an adventurous kind, for there are specimens from Pilatus, Monte Baldo and the mountains of Savoy—peaks arousing little emotion among the alpinists of to-day, but most formidable in the eyes of the men of earlier centuries.

*Das Herbarium Felts Plattner. Ein Beitrag zur Geschichte der Botanik des XVI. Jahrhunderts. By Prof. Walther Rytz. (Verhandl. Naturforsch. Gesellsch. Basel, 44, pt. 1, 222 pp., 22 figures. (Basel: Naturforsch. Gesellsch., 1931.) 3 Sw. fr.)
Pflanzenquellen des Hans Weiditz aus dem Jahre 1529: die Originale zu den Holzschnitten im Brunschwiler Kräuterbuch. By Prof. Walther Rytz. 44 pp., 15 coloured plates. (Bern: Paul Haupt, 1936.) 60 Sw. fr.

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ARBER, AGNES

STUDIES IN FLOWER STRUCTURE

II. ON THE VASCULAR SUPPLY TO THE NECTARY
IN *RANUNCULUS*

Reprinted from *Annals of Botany*
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Pages 305-320

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ARBER, AGNES

STUDIES IN FLOWER STRUCTURE

III. ON THE 'CORONA' AND ANDROECIUM IN CERTAIN
AMARYLLIDACEAE

Reprinted from Annals of Botany
New Series Vol. I No. 2 April 1937
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9
THE INTERPRETATION OF THE FLOWER:
A STUDY OF SOME ASPECTS OF
MORPHOLOGICAL THOUGHT

BY
AGNES ARBER

[REPRINTED FROM BIOLOGICAL REVIEWS, Vol. 12, 1937, p. 157]

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CAMBRIDGE: AT THE UNIVERSITY PRESS

PRINTED IN GREAT BRITAIN

BIOLOGICAL REVIEWS

CONTENTS OF VOL. 12, No. 3

July 1937

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E. S. RUSSELL. Fish migrations.

H. LULLIES. Die Messung und Bedeutung der elektrolytischen Polarisation im Nerven.

J. H. BIRKINSHAW. Biochemistry of the lower fungi.

Dr. A. Arber
with compliments
from L.S. & M.S.L.

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(Please bind as a whole)

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The horse-drawn barrel which toils to and
fro along the road carries the reminder
that no rain for a month involves the heavy
task of "pulling" water for the cattle.

A HOLIDAY THROUGH
A WINDOWSIGHTS AND SOUNDS IN A
CORNISH VALLEY

FROM A CORRESPONDENT

It was to have been a walking holiday, but the fracture of a bone put an end to all planned activities, leaving nothing except what the eye can reach from a window looking over an inland valley far to the west in Cornwall. In the foreground of the picture stands a "scale object," a solitary cordyline, swaying on its slender trunk, its yard-long leaves, ribboned by the wind, rustling and moaning as if homesick for a still more southerly air; it seems to be rooted as reluctantly as the observer regarding it from the sofa.

In the early morning, looking across to the opposite slope of the valley, the fields in the dimness suggest a pleasantly faded patchwork quilt, while the curving woods might be an eiderdown thrown back untidily. Then, as the sun lights it up, the bedspread is transformed into quiet-coloured stained glass, the dark "tending" of the hedges outlines the delicately translucent bushes of stubble and pasture, the full green of cabbage fields, and the warmly tinted areas of bare earth. On the distant ridge a house gazes, four-square, across the valley; its familiar look is puzzling until a sunbeam reveals it as the friendly face of the Cheshire Cat, with chimney-ears, peering over the edge. In a field on the far slope of the valley corn is being carried, and tiny wagons pass and repass with their toy-like horses and men. Echo brings to the window a faint creak and rumble from their wheels. Such sounds make themselves felt upon a background of soundlessness; to town-dwellers the quiet of the valley is a positive and active quality, not the mere negation of noise.

The picture of the cornfield brightens, and dulls, and brightens again. In this peninsular country the sky changes not from hour to hour but from minute to minute. A soft ceiling of mist, or a dome of cloud, almost instantaneously cloaks the blue brilliance, and then, before the loss has had time to make itself felt, the sky is suddenly swept clean again and the sun is flooding the valley all too strongly. The horse-drawn barrel which toils to and fro along the road carries the reminder that no rain for a month involves the heavy task of "pulling" water for the cattle.

The sunlight reveals, too, the power-lines and telegraph-wires threading the landscape like glistening spiders' webs, and, below the crest of the ridge, the little train, weaving busily shuttle-like on its short journey; it travels mostly in cuttings, where it can neither be seen nor heard, but from which it sheds its evanescent cotton-wool over the fields. Neither wires nor rails are discordant intrusions. Like the road, they follow the direction laid down long ago by the stream which carved the valley into whose life they are incorporated. They connect the valley with the world outside without destroying its own individuality. Such links with the remote "up country" might have been warmly welcomed by some of those who in the distant past walked the valley, but who now lie in the churchyard—Chariy Prideaux, Bathsheba Glasson, Hannibal Orchard, Christopher Wedlock, Trevithicks, Carlyons, Varthas, Polkinghorne, and "Ann, Wife of Wm. Gluyas Mercht, in Marazion." There is no tyranny here of lordly names. It is typical of the Cornish countryside that Breage Church has its great wall-painting of the Crowned Christ, surrounded by the implements of labour, each hallowed by a jet of the Sacred Blood—trowel and shears, axe and cart, arrow, scythe, and anchor, and to show that man shall not live by bread alone, a lute whose lineaments have survived the crumbling of the plaster which has obliterated many of the symbols of material cares.

Fancy, feeling its way into the past, is recalled to the present by the reiteration of a soft, regretful fussy noise; on the top of the grey wall outside, nine young turkeys appear in silhouette, the sun glowing through their scarlet neckties. They have evidently meditated a raid upon the garden but the intention wanes perceptibly at the sight of an alien face. After a few minutes of mopping and mowing and quiet complaining conversation they flop back one by one into their field, still uttering mild lamentation.

With the fall of evening the landscape slips gradually into monochrome, and at last takes on the appearance of a pencil sketch in which the distance has been "faintly out" with bread crumb. The wind drops and the cordyline at last is still. It no longer strains at its roots; its life has become one with that of the valley. Its present peace, like its past restlessness, is shared by the watcher at the window.

P. S. R.
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im
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ARBER, AGNES

STUDIES IN FLOWER STRUCTURE

IV. ON THE GYNÆCEUM OF PAPAVER AND RELATED
GENERA

Reprinted from *Annals of Botany*
New Series Vol. II No. 7 July 1938

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March 4, 1938

13
The Cambridge Review

A Further Note on the Carving of St
John's College Gateway

Mrs Shore's identification of the four-petalled flowers on the gateway of St John's College as speedwell (*Veronica*), and hence as Lady Margaret's "fleur de souvenance," seems a peculiarly happy thought. It is not a far cry from the archaic word "souvenance" (used in the fifteenth century, and later, for "remembrance") to "sophanyes," and thence to "syphanyes." To complete the chain of evidence we need to find a contemporary or earlier example of "fleur de souvenance" (or some such phrase) used, in France or England, definitely to mean *Veronica*; but this link at present eludes us. It may be because the name was rarely employed that the scribe, who was responsible for the list of Lady Margaret's embroideries, misunderstood and corrupted it.

While the subject is under discussion, another point of interpretation may perhaps be considered. It is clear that the flowers are not merely in "bunches," but are among growing plants. By considering the background a uniform green, those who painted the gateway have shown that they understood the design in the sense of Chaucer's "mede Al ful of freshe floures"; but is this necessarily what the original craftsman had in his mind's eye? The carving seems rather to represent a set of small raised beds with narrow paths between. Such beds are frequent in garden pictures from the middle ages to the seventeenth century. Many examples are reproduced in Sir Frank Crisp's *Mediaeval Gardens* (1924), in addition to illustrations of "flowery medes." The beds were commonly rectangular, and this form has been employed in the gateway, so far as the exigencies of the design would allow. In early pictures the plants are often sparsely arranged, an individual specimen alone being sometimes allotted to a bed; this feature also reappears in the St John's carving. Whether sparse planting was, in practice, characteristic of the gardens of the period is more than doubtful. This doubt, however, does not affect our argument, since we are not concerned here with the actual history of gardening, but merely with the particular stylised mode in which early artists were in the habit of representing garden scenes.

The fox going to earth with his booty, and the other burrows indicated in the carving, may perhaps be held to militate against the garden interpretation; but to exclude animal life from a garden was probably less easy in the sixteenth century than it is today. Moreover it is quite likely that the artist introduced the burrows for no more serious reason than that they gave him an opportunity of using the favourite fox and goose motive, and of filling blank spaces with pleasing curlicues, which he could carve with enjoyment.

AGNES ARBER

SATURDAY JULY 2 1938

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HENRY VII AND A HERBAL

Sir,—In the account of the Ham House Library sale in your issue of June 11, mention is made of the magnificent "Ortus sanitatis," published by Vêrard, and illuminated on vellum, which fetched £1,250. It is noted that, though the book was evidently intended for Henry VII, whether he took delivery of it remains uncertain. The writer who describes the sale takes the view that the volume in question cannot possibly be the copy of this work for which the King's Treasurer is recorded to have paid £6, since it could not have been assigned for so small a sum if it had been printed on vellum. May I confirm this view by recalling that in the British Museum there is a fine but relatively modest copy, not on vellum, which has been identified as that which Henry VII actually purchased with his £6; one cannot but respect his taste in preferring it—as he apparently did—to a book "extravagantly" decorated. A description of the British Museum version will be found on page 70 of J. Macfarlane's study of Antoine Vêrard (Bibl. Soc. Illustrated Monographs, No. 7, 1900 for 1899).

AGNES ARBER,

WEST CORNWALL

THE PAST IN THE PRESENT

FROM A CORRESPONDENT

It lay flat on its baking-tin in the village shop, two foot six of it, a slightly mysterious object to the visitor from up the country until it was explained as being the corn-sheaf for a harvest festival. It was, indeed, a miracle in fancy bread, exquisitely modelled in low relief, and delicately browned with charming variations of tone and shininess.

The baker, in this harvest month, was constructing eight of these trophies for eight different chapels. His wife told how it would be erected, surrounded by a galaxy of cottage loaves, little perfections in their kind. Beside it would be set an actual sheaf of corn, so that the whole would stand for the works of God and for the wholesome uses to which they are put by man. As the baker's wife spoke she radiated delight in the symbolism she was describing: one saw, unextinguished by the Nonconformist present, the spirit of Cornish forebears who had rejoiced long ago in the coloured and allegorical ritual of the Church of Rome.

Like for the old religion was indeed deeply rooted in the West Cornish temperament. Even before the men of Cornwall in 1549 rebelled against the first Prayer-book of Edward VI there was a riot in the streets of Helston, where a commissioner guilty of vandalism in the Church of St. Michael met his death. In the Hal-an-Tow song, still chanted every year on Helston Furry Day "to fetch the summer home," there are two puzzling lines which may date back to those years of trouble:—

God bless Aunt Mary Moses
And all her power and might, O.

The "Aunt Mary Moses" of the song has developed into a legendary figure, and it is on record that 80 years ago, in a revel associated with Furry Day and called "The Mock Mayor of St. John's," this unknown lady was billed as appearing "on a white palfrey with her squires and attendants"; but her identity has remained undetermined.

The suggestion has been made that the reference is to the Virgin Mary, and that "Aunt" is a term of endearment. So familiar an address is less than probable, and moreover this explanation leaves "Moses" unaccounted for. The visitor from up-the-country, reflecting on the obscure line, was struck with the notion that the whole phrase, preceded by the vibrant ending of "bless," might camouflage a rapid repetition of "Sanctus Maria, ora pro nobis." A parallel may be found in the old Cornish use of "Numny dummy" to exorcise a ghost, which is clearly a hidden version of "In Nomine

Domini." If this interpretation of "Aunt Mary Moses" is right, the men who now join in the Hal-an-Tow at Helston in St. Michael's spring festival are keeping alive, though unwittingly, a relic of the ancient faith.

In the remoter parts of Cornwall the past penetrates the present as the granite breaks through the thin soil. The men in their characteristic height and strength of feature look as if they might well be descendants of the faithful who, four centuries ago, fell upon the commissioner in the market-town because he had violated their sacred places. It is not unnatural that people of this fine and severe structural type should, in their general talk, favour the word "handsome" as a term of approval. A nice day is "handsome," and even the doctor's mixture may be praised as "a handsome medicine." Their language, when the elements traceable to the wireless are disentangled from it, has an emotional tinge which belies a certain hardness in their mien. There is a delicious incongruity in hearing a farmer, cast in a heroic mould and looking as if he might be a reincarnation of that Elshu Palamoutain who flourished hereabouts 200 years ago, addressing a hen or a fifti lorry driver as "My dear," and his small boy as "My lovely."

In more crowded country the past had to give way on every hand to the insistent claims of the present; but West Cornwall has room for what is dead-and-gone to coexist with the living. The days when tin mining was a vast industry here, employing hosts of men, are still reflected in the deserted mine buildings dotted about the uplands. In their ruinous state they accord completely with the grim setting of moor scarred by old workings and spoil heaps, which are softened but not obliterated by wind-swept gorse and heather. The mine chimneys are built below of massive granite blocks and skilfully set into a tapering form, while the slenderer region above is of suave red brick. Beside it stands the two-storeyed granite building which once housed the machines, now roofless and falling into decay; its greyness is tempered by the curves of brick crowning the windows, and by the waving grasses that make a shift to grow between the loosened stones of the once solid walls.

These ruins, in their gigantic scale, severe economy of line, and subtlety of colour, are not unworthy of the distant shining of the sea, for which their gaping doors or shattered windows often form an arching frame. They have a functional harmony independent of any conscious desire to produce a thing of beauty; it may be an expression of that controlled fervour which finds its scope not only in the Cornishman's religion but in his daily work, whether in one generation he builds a mine chimney or in another bunches his well-tended anemones for their long journey to the distant world of streets.

Reviews

Anton Schneeberger (1530-1581) ein Schüler Konrad Gesners in Polen. By B. Hryniewicz. 64 pp., 11 text-figures. Heft 13. 1938. Veröffentlichungen des Geobotan. Institutes Rübel in Zürich. Bern: Hans Huber. Price Fr. 3.50 or RM 2.10.

In the diffusion of botany over Europe during the sixteenth century, a conspicuous part was played by the Swiss naturalist, Konrad Gesner of Zürich. Among his many devoted pupils was a certain Anton Schneeberger, whose career & work have been studied intensively by Prof. Hryniewicz in the memoir under review.

Schneeberger — the great-grandson of a Basarian physician who had migrated to Zürich — was born in 1530. Little is known about his education as a youth, except that Gesner, who speaks of him as "discipulus germanus meus, charissimus", taught him Greek & inspired him with love in natural science & medicine. At about the age of twenty, when Anton left Switzerland for Poland, he matriculated at the University of Kraków. After various wanderings he took his Doctor's degree in Philosophy & Medicine in Paris, but he eventually returned to Kraków where he settled; he spent the rest of his life as a physician in that town. In addition to purely medical writings, including the earlier *de causis* now printed upon his own, he produced a work on botany. Konrad Gesner, among his pupils, he produced a catalogue of plants known in four languages — Latin, Greek, German & French. Among the pupils of his master, Schneeberger occupied himself with a *Catalogus Rariorum quarundam natione ac Poloniae con-* scriptus. This small book, which is now a great rarity, appeared at Kraków in 1557. In it Schneeberger identified the plants of Poland in the aid of the herbaria available in the place, but had been published in other countries of Europe. One has had been published in other countries of Europe. He cites twenty-seven writers, of whom Gesner, Mattioli, Boerhaave, Ruell, & Fuchs are the most frequently named.

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ARBER, A.

STUDIES IN FLOWER STRUCTURE

V. ON THE INTERPRETATION OF THE PETAL AND
'CORONA' IN LYCHNIS

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THE TIMES THURSDAY MARCH 9 1939

Principles of Paleobotany. By W. C. DARRAH. A New Series of Plant Science Books, edited by F. VERDOORN, Vol. III. $6\frac{1}{2} \times 9\frac{1}{2}$ in. 239 pp., 6 pl. Leiden, Chronica Botanica Co.; London: Wm. Dawson and Sons, Ltd. 1939. 7 guilders or about 15s.

Dr Darrah of Harvard states in his Foreword that his purpose in this work has been to produce a general introductory survey of the field of palaeobotany. This aim has been fully attained, and the list of references accompanying each chapter will give the reader every help in pursuing the subject further; but there is perhaps undue hopefulness in the author's remark that, since most of the cited papers are accompanied by comprehensive bibliographies, the reader "can soon cover the subject well". Throughout the book the geological aspect is kept steadily in view, and the account of the changes which the face of the earth has undergone is excellently dynamic. The author's correlations of American and European horizons, where these are important in fossil botany, will be useful on this side of the Atlantic.

In the introductory section, the history of palaeobotany is briefly sketched; an unusual feature is the inclusion of the names and nationalities of those now at work upon the subject, as well as of those whose contribution is of the past. Another preliminary chapter, on palaeobotanical techniques, gives full practical directions for the making of sections, nitrocellulose peels, coal macerations, etc. In the main body of the work, the different phyla of fossil plants are discussed, partly in botanical grouping, and partly as floras. The lively briskness of Dr Darrah's style carries the reader through the mass of detail presented, but it is questionable whether the student can be expected to master this vast array of facts, with only the limited aid of the relatively few and often over-reduced line drawings with which the book is illustrated; these are described as "plates", but in this country they would probably have been called text-figures. If, as is likely, Dr Darrah's book runs into further editions, it would be a great advantage if more pictures could be added, for illustrations are of paramount importance in a subject in which the student can never actually see or handle more than a very small proportion of the types which he is expected to visualize.

Dr Darrah bases his general views upon the reline theory and boldly gives a phylogenetic chart deriving all the vascular plants from the Psilopsida-complex. He discusses with vigour and acuteness many of the problems with which palaeobotanists are faced, but his conclusions occasionally bear the marks of over-rapid thought. This is noticeable, for instance, in his account of the relations of woody and herbaceous plants. After alluding to the anatomy of certain petrified woods, he remarks "that nothing contradictory to the notion that the woody habit is the oldest among angiosperms is found among these Cretaceous woods"; but the Cretaceous woods themselves can hardly be expected to produce evidence against this hypothesis. After reviewing the opinions of various authors, Dr Darrah finally accepts the idea that it "may be assumed with confidence that the woody habit is ancestral"; but it may

be pointed out that H. A. Senn's recent discussion of the question (*Bibliographia Genetica*, 12, 1938, 303 *et seq.*) demonstrates the insecurity of this assumption.

Within less than 250 pages, Dr Darrah has indeed given the student of fossil plants overflowing measure, but yet it may be doubted whether the book, admirable as it is, quite fulfils the promise of its title. Palaeobotany is relatively so young a science that the time is perhaps scarcely ripe for that organized and integrated examination of its modes of thought, which must precede any valid attempt to analyse them into their principles.

AGNES ARBER

New Phytologist

There is an long-organised tradition including not only Victorian but also pre-Victorian elements, and sometimes representing both the swing and the return of the pendulum. She could recall, for instance, that her mother considered it ridiculous, but that the women of her grandmother's period were inclined to blame her mother for holding an opinion which they felt

MISS D. F. M. PERTZ

LINK WITH VICTORIAN AND
GEORGIAN DAYS

Miss Dorothea Francis Matilda Pertz, for many years a research worker in the Cambridge Botany School, died at Cranmer Road, Cambridge, on Monday, at the age of 79. Dr. Agnes Arber writes:—

The death of Dora Pertz severs a link with the scientific life of Victorian and even Georgian days. It was probably from her grandfather, Leonard Horner, that she inherited her urge both to the pursuit of science and to social work. Horner was made an F.R.S. as long ago as 1813; he was twice president of the Geological Society, and was also one of the first inspectors to be appointed under the Factory Act of 1833. Dora's mother, Leonora Horner, was the second wife of Chevalier Pertz, Editor of the *Monumenta Germanica*, and Royal Librarian in Berlin. After Dr. Pertz's death his widow and daughters lived for a time in Florence, and then returned to London, moving ultimately to Cambridge. An incident of their London period, when their circle included writers as well as men of science, may be worth recording. One day, when Dora had been to see an aunt who lived near, she re-entered the drawing-room to find Henry James sitting with her mother. "Miss Pertz asked, 'Where have you been?' and the reply was, 'The other house'—a name used among them for what was practically a second home. Henry James seized upon the phrase, and repeated it more than once in a reflective way. Perhaps it appealed to him as one of those seemingly simple descriptions which may be made to bear a wealth of subtle implications. We may hazard the guess that, later on, when he gave this title to one of his novels, Dora Pertz's chance remark was in his mind.

Miss Pertz's eldest sister had married Sir Charles Lyell, the geologist, and "Uncle Charles" was an adored figure of Dora's childhood. Dora also had youthful recollections of staying with the Darwins at Down, and enjoying that glorious resource of the Victorian child, the "nursery yacht." The Darwin connexion was of great importance in her life. After reading Natural Sciences at Newnham College, she spent some of her happiest years working at plant physiology under Charles Darwin's son Francis (later Sir Francis Darwin). More recently, when Down House became a museum, she contributed to its collections various association objects of the Darwin-Lyell period, including one of the geological hammers used by Sir Charles Lyell.

On both sides Dora Pertz came of families which were long-lived, and in which the generations were widely spaced; her own father was born as long ago as 1795. As a result, she was conscious of a tradition including not only Victorian but also pre-Victorian elements, and sometimes representing both the swing and the return of the pendulum. She could recall, for instance, that her mother considered Fielding unreadable, but that the women of her grandmother's period were inclined to blame her mother for holding an opinion which they felt

to be proudest. With the more modern world Dora Pertz was brought into touch by her sympathetic appreciation of the achievements of her younger relations, especially her father's grandchildren, great-grandchildren, and great-grandchildren by his first marriage, which was to a lady who was lineally descended from Sir Humphrey Gilbert. Humphrey Payne, Director of the British School at Athens, was thus Dora's great-nephew. His premature death, a great loss to classical archaeology, cast a shadow over her last years. Humphrey's sister, Cecilia Gaposchkin—like her great-aunt, a member of Newnham—is well known as an astronomer at Harvard University Observatory.

Throughout Dora Pertz's life, the warmth of her affectionate nature, together with a certain childlike quality of mind and spirit, endeared her to an intimate circle. The distresses of her long illness were alleviated by the devoted care of her housekeeper, a friend to two generations of the family.

Miss Dorothea F. M. Pertz

DORA PERTZ, who died on March 6, a few days before reaching her eightieth birthday, was born in 1859 into a cosmopolitan, intellectual milieu, for which it would be difficult to-day to find a parallel. Her father was Dr. G. H. Pertz, a scholar of world-wide repute, and Royal Librarian in Berlin. His first wife was a brilliant Englishwoman, who counted Simondi and Lafayette among her friends. His second wife, Dora's mother, also an Englishwoman, was one of a remarkable group of sisters, the six daughters of Leonard Horner, a prominent early member of the Geological Society, and twice its president. He was evidently a man of unusual breadth of view, for though he was born at so remote a date as 1785, he was sufficiently open-minded to commend Darwin's speculations in his last address to the Geological Society in 1861. Horner's eldest daughter was married to Sir Charles Lyell, and his second daughter to Sir Charles J. F. Bunbury, a botanist, who, under Lyell's influence, turned his attention to fossil plants.

Among the Horners, scientific enthusiasm was by no means confined to the men. Dora Pertz's grandmother helped her husband with his rock collections, and when the meetings of the Geological Society were first thrown open to women visitors, Dora's aunt, Lady Lyell and her sisters, were constant in their attendance, though otherwise few women cared to avail themselves of this privilege. Katharine Horner, who married Lyell's brother, and eventually became the biographer of her father and her brothers-in-law, was a botanist. She published in 1870 "A Geographical Handbook of Ferns"—a highly technical catalogue dealing with the distribution of this group. Of Sir Charles Lyell, in his Harley Street period, Dora had certain childish recollections, especially of occasions when he would call a hansom cab and carry off his two small nieces for rapturous visits to the Zoo. Love of animals was throughout Dora's life a ruling passion, and her youthful memory of visiting the Darwins at Down, centred in the joy of being allowed to caress the nose of the horse on which Charles Darwin was riding, in his cloak and broad-brimmed hat.

(Reprinted from NATURE, Vol. 145, page 803, May 25, 1949.)

THE COLOURING OF SIXTEENTH-CENTURY HERBALS

BY DR. AGNES ARBER

IN many copies of sixteenth-century herbals the woodcuts are coloured, but we have little direct information as to when, and under what conditions, the painting was done. For this reason it may be worth while to direct attention to certain points which seem hitherto to have escaped notice in connexion with the colouring of one of the most beautiful of these works—"De historia stirpium" by Leonhart Fuchs, published by Isingrin at Basle in 1542. In the description of maize (Cap. cccxviii) the following words occur: "Hæc pictura in una vagina quatuor tibi granorum colores monstrat, cum tamen quævis unus dimittat coloris grana, nempe aut lutea, aut purpurea, aut rufa, aut subcandida omnia habeat. Quod nos, ne aliquem pictura deciperet, monendum esse duximus." This careful explanation that the grains are indicated in four colours—yellow, purple, reddish, and whitish—in one cob, though these variants would not, in fact, be found together, shows clearly that coloured copies must have formed an integral part of the edition, for Fuchs's words would be meaningless if the whole edition had been issued uncoloured.

In painted copies in the libraries of Winchester Cathedral, and of the Linnean Society*, the four colours which Fuchs mentions in the text are represented in horizontal zones in the one maize cob in which the grains can be seen. In similar coloured copies in the University Library, Cambridge (Sol. 2. 81), and in the Library of Corpus Christi College, Cambridge, there is also an attempt at zoning, though the pigments are less well defined. I find, on comparing the general colouring

* For information on this point I am indebted to the librarians of Winchester Cathedral Library, and of the Linnean Society.

Liefrinck; and Lyncken, the widow of Abraham Verhoeven. Any student, to whom the original documents at Antwerp are accessible, might be able to unravel the exact part played by these painters in relation to the authors, and to the other artists who were members of Plantin's staff.

To sum up, we may say that the evidence here considered suggests that the colouring of sixteenth-century herbals by individual owners was less frequent than has often been supposed; it can indeed have happened but rarely that an amateur was capable of carrying so onerous a task to completion. There seems more probability in the alternative that the colouring was as a rule done officially before the books were sold. If further study shows this view to be of general application, it means that coloured copies deserve more attention than has hitherto been accorded to them, since they may prove to provide an authoritative commentary on the text, and to emphasize the intentions of the author.

¹ *Trans. South-East Union Sci. Soc.*, 43, 55 (1938).

(Reprinted from NATURE, Vol. 146, page 81, July 20, 1940.)

AN AZTEC HERBAL

By DR. AGNES ARBER

OUR fragmentary knowledge of the early history of botany in Mexico has lately received a remarkable addition in the form of a reproduction of a manuscript herbal of the sixteenth century, written by an Aztec physician, and now edited by Dr. Emily Walcott Emmart¹. It had long been known that, by the period of the Spanish conquest, gardening and medicinal botany in Mexico had reached a high degree of elaboration². The fact that the language of the Nahuas included several different names for different types of garden, shows that horticulture played a considerable part in their lives. Montezuma possessed gardens for flowers and medicinal herbs, in which, according to the chronicler, Cervantes de Salazar, he "did not allow any vegetables or fruit to be grown, saying that it was not kingly to cultivate plants for utility or profit in his pleasure". He also owned vegetable gardens and orchards, but these he seldom visited, since he held them to be "for slaves or merchants". His contempt for mere utility did not extend, however, to curative herbs. He ordered his physicians to make experiments with the medicinal plants in his gardens, and to use the best-tried remedies for the benefit of the lords of his court.

Montezuma the Elder, in the fifteenth century, restored an ancestral tropical garden at Huaxtepec. It is recorded that he sent to the Lord of Cuicatlaxtla for plants with roots of the vanilla orchid, cacao, magnolia, and other exotics, and asked that they should be escorted by native gardeners capable of cultivating them. His directions were followed religiously, and the plants arrived with their roots in earth and wrapped in beautifully woven mantles. The gardeners, before replanting these treasures, fasted for eight days, and made sacrifices of incense and other offerings before the god of flowers. This procedure was a great success: the plants flourished exceedingly, and Montezuma wept with joy at the triumphant result of the

tween the highly stylized and sophisticated schools of herbal illustration of the Old and the New Worlds.

It should be remembered that the Indians were highly susceptible to the education offered to them by the Spaniards; in the year 1541, Gerónimo López wrote that some of the Indian boys "speak Latin as elegantly as Cicero". We are told, also, that in the Convent of San Francisco, those native boys who showed ability in drawing and writing, were given the task of illuminating manuscripts; here influences from Europe had a direct opportunity of playing upon Aztec art. The staff of the College of Santa Cruz must have consisted of men of broad culture, and they cannot have carried on their work without books. Even though they were sojourning in a country with an unfamiliar flora, it is unlikely that illustrated herbals found no place in their library, considering the importance then attached to these books from a medical point of view. We may at least conclude that the possibility of European influences having had their role in determining the style of the pictures in the Badianus herbal, cannot at present be rejected. It is to be hoped that the later work of American students of the Aztec civilization may reveal more decisive evidence on this point.

The Badianus herbal contains an important body of directions for the treatment of ill-health, not only by pharmaceutical, but sometimes also by surgical methods. Occasionally there are indications of a surprisingly enlightened attitude. For example, both melancholia and fatigue are recognized as conditions for which medical treatment is suitable. The needs of the ancient Aztecs are indeed ours to-day, for we read of certain medicaments intended to relieve the "fatigue of those administering the government and holding public office", and also serving to "drive weariness far away, and, finally, to expel fear, and fortify the heart of man".

¹ The Badianus Manuscript (Codex Barberini, Latin 241), Vatican Library. An Aztec Herbal of 1552. Introduction, translation and annotations by E. W. Rimmer. (Johns Hopkins Press, Baltimore, 1940.) 2.50 dollars.

² The Gardens of Ancient Mexico. By Z. Nuttall. (Ann. Rep. Smithsonian Inst., 1925 for 1923, pp. 453-64.)

ARBER, AGNES
STUDIES IN FLOWER STRUCTURE

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AGNES ARBER

ON GRASSES IN HERBAL LITERATURE

Separata de la revista *Doroteiana*, tomo 5
(de homenaje al botánico y agrónomo argentino Lorenzo R. Palao)
páginas 20 a 30; Buenos Aires, 1941

Buenos Aires
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1941

On the history of European Botany: One of the most scholarly contributions to the history of botany, which has appeared in recent years, is the study by T. A. and M. S. SPRAGUE of *The Herbal of Valerius Cordus* (Journ. Linn. Soc. Lond., Bot. 52:1, 1939). The authors have made a searching examination of the *Historia Plantarum*, which was written before 1545, but not published until 1661. This work has a wider scope than the herbals of BRUNFELS, BOCK, and PUCHER; it contains early notices of many exotic drugs and timbers, in addition to numerous first records for Germany and Italy. Over 500 plants are described, of which about 65 are "new". The authors of the present study include an account of Cordus' life, and an appraisal of his botany from various points of view, but most of the work is occupied by a systematic consideration of the plants described and figured, and of their modern identification. Another paper by T. A. SPRAGUE, *The Evolution of the Herbal*, with

Special Reference to the British Flora (Trans. S.-E. Sci. Soc. 43:35, 1938) deals with the subject on broad lines. Though less technical than the account of Cordus, it contains much that is original. Another recent work on herbals is *Ueber alte Kräuterbücher* by A. SCHMIDT (Mitteil. v. d. Buchk., Schweiz. Bibliophilen Gesellsch., Bern, 1939). This book is particularly valuable for its discussion of a number of the less well known herbals of the sixteenth century and later. An interesting feature is a diagram in the form of a complex genealogical tree, showing in graphic manner the relation to one another of the principal herbals, both as regards text and illustrations, and also distinguishing their individual contributions. The author, being a medical man, is able to give an authoritative account of the doctrine of temperaments, which is necessary for the full understanding of herbal literature. The figures include reproductions of a number of title-pages, and a series of pictures of *Symphylum officinale* L., derived from herbals of the fifteenth to nineteenth centuries. This plant was chosen for special illustration because, after an early period in which its healing powers were held in high esteem, it passed through a time when its use was obsolete except in folk medicine, but it has now been reinstated and has received medical and scientific recognition.

A study dealing with a more specialised theme is B. HRYNIEWIECKI's account of Anton Schneberger (1520-1581), ein Schüler Konrad Gessner in Polen (Veröffentlichungen des Geobot. Inst. Rübel in Zürich 13, 1938). SCHNEBERGER belonged to a family of Bavarian extraction settled in Zürich, but he himself spent most of his life in Poland. He compiled a *Catalogus Stirpium... Latine et Polonice conscriptus*, Krakau, 1547, in which he identified the plants of Poland, and added the names in the Polish vernacular. This little book, which is now an extreme rarity, is the first of its kind dealing with the botany of Poland. It includes 432 plant names, of which 270 are wild Polish plants.

New light has recently been thrown on SCHNEBERGER's great contemporary, CLAUDIUS (1526-1609) by the publication of his letters to a Florentine gardener and botanist, CACCINI. (P. CACCINI, Lettere inedite di Charles de l'Escluse... a Matteo Caccini, Firenze, 1939). The letters cover the period 1606-1609, the last being written only thirteen days before the death of CLAUDIUS. CACCINI's help is acknowledged in the posthumous *Curas posteriores*, which is dedicated to him. CONTI's work, which includes a full introduction and many illustrations, is a valuable addition to CLAUDIUS literature.

A note on *Hycoscyamus luteus*, by R. E. OCKENBEN (Ibid., 30:273, 1939) may perhaps be mentioned before leaving the subject of renaissance botany. A certain plant described by DODONÆUS as *Hycoscyamus luteus* has been identified as *Nicotiana rustica*. This brief paper reviews the evidence for

and against this identification, and concludes that it is doubtful.

A general work of another kind, the interest of which is horticultural and archaeological as well as botanical, is S. TOLKOWSKY's *Hesperides, A History of the Culture and Use of Citrus Fruits* (London, 1938). This fully illustrated and documented monograph gives the history of the migrations of the orange, citron, tangelo, lime, shaddock, and grapefruit, from their original home in S. E. Asia. The evidence drawn from representations of these fruits in pictures and other works of art is shown to be particularly useful, since it avoids the uncertainties as to the exact meaning of the names used at different periods, which often minimise the value of references in literature.

On the history of botany in the nineteenth century, three papers by W. T. STEARN in *The Cactus Journal* may be mentioned. The first of these is *An Annotated Index to Salm-Dyck's "Monographia Generum Aloes et Mesembryanthemum"* (7, Nos. 2 and 3:34, 66, 1938-9). This memoir includes a biography and portrait of SALM-DYCK (1773-1861) and specimen plates from his work, which is fully analysed. There are also notes on other workers who have studied these genera. The second paper is a facsimile of "*Plantae succulentae, in Horto Alencomio. Auctore H. A. Duval, Paris, 1809*" (Ibid., 7, No. 4:105, 1939). The facsimile was made from the copy formerly in the possession of Sir Joseph Banks, which seems to be the only one extant. The introduction includes a biographical account of DUVAL, and a study of the sources from which the plants in the Alencon garden were derived. STEARN's third paper is on Pfeiffer und Otto "Abbildung und Beschreibung blühender Cacteen" (Ibid., 8, No. 2: 39, 1939). This bilingual work (German and French) published in Cassel, 1838-50, has fine coloured plates of Cacti in flower. Dates of publication of individual plates have been worked out, and the names used in the standard work on the family (BARTON and ROSE, *The Cactaceae*, 1919/23) have been added. Biographical information about PFEIFFER and OTTO, and a portrait of PFEIFFER are included. (AGNES ARBER, Cambridge).

entre insectes et fleurs et qui varient d'une région à l'autre, les conditions géographiques et historiques, tous ont leur influence sur la répartition des espèces qui entrent en concurrence et qui constituent les diverses associations végétales. Il est difficile d'admettre que toutes ces influences soient en tout lieu, rigoureusement subordonnées à une loi mathématique, réglant d'une façon uniforme la répartition proportionnelle des genres et des espèces.

► En résumé, les nombreux faits concernant la distribution florale que nous avons relevés nous permettent d'accorder aux divers facteurs énumérés ci-dessus, une influence indéniable sur les rapports statistiques exprimés tant par le coeff. gén. que par le coeff. de communauté et par le degré de fréquence des espèces associées. Les indications qu'ils fournissent à la phytosociologie ont une valeur incontestable et complètent utilement les données essentiellement descriptives de la Phytographie et de la floristique lorsqu'on compare entre elles des associations végétales d'un territoire limité.

LAB. DE PHYSIOLOGIE VÉGÉTALE,
ÉCOLE POLYTECHN., ZÜRICH.

EM 1846.

AGNES ARBER: The relation of Nehemiah Grew and Marcello Malpighi. At the tercentenary of the birth of NEHEMIAH GREW (1641-1712) - one of the two founders of the branch of plant sciences that deals with anatomy - it seems a necessary act of justice to his memory to scrutinize the charges brought against him in the nineteenth century by SCHLEIDEN. This author, in the *Gründzüge der Wissenschaftlichen Botanik* (of which I have seen only the second edition of 1845), accuses GREW of gross unfairness to his fellow pioneer, MARCELLO MALPIGHI. Even today GREW's reputation still suffers to some extent from the after effects of this accusation. SCHLEIDEN's statement is that MALPIGHI sent his great work to the Royal Society of London in 1670, and that it was not published until 1675 and 1679; he adds that GREW was Secretary of the Society long before the *Anatomie Plantarum* was printed, and that he thus had access to MALPIGHI's manuscript, of which he made illegitimate use, and, moreover, that he hindered the publication and appreciation of MALPIGHI's work as much as possible. In 1868 POLLENDER took up the cudgels on GREW's behalf; but the article in which he set forth his evidence (41. *Versamml. Deutscher Naturf. und Ärzte*, Frankfurt a.M., 1867) does not treat the case completely, and also is by no means readily accessible. GREW's good faith was also defended, nearly forty years ago, in an address by CARSTENSSON (J. Roy. Mic. Soc. 1902, p. 129; and J. Bot. vol. 40, 1902, p. 19), which I overlooked until the present article was nearly completed. Though this address covers a great part of the ground, I do not think that a fresh discussion of the question is superfluous today.

When we come to analyse the position, we find that at the time when GREW, ac-

cording to SCHLEIDEN, was misusing his position as Secretary of the Royal Society, he was not, in fact, an official of the Society at all; his election as Secretary did not take place until 1677. Again, when we consider the relation of the first works of these two plant anatomists, we find that SCHLEIDEN is wholly wrong in his account. He declares that MALPIGHI sent his manuscript to the Royal Society in 1670. If this were true, special significance might attach to it, because it was not until November 9, 1671, that the Council of the Royal Society ordered the printing of GREW's first book. When we look into the dates, however, we learn that the Royal Society did not receive MALPIGHI's first manuscript in 1670 but, on the contrary, not until late in 1671, when GREW's first work was already in print. There is a Latin letter from OLDENBURG, the Secretary of the Royal Society, to MALPIGHI, dated December 14, 1671, which makes the situation quite clear. OLDENBURG tells MALPIGHI that "a certain medical man of our country belong to the Royal Society [NEHEMIAH GREW] has undertaken to treat the same argument; nay even at the very hour (which will greatly surprise you) in which your manuscript was brought to me, his little book in English already published was exhibited to the excellent Society". This puts it beyond a doubt that the first essays of the two earliest botanical anatomists were composed in entire independence of one another. In the same letter OLDENBURG goes on to say that he will send MALPIGHI a copy of GREW's work by sailing ship at the first opportunity; he also expresses the hope that both GREW and MALPIGHI will proceed with their researches, the importance of which he recognizes fully. Sending books from England to the continent was apt to be a slow process in those days. In March, 1672, MALPIGHI writes that he is eagerly expecting the promised volume; and then in a letter dated October 8, 1672, he is able to say that it has actually arrived. Unfortunately, since MALPIGHI understood no English, he had to rely on the help of a friend who translated GREW's treatise into Latin for him; he writes with distress about the difficulty of getting at the meaning in this indirect way. This hindrance to understanding may indeed have been mutual for MALPIGHI's Latin is far from good, and it is often an insoluble problem, even for a classical scholar, to determine exactly what he intended to express. It seems probable that, owing to the obstacle of language, the Italian and the English botanist never became completely conversant with one another's works. In his little book of 1673, however, GREW compares his results with those of MALPIGHI, acknowledging indebtedness and admiration; "the learned MALPIGHIUS ('to whose most ingenious and accurate industry the World is much beholden') . . . By whose Suffrage I was glad to see the Truth of my observations all along confirmed; his very little differing from mine, though He hath every where made use of the Microscope. As for the

Air-vessels . . . the manner of their Spiral Conformation (not observable but by a Microscope) I first learned from Him, who hath given a very elegant Description of "several Figures in Nineteen Copper-Plates" by which it was, as he says, "explicated", had been shown at meetings of the Royal Society in 1673 and 1674.

It was not until four years from the time when the first part of MALPIGHI's *Anatome Plantarum* arrived in London, and after GREW, who had then become Secretary, had written a letter to MALPIGHI "about the expectation of the Society of his farther discourse on vegetables", that in December, 1678, the second part was presented to the Society, "being a farther prosecution of that excellent work of his formerly printed". The Society decided "that the discourse be forthwith printed with all possible correctness; and that a good number of the printed copies be transmitted to the author".

The impression of the relation of GREW and MALPIGHI, derived from the external world of dates and facts, is fully confirmed when we compare the actual work of the two men, for this work shows little sign of reciprocal influence. The final conclusion must be that the co-founders of the science of plant anatomy carried on their investigations in essential independence, and that their personal relation, though somewhat remote, was never anything but friendly.

CAMBRIDGE, ENGLAND. Summer 1941.

Attenuation of Bacteria Pathogenic on Plants: The investigation of variations in pathogenicity among microorganisms is an essential complement to the work on disease resistance of the host. This is more apparent when one recalls that resistance must be defined in terms of pathogenicity of the causal agent and pathogenicity in terms of the susceptibility of the host. These problems are dealt with in some detail by several authors in "The Genetics of Pathogenic Organisms" (A.A.A.S. Pub. No. 12, 1940, Lancaster, Pa.).

While the work on disease resistance has been relatively abundant and extremely profitable from the economic standpoint, investigations on variations in pathogenicity and methods of inducing them have lagged far behind. Work with fungi has been largely limited to those pathogenic on plants (*loc. cit.*), while most of the variation in bacteria has been studied with organisms pathogenic on animals (*loc. cit.*). For the most part, the bacterial variations studied have resulted from spontaneous changes or from changes induced by toxic agents, by antigenic materials in the host, or by various unfavorable conditions of growth.

Recently normal constituents of the host have been employed to attenuate bacteria pathogenic on plants. Glycine has been employed against the legume root nodule bacteria (LONGLEY *et al.*, Jour. Bact. 32: 17, 1937) and those causing crown gall (RIKER, VAN LANEN, and BALDWIN, Phytopath. 28: 19, 1938).

It is worth noting that, as none of MALPIGHI's illustrations reached England before January 1674/5, all the figures in

(Reprinted from NATURE, Vol. 147, page 630, May 24, 1941.)

TERCENTENARY OF NEHEMIAH GREW (1641–1172) 172

By DR. AGNES ARBER

NEHEMIAH GREW will always be held in honour by botanists as the co-founder with Marcello Malpighi of the science of plant anatomy. It is true that in his ideas about plant cells he did not advance much beyond Robert Hooke, who, in 1665, figured and named these units; but, as regards knowledge of vascular structure, the position is very different. Grew and Malpighi not only initiated the study of the bundle system of the flowering plant, but also carried it to a surprisingly high level, considering that they had to start from the very foundations. Grew's first book, "The Anatomy of Vegetables Begun" (1672), contains the earliest printed illustration showing vascular bundles as seen in section under the microscope. He followed up this work in 1673 and 1675 by treatises on the detailed anatomy of roots and of stems. Finally he brought all his results together, in 1682, in a splendidly illustrated folio, "The Anatomy of Plants", which included improved second editions of his first three books, as well as much additional matter. The excellence of Grew's botanical morphology and anatomy has been recognized fully; indeed his reputation in this line is deservedly so great that it has tended to overshadow the other facets of his output. It seems worth while, therefore, in this, his tercentenary year, to direct attention to certain less specialized aspects of his scientific work.

Grew's general attitude towards biology cannot be understood unless one realizes how deeply he was committed to a mechanistic view of the universe. It seems likely that Hooke, and also Descartes, had to some extent turned his mind in this direction, though in the seventeenth century such ideas were so much in the air that it is scarcely

Air-vessels . . . the manner of their Spiral Conformation (not observable but by a Microscope) I first learned from Him, who

GREW's first three books were drawn before he had seen any pictures by MALPIGHI. It is true that the third book—that on *Trunks*

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MALPIGHI's illustrations reached England before January 1674/5, all the figures in VAN LANEN, and BALDWIN, *Phytopath.* 28: 19, 1938).

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AGNES ARBER

ON THE MORPHOLOGY OF THE PITCHER-LEAVES IN HELIAMPHORA, SARRACENIA DARLINGTONIA, CEPHALOTUS, AND NEPENTHES

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[Extracted from the PROCEEDINGS of THE LINNEAN SOCIETY
OF LONDON, Session 153, 1940-41, Pt. 2, 21 November 1941.]

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NEHEMIAH GREW AND MARCELLO
MALPIGHI.

BY
AGNES ARBER.

Digitized by Hunt Institute for Botanical Documentation

THE INTERPRETATION OF LEAF AND
ROOT IN THE ANGIOSPERMS

BY
AGNES ARBER

[REPRINTED FROM BIOLOGICAL REVIEWS, Vol. 16, 1941, p. 81]



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BIOLOGICAL REVIEWS

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DOROTHY H. RAYNER. The structure and evolution of the holostean fishes.

Studies in Flower Structure

VII. On the Gynaecium of *Reseda*, with a Consideration of Paracarp

BY

AGNES ARBER

Reprinted from

Annals of Botany. N. S. Vol. VI, No. 21, January 1942

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the apex from youth to maturity. Special attention has also been attracted to the carpellary analysis of the genus, in connexion with Troll's theory of paracarp. It has hence seemed worth while to re-examine the structure of the *Reseda* gynaecium with these relations in mind. The theoretical questions involved will be discussed after certain relevant features in the construction have been briefly described.

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2. DESCRIPTION

A four-carpelled fruit of *Reseda odorata* L. is seen from above in Fig. 1 A. The top of the ovary is partially closed by four incurved triangular flaps, each of which is formed from the fused margins of two adjacent carpels; the arrows indicate the boundaries between the carpels. Fig. 1, B and C, show external views of the gynaecium of *R. luteola* L., while Fig. D, a segment cut tangentially from the fruit of *R. luteola* L. and viewed from the inside, indicates the situation of the turn-over flap which occurs above each placenta. Fig. 1, E1-E5, represent transverse sections from a series through the apical region of a gynaecium of *R. alba*, in which the transmitting tissue (dotted) can be traced from the cavity of the ovary to the stigmas. The midrib regions of the four carpels are lettered A, B, C, D, and their marginal regions, A', A'; B', B'; C', C'; D', D'. Carpels C and D are cut at a slightly higher level than A and B. The uppermost ovule borne by the placenta marked A'+B' is seen in Fig. 1, E2. At this level the tip of the corresponding downwardly directed triangular flap projects freely into the ovary cavity, and it is seen to contain a single transmitting canal (dotted). At a slightly lower level (E1) the transmitting tissue in the flap is seen to have reached the actual surface, so that it would

[Annals of Botany, N.S. Vol. VI, No. 21, January, 1942.]

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In comparing paracarpous gynaecea with other types Troll points to the fact that paracarpous is often associated with the absence of elongated styles (e.g. *Reseda*, *Cruciferae*, etc.), and he regards this as confirming his view that in these gynaecea the stylar region is used up, as it were, to form the fertile ovary. It may be questioned, however, whether there is any causal connexion, such as Troll postulates, between paracarpous and absence of styles, for in the *Gentianaceae*, and other families, parietal placentation may be associated with a well defined style. The degree of gynaecial elongation between the ovary and stigma is probably a resultant of complex processes of relative growth; it is unlikely that it can be explained on purely morphological grounds.

4. SUMMARY

1. It is shown by a study of serial sections of the apical region of the gynaecium of *Reseda alba* L. that there is a normal mechanism of transmitting canals leading from the stigmas down into the interior of the ovary above the placentas. Despite its open character, the gynaecium is thus, in its system for pollen-tube conveyance, typically 'angiospermous'.

2. In connexion with the parietal placentation (paracarpous) of *Reseda*, Troll's classification of gynaecea (1928, etc.) is considered, and it is concluded that the sharp distinctions which he draws between syncarpous, paracarpous, and apocarpous types are artificial and cannot be maintained. These different forms constitute a graded series, and transitions between them can be found even within individual gynaecea.

LITERATURE CITED

- ARBER, A., 1928: Studies in Flower Structure. IV. On the Gynaecium of Papaver and Related Genera. *Ann. Bot.*, N.S., ii: 649-664.
 GOEBEL, K. VON, 1933: Organographie der Pflanzen. Ed. 3, part 3. Samenpflanzen, Jena.
 HUNT, K. W., 1937: A Study of the Style and Stigma, with Reference to the Nature of the Carpel. *Amer. Journ. Bot.*, xxiv, 288-95.
 SAINT-HILAIRE, A. DE, 1838: Deuxième mémoire sur les résédacées. *Mém. de l'Acad. des Sciences*, Paris, xv, 313-54.
 SCHLEPPI, H., 1937: Vergleichend-morphologische Untersuchungen am Gynoecium der Resedaceen. *Planta*, xvi, 470-90.
 TROLL, W., 1928: Zur Auffassung des Paracarpous Gynaeciums und des Coenocarpous Gynaeciums überhaupt. *Planta*, vi, 255-76.
 ———, 1933: Beiträge zur Morphologie des Gynaeciums. III. Ueber das Gynaecium von *Nigella* und einiger anderer Helleboreen. *Planta*, xxi, 266-91.
 ———, 1935: Vergleichende Morphologie der höheren Pflanzen I. i. Berlin.
 WILSON, C. L., and JUST, T., 1939: The Morphology of the Flower. *Bot. Rev.*, v, 97-131.

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The tables furthermore appear to be by another author than DALMATIUS. Although the first leaf is so badly damaged that little can be read, it seems to open, "Dicit Jaco . . ." which would indicate that the name of the author was JACOBUS. Moreover, he was a Jew,¹ and several times cites Jewish writers such as "that eminent doctor Rabbi MOSES" and LEO HEBRAEUS OF LEVI BEN GERSON whose *Milcha-*

¹ It was difficult to distinguish the copyist's I from his 2.
² At fols. 29v, 31v and 37r, respectively.
³ At fol. 28r.

⁴ Fol. 12r, " . . . deus benedictus qui est lux perfecta fortis et continens ex habundantia eius refulcent tenebre sicut dixit propheta et terra illuminata de gloria eius domine deus sabaoth reverte nos ad reducere faciem tuam et salvi erimus."
⁵ Fol. 1r, "sicut declaravit ille egregius doctor rabbi MOSES bone memorie in libro iudiciorum significationis mensis."

CEREMONIOUS, king of Aragon, turned the twelve astrolabes or quadrants for a specialist capable of regulating the royal clock at Barcelona. One whom he so employed in 1345 was named Mossé JACOB,¹² which suggests the opening words, "Dicit Jaco . . ." of our treatise.

Columbia University
New York City

¹⁰ Fol. 11r, "ille sapiens rabbi Levi eo quia subtiliavit istam diversitatem . . . in fine verborum eius super hoc capitulo si sui libri de astrologia quem nominavit Bella Domini talia verba . . .
¹¹ Also fol. 3r, " . . . qui componens in ea tabulas sicut ille sapientissimus rabbi AYA(?) Ispalensis et coram sapientum ille egregius doctor ille rabbi Levi filius rabbi Gressarii(?) . . ."
¹² Fol. 1v, "Ego autem a die qua aperti sunt oculi mei modicum in ista scientia investigavi invenire istum motum."
¹³ CHARLES DE LA RONCIÈRE, La découverte de l'Afrique au moyen âge, 1925, I, 122.

NEHEMIAH GREW (1641-1712) AND MARCELLO MALPIGHI (1628-1694): AN ESSAY IN COMPARISON¹

By AGNES ARBER

GREW and MALPIGHI, who laid the foundations of the science of plant anatomy almost at the same time in England and in Italy, show certain remarkable similarities, as well as certain suggestive contrasts, in their professional careers and in their approach to research. Both of them achieved distinction as medical men. GREW, an M.D. of Leyden, and an Honorary Fellow of the Royal College of Physicians, wrote no strictly medical treatises, but such slight indications as one can gather from his incidental references, suggest that he tackled

illness with a common sense rare at that date. He rejected the old wives' remedies then in vogue; "if you turn over an *Herbal*," he says, "you shall find almost every *Herb*, to be good for every *Disease*." He was alive, too, to the frauds which the druggists then practised on the public; he points out, for instance, that the picturesquely named "Red Oyl of Scorpions" was nothing more exotic than oil coloured with alkanet root. In his dealings with his patients he was evidently disposed to leave a good deal to nature—a wise procedure, considering the state of medicine in the seventeenth century. He recognized that the body is adapted not only "to prevent, but also to cure, or mitigate Diseases . . . In most Wounds, if kept clean, and from the Air; for which the Use of Plaisters in Wounds, chiefly consists: the Flesh will glen together, with its own Native Balm." GREW not only occupied himself with the treatment of the body; he also cogitated upon what is now known as psychological medi-

¹ The titles in brief of the works of these two authors on which this article is based are:
 GREW, N. (1672): *The Anatomy of Vegetables Begun*. (1673): *An Idea of a Phytological History*. . . with a Continuation of the Anatomy of Vegetables, Particularly prosecuted upon Roots. (1675): *The Comparative Anatomy of Trunks*. (1681, also 1686 and 1694): *Museum Regalis Societatis*. (1682): *The Comparative Anatomy of Stomachs and Guts*. (1687): *The Anatomy of Plants*. (1701): *Cosmologia Sacra*.
 MALPIGHI, M. (1675 and 1679): *Anatomie Plantarum*. (1687): *Opera Omnia*. (1697): *Opera Posthumum*.

the book was as perfect as possible before it passed into the hands of the public. We know what he thought about taking trouble, for he says, "we may as well weigh a Peacock's Tail, against a Prince's Crown; as the finest Parts, against anything great and weighty, without the Care and Pains which are equally great." Evidence of the flashes of insight amounting to genius—"the finest Parts"—which coexisted with his more pedestrian quality of painstaking, is abundant in GREW's books. This insight is often shown in the discerning of problems implicit in facts which his contemporaries took at their face value. He fastened, for instance, upon a question on which many biologists of relatively modern times have tried their wits—how it is that diversity can arise in a uniform environment; he wonders how plants come to differ so much, "since all, or most, seem to grow in the same manner, with one Sun, one Rain, indifferently well upon one Soil." More important is his anticipation¹ of the doctrine of emergent evolution, when he stresses the existence of composite bodies, the properties of which are not merely the summed qualities of their components. "And since we see," he says, "that the mixture of two Bodies of two different qualities, as of two colours, will

¹For further studies of GREW's anticipation of modern views, see ARBER, A. (1941). Tercentenary of NATHANIEL GREW, *Plants*, vol. 147, p. 638-52, and NEHEMIAH GREW and MARCELLE MALHERBE *Proc. Linn. Soc. London*, Part 2, Nov. 27, 1941, pp. 218-38.

"SIR" JOHN HILL VERSUS THE ROYAL SOCIETY

By CLARK EMERY

"BIOGRAPHY," moralizes ROBERT CHAMBERS, "combining instruction with amusement, not infrequently exhibits, in one and the same character, examples of excellence to be fearlessly followed, and of weaknesses to be sedulously shunned." This is his somewhat alliterative introduction to a brief life of JOHN HILL, who, forgotten though he may now be except by scholars, has listed in the *Dictionary of National Biography* no less than seventy-six publications. HILL does not deserve oblivion: he wrote poetry, operas, plays, novels, and a variety of scientific and pseudo-scientific works; he translated THEOPHRASTUS' *On Gems*; he quarrelled with HENRY FIELDING, DAVID GARRICK, CHRISTOPHER SMART, and the Royal Society (among others); he published a newspaper, and for two years wrote a newspaper column. His knowledge and reading were so diffuse that among his publications are works as divergent and ambitious as the following:

¹The *Book of Days*, Philadelphia, 1891, vol. II, p. 601.

produce a third colour differing from them both, as blue and red do a murrey [mulberry colour]; why should not two or more bodies of different natures also, be so combined together, as to produce a third nature?" That he was alive to the implications of this idea is proved by his statement that "the faculty or power of a Body lieth not in any of its principles" apart, but is a resultance from them all, or from their being in such peculiar sort and manner united and combined together."

If GREW could return to scientific life today, he would receive a welcome among the more advanced biologists of the twentieth century for many reasons, but perhaps primarily on account of his instinct for probing down to the metaphysical bases for research. He realized that it is a fundamental condition of such work to recognize that the "Nature of Vegetation" is, at least in great part, knowable, and he warns us against underestimating the amount which can be brought within the scope of human cognizance, since, if we take a narrow view of the possibilities of knowledge, "we shall hereby but intrench our endeavours, which we are not wont to carry beyond the Idea¹ which we have of our Work."

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¹GREW used the word "principles" for the elements or atoms of which any body was composed.
²GREW was in the habit of using the word "Idea" in the sense of "a projected scheme". MALHERBE also speaks of "future open ideas."

History of Fossils, London, 1748.

A General Natural History; or Descriptions of the Animals, Vegetables, and Minerals of the Different Parts of the World, London, 1748-52, 3 vols.

Observations on the Greek and Roman Classics in a series of Letters to a Young Nobleman, etc., London, 1753.

Urania; or a Compleat View of the Heavens, containing the Ancient and Modern Astronomy in form of a Dictionary, etc., London, 1754.

The Useful Family Herbal; or an Account of all . . . English Plants . . . remarkable for their virtues and of Drugs . . . and their Uses, etc., 2nd ed., London, 1755.

The Fabric of the Eye, London, 1758.

The Family Practice of Physick, etc., London, 1769.

The Construction of Timber from its early growth, explained by the Microscope and proved from experiments, etc., London, 1770.

HILL started life inauspiciously as the son of a Lincolnshire clergyman, but after being educated as an apothecary, opened a shop in London. An early marriage apparently forced him to seek other means of support. He turned first to botany, and

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An Englishman's true glory should be, to do his business well, and say little about it; but he disgraces himself when he puffs his prowess as if he had finished his task, when he has but just begun it.—WILLIAM COWPER (to the Rev. William Unwin, May 27, 1782).

(Quotation sent by A. A.)

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