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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.

Article 1. appeared 1941 1st article   Am 2

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 1561. This work has a wider scope than the herbals of Brunfels, Bock, and Fuchs; 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 66 are 'new'. The authors of the present study include an account of Cordus' life, and an appraisement of his ~~work~~ 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. Union Sci. Soc. 43: 33, 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. Schmid (Reprint with a preface added, from Schweitzer Beitr. z. Buchkunde, Schweizer 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 ~~fine~~ reproductions of a number of title pages, and a series of pictures of Symphytum 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 Schneeberger (1530 - 1581) ein Schüler Konrad Gesners in Polen (Veröffentlichungen des Geobot. Inst. Rübel in Zürich. 13, 1938). Schneeberger belonged to a Bavarian family of extraction settled in Zürich, but he himself spent most of his life in Poland. He compiled a Catalogus Stirpium ...Latinè et Polonicè conscriptus. Krakau, 1557, 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.

also falls under the heading fifteenth century Botany A note on Hyoscyamus luteus, by R.F.Ockenden (Isis, 30: 273, 1939). A certain plant described by Dodoens as Hyoscyamus 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 very fully illustrated and documented monograph gives the history of the migrations of the orange, citron, lemon, lime, shaddock, and grape fruit, 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 Mesembryanthemi" (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 Alenconio, 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 biographic account of Duval, and a study of the sources from which the plants in the Alençon garden were derived. Stearn's third paper is on Pfeiffer and Otto's "Abbildung und Beschreibung Blühender Cacteen" (Ibid, 8, No 2: 39, 1939). This bilingual work (German and French) published in Cassel, 1838-1850, has fine coloured figures 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 (Britton and Rose, The Cactaceae, 1919-23) have been added. Biographical information about Pfeiffer and Otto, and a portrait of Pfeiffer are included.

Agnes Arber

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New light has recently been thrown on Schneeberger's great contemporary, Clusius (1526-1609) by the publication of his letters to a Florentine gardener and botanist. (P.G. Conti, Lettere inediti di Charles de l'Escluse...a Matteo Caccini. Firenze, 1939). The letters cover the period 1606 to 1609, the last being written only thirteen days before the death of Clusius. Caccini's help is acknowledged in the posthumous Curae posteriores (1611), which is dedicated to him. Conti is [illegible] letters, [illegible] full [illegible], [illegible] illustrations, [illegible] Clusius [illegible].

A note on Hyoscyamus luteus, by R.E.Ockenden (Isis, 30: 273, 1939) may prhaps be mentioned before leaving the subject of renaissance botany. A certain plant described by Dodoens as Hyoscyamus luteus has been identified as Nicotiana rustica. This brief paper reviews the evidence for and against this identification, and concludes that it is doubtful

Article 2

Recent work on the history of botany in the Old World

Contributions to the history of botany published during the last year or two take the form of scattered studies of subjects ranging over a period of more than 3000 years. They are best considered in roughly chronological order. Very early work has been brought to notice by F.E.WEISS in his account of the so-called "botanical chamber" attached to the banqueting hall of THUTMOSIS III (1501-1447 B.C.) at the east end of a great ~~the Festal~~ Temple at ~~of~~ Karnak (J.R.Hort. Soc., 66, 1941, 51-4). ~~The walls of the chamber are lined with slabs of sandstone on which~~ On the sandstone blocks lining the chamber, plants are represented in bas relief, ~~often of great beauty~~. These perennially interesting decorations were analysed in 1919 by G. SCHWEINFURTH (Engler's Bot. Jahrb., 55, 464-80), and WEISS does not go beyond his findings; indeed, unless the reader also returns to SCHWEINFURTH, the later account may leave a slightly misleading impression, for WEISS takes the attractive view that these outlines represent in actual fact the plants and animals which THUTMOSIS, who was a great military adventurer and conqueror, brought to Egypt from Syria. But, ~~according to~~ SCHWEINFURTH, states, on the authority of BREASTED that the hieroglyphic inscription upon which WEISS relies, does ~~not~~ ~~make any~~ ~~state~~ not declare that the plants portrayed were brought by the king from Syria; it merely says that they were there, and that the king found them. It seems most likely that the designer, without having either plants or sketches to go upon, was commissioned to represent as best he could an exotic flora ~~upon~~ which he had never ~~set eyes~~ seen; possibly he looked for inspiration to any foreign

plants available to him, ~~for instance certain species, not from Syria but from other Mediterranean regions or from S.W.Arabia~~, which were then cultivated in Theban gardens. This view is disappointing as it reduces the interest of the "botanical chamber", but it appears that it must be accepted, since it is borne out by the fact that the only six plants which are definitely recognisable in the reliefs are not now native to Syria: Nymphaea coerulea Sav.; Punica granatum L. ; Arum italicum L.; Dracunculus vulgaris Schott ; Kalanchoë sp.; Iris sp.

THEOPHRASTUS, though he lived more than a thousand years after the botanical chamber of THUTMOSIS III was decorated, is often known as the Father of Botany. Modern detailed studies ~~not infrequently~~ have revealed that his work is of even finer quality than one might suppose at first glance. G. SENN, for instance, has recently worked over the oak galls mentioned by THEOPHRASTUS (Trans. R. Soc. Edinb., 60, 1941, 343-54), and he considers that, though formerly scholars have concluded that the ~~Theophrastean oak~~ these galls are hardly capable of identification, nine of the ten to which ~~he~~ Theophrastus alludes can ~~actually~~ in fact be named with certainty today. SENN'S illustrated account should be very ~~valuable~~ useful to students of the history of cecidiology.

Passing over a period of 1500 years, the next contirhution we have to notice relates to a Chinese printed herbal, which much predates any herbal printed in Europe (HUMMEL, A.W., The Printed Herbal of 1249 A.D., Isis, 33 ,

1941, 439-42; reprinted from Ann.Rep. of the Lib. of Congress, Washington, 1941, 155-7, with editorial note by SARTON). The printing of herbals in China began before 1000 A.D.. The book of 1249, which Hummel has described, is a very fine example of early printing. Its ancestry can be traced back to a herbal compiled towards the end of the eleventh century, which was itself based upon earlier works...HUMMEL reproduces the figures of Euphorbia pekinensis Rupr. from the 1249 herbal; they are astonishingly similar to certain ~~much later~~ European illustrations of much later date.

~~Perhaps~~ The most famous of the early botanical gardens, that of Montpellier, is the subject of an historical study by D.MAW (J. R.Hort. Soc., 66, 1941, 121-8 and 158-63). P.R. de BELLEVAL (c. 1564-1632) initiated the garden in the last decade of the sixteenth century. He had pleaded that the students tended to abandon the school of medicine at Montpellier, in favour of those Italian universities which already possessed botanic gardens, and in 1596 Henry IV was moved to order his treasury to find a site and to pay the wages of a gardener. BELLEVAL anticipated modern methods by imitating natural conditions for marsh, water and rock herbs; he is also remembered for his introduction of the cultivation of the mulberry tree into Languedoc. The success of the garden is shown by the fact that , two or three years after its foundation, 1332 species species were being grown. But less than a quarter of a century later, much of BELLEVAL's enthusiastic work was tragically undone. It was decided to increase the fortifications of the town, since conflicts between the Catholics and Huguenots had

broken out, and the garden, being on slopes essential to the new defences, was doomed to demolition. The town, indeed, suffered a siege, but when this phase was over, BELLEVAL did all that was possible towards restoring the garden. In MAW's memoir, interesting information is given about BELLEVAL's successors, the chief stress being laid upon the adventurous career and botanical travels of P.M.A. BROUSSONET (1761-1807).

Among recent work on eighteenth century topics, special value attaches to S. SAVAGE's scholarly "Synopsis of the annotations by Linnaeus and contemporaries in his library of printed books". (Cat. of MSS in Lib. Linn. Soc. Lond., Part III, 1940). Of the 1600 works at present constituting the library of Linnaeus, between one-fifth and one-quarter contain written notes. All these have been analysed by SAVAGE, and his record forms an important source for students of LINNAEUS.

In 1941 two writers, independently, produced studies of "The Botanic Garden" published 150 years ago by ERASMUS DARWIN, CHARLES DARWIN's grandfather (EMERY, C., Isis, 33, 315-25; HALL, A. D., J.R.Hort. Soc., 66, 24-7). This poem, composed in heroic couplets, though pompous is by no means negligible. With the voluminous notes appended to it by the author, it throws considerable light upon the state of botany at the end of the eighteenth century, and also sometimes foreshadows more recent developments.

WILLIAM FORSYTH (1737-1804), gardener to GEORGE III, after whom Forsythia was named, is commemorated in an article by A. SIMMONDS (J.R.Hort.Soc., 66, 1941, 319-24). In 1782 FORSYTH became one of the founders of the Society for the Promoting of

Natural History-a less successful precursor of the Linnean Society, to which its funds, books, and collections were eventually transferred. He was also one of the seven men who attended a meeting in 1804 from which the Royal Horticultural Society took its origin.

The centenary of the Royal Botanic Gardens, Kew, was commemorated by TURRILL in Chronica Botanica, VI, 17/18, 1941, pp. 414-7. A short notice of the first Director, Sir WILLIAM HOOKER by A. Vaill appeared in J.R.Hort. Soc., 66, 1941, 154-7.

Finally three papers by W.T. STEARN may be mentioned, which, though their intention is primarily bibliographical, contain a good deal of historical information: SCHNEEVOOGT and SCHWEGMAN's "Icones Plantarum Rariorum", J.Bot, 1940, 66-74; Ledebour's "Flora rossica", "Icones plantarum novarum", and "Flora altaica", with a note on Pallas' "Flora rossica", J.Arnold Arboretum, 22, 1941, 225-30; "Bonpland's Description des plantes rares cultivées à Malmaison et Navarre", J. Arnold Arboretum 23, 1942, 110-4.

April, 1942

Agnes Arber
Cambridge, England

AN4

Another Little-known History of Botany

In Nature for May 7 Dr Jules Brunel enquires about the "L.S." who was responsible for the Précis de l'Histoire de la Botanique, in T. xvii of Le Règne végétal, by O. Réveil, and others, Paris, 1870-1. The volume in question is not accessible to me, but I find that in the catalogue of the Library of the British Museum (Nat. Hist.), "L.S". is identified as "L.Gérard". I do not know on what evidence this is based; I have been unable to trace any botanist of this name who might be the writer in question. Louis Gérard is too early in date, as he was born in 1733. As another ~~speculative possibility~~ may I suggest Lazare Garreau, who was professor at Lille? He was born at Autun in 1812, and was apparently still living when the second edition of Pritzel's Thesaurus appeared (1872,7). Garreau published papers on physiological botany in the decade between 1850 and 1860.

Agnes Arber
52 Huntingdon Road
Cambridge

G.... (L.) Précis de l'histoire de la Botanique
par L. G. [i.e. L. Gérard] et
Reveil (P. O.) edtrs. Le Règne végétal T. 17
1871

Le Règne Végétal. par O. Réveil ed trs.
9 vols atlas 8 vol
Paris [1864–] 1870–71

Another Little-known Hist. of Bot.
Jules Brunel, Botanical Institute
University of Montreal.
My 7. 1949 author of L. G. who wrote
Précis de l'histoire de Bot. in the botanical encyclopaedia
Le Règne Végétal Asc 5th edition? to
Bot Mus ... this L. Gérard

(Louis Gérard, botaniste né Cotignac (Var)
1733
1819)

Garreau memoirs in bot physiology betw
1850 & 1860.

AR 8

ISIS
Review of the History and Philosophy of Science
Organ of the History of Science Society
(Widener Library 185, Cambridge 38, Mass.)

to Dr. A. Arber, FRS.

Friday 4907.15

Dear Agnes,

Your good letter of 4904.24 containing the sentence "I do not like to think of your digging snow" refreshed me for it arrived on an extremely hot day. We have had more heat this summer than our share, and the real summer began long before the equinox. I have read your letter in Nature concerning L.G. and am almost certain that Brunel was right. L.G. = L. guerini. I'll publish a note ad hoc in Isis, of which a carbon copy is enclosed. Please note that in spite of the title page, the date of Pritzel's Thesaurus (2.ed.) is 1877 not 1872.

I think that Verdoorn will publish my London lectures and bibliography; I like him and trust him. He knows English very well but speaks it with the queerest accent imaginable, but it is clear I have no right to make such remarks!

Mabel is remarkably well and I have to restrain her from gardening, but can not restrain her in the best way which would be to do the work myself. Thanks to a very bad education, I am very lazy as far as manual labor is concerned: I was not trained for a servant boss age.

I hope that your thumb is completely healed ✓

With affectionate greetings from home to home

George Sarton

An 5

Query no. 125 Who was the author (L.G.?) of the Précis de l'histoire de la botanique, Paris 1869?

Two letters published in Nature by Jules Brunel (May 7, 1949, p. 772) and by Agnes Arber (June 4, p. 882) ask that question without solving it. The ascription to Louis Gérard, appearing in the Catalogue of the Library of the British Museum (N. H.), seems due to a misunderstanding.

Here are the facts known to me, the Précis by L. G. constitutes the 17th and last volume of Le Règne Végétal by Aristide Dupuis, Fredéric Gérard, Oscar Réveil, etc. (17 vols. Paris 1864-69). The Précis contains a notice devoted to the Provençal botanist, Louis Gérard (17[illegible]-1819) author of the Flora Gallo-provincialis (1761), said to be the first flora based upon the new (unpublished) classification of Bernard de Jussieu (1759). In his préface L. G. states that his work is derived partly from the Thesaurus of G. A. Pritzel and partly from the notes taken by Frédéric Gérard. Now, if L. G. had been a second Louis Gérard, he would probably have mentioned his connection (or lack of connection) with the first Louis Gérard and with Fréderic Gérard.

As pointed out to me by Dr. Frans Verdoorn, Brunel's ascription of the Précis to L. Guérin is probably correct. The book was published by "L. Guérin et Cie, éditeurs. Théodore Morgand, libraire-dépositeur. rue Bonaparte 5, Paris". L. G....who signed the preface was probably the éditeur L. Guérin. The ascription is confirmed by internal evidence. E. g., the footnote on p. 397 "Nous citons exceptionnellement ici M. Reveil, l'un de nos

auteurs, non pas seulement parce qu'il est mort, mais à cause de la très-grande importance de son dernier travail, signalé par M. Duchartre dans son Rapport sur les Progrès de la botanique physiologique. Nous aurions dû consacrer une notice à cet éminent chimiste; mais cela nous aurait entrainés à en faire autant pour chacun des auteurs du Règne végétal, ce qui serait en contradiction avec leur pensée et leur volonté." G. S.

× That is, of the first edition Leipzig 1851 and the Additamenta of 1853; the editio nova et reformata is posterior to the Précis. It began to appear in Leipzig 1872, but was completed only after Fritzel's death (1874) by Karl Jessen in 1877. The Editio nova was reprinted in 1924.

An 7

Gray, Ronald D. (1952). Goethe the Alchemist. Cambridge

A good deal that its interesting in the book, but it seems to me ti be largely vitiated by the fact that Gray seems to have looked about for a relatively unworked thesis about Goethe, and to have hit on the idea of representing him as profoundly inflenced by alchemy* - he simply dismisses Goethe's considerred condemnation of alchemy, which he quotes on pp. 66-7. Gray makes alchemy out to be a much more distinct and independent "religion" than it can actually have been; it was in fact largely a tissue of elements borrowed from Neo-platonic and other mystics, with an added empirical element (which had its value in leading on to scientific chemistry) - the whole mixture being then diluted with muddled magic. As examples of the features that Gray attributes to alchemy one may take the microcosm and macrocosm idea (pp. 8-9) but this was merely an old conception common to many early thinkers, which alchemy absorbed. Again he attributes the idea of the coincidence of contraries to alchemy, but this was found very early in Greek philosophy and was stressed in the Middle Ages by Nicolas of Cusa, and in the Renaissance by Bruno.

*and then to have forced everything into this scheme. Yet (p 257) he complains of Goethe for first setting up a system & then looking for confirmatory evidence — which is exactly what Gray does himself!

It seems to me that Gray's knowledge of Neo-Platonism (and indeed of mysticism altogether) is surprisingly superficial - if he knew much about it I doubt if he would have referred to Evelyn Underhill's work as "Authoritative" (p. 21). Again he speaks of Spinoza in a way that does not suggest any first hand acquaintance with his writing. He attributes (p 72) to him the tenet "God is circle, whose centre is everywhere, and whose circumference is nowhere" This is not a belief that Spinoza would ever have expressed - ~~I cannot lay my hand on it, but I feel pretty sure it is either~~ it can be paralleled in Nicolas of Cusa Nicolas or Bruno. Acc. to Nicolas (Vansteenberghe p 377) in the Maximum (Dieu) "Centre infini, il est en tout... Circonférence infinie, il est hors de tout et embrasse tout" (? Docta Ign.)

Gray finds Goethe's botany saturated with alchemy. But he [illegible]

After Bruno. – Greenberg S (1950) p 162. [illegible] 5th Dialogue [illegible] of the [illegible] the centre, [illegible] is everywhere, & the circumference is not – [illegible]

* Gray ignores this later in the book (p237) speaks of Neo-Platonism as a philosophy which he became acquainted with "in the course of years", not as a youthful influence

(Gray) states himself that Goethe read Plotinus "Ennead s" when he was fifteen; this must have given him, even in his first youth an insight into pure Neo-Platonism and the better kind of mysticism.* When it came to botany, he would thus have been already alive to the Unity of all things. The ideas of bipolarity and the tension of opposites, again, needs no alchemical derivation ~~It is~~ They are very ancient philosophical conceptions. This being so, it is difficult to see why alchemy should be dragged in to explain the Urpflanze. I see no reason whatever to connect Boehme's "Qual ities" with Goethe's stages of the plant, especially as Goethe, on Gray's own showing, makes only one passing reference to Boehme, which might equally well refer to any other man who had had a mystic experience (p.38). Gray's diagram would indeed have shocked Goethe; it looks as though Gray had never in his life looked at a plant with a seeing eye. Goethe himself was a draughtsman, and if he had thought fit he could have portrayed the Urpflanze, but he had far too much insight - he knew that the conception was unpicturable.

p. 262. I doubt if the statement that Goethe believed in magic all his life is justifiable. Gray does not seem to distinguish between a man's beliefs and the ideas with which his mind chooses to play ("The human mind is playfull and will not be denied its sport".) The scale of Goethe's personality left plenty of vitality over for mental play.

Gray's Chap XI. (Conclusion) is rather more sober than the rest of the book but he states that "Goethe's most deep-seated convictions had originally sprung from the occult tradition alone" (p257) It does not seem to me that he substantiates this at all.

p73. Gray seems to think that it is an accepted idea that the leaf is the fundamental organ of the plant.

An 8. Dr. Bernhard Milt on Gesner received July 1936 from An12
For slip of publ. in 1936 see bibliography

Conrad Gesners
Historia Plantarum (Fragmenta relicta)

Conrad Gesner (1516-1565), Naturforscher, Polyhistor, Stadtarzt und Lehrer in seiner Vaterstadt Zürich, ist der Begründer der modernen wissenschaftlichen Botanik. Er hat den gigantischen Versuch unternommen, die gesamte Wissenschaft von der Natur in grossangelegten Werken darzustellen, ein Versuch, wie er in diesem Umfang wohl weder vor noch nach Gesner je von einem Gelehrten allein gewagt worden ist. Er verarbeitete zu diesem Zweck die gesamte ihm zugängliche naturwissenschaftliche Literatur vom Altertum bis auf seine Zeit, stellte die kritisch gesichteten Ergebnisse zusammen, prüfte sie so weit als möglich in der Natur selbst nach und bereicherte sie durch viele eigene neue Funde und Beobachtungen. Es handelte sich um erste Gesamtdarstellungen in modernem Sinn; altes und neues Wissensgut wurde eklektisch zusammengestellt, wobei der Massstab der Beurteilung in erster Linie die eigene Beobachtung und das eigene kritische Urteil und nicht mehr das Zeugnis klassischer Autoritäten war. Ein vierbändiges Tierbuch wurde noch von Gesner selbst vollendet. Für eine grossangelegte Pflanzenkunde, die mit 260 Büchern mehrere Foliobände füllen sollte -Gesner hatte für ihre Ausarbeitung zwei Jahre in Aussicht genommen- waren die Vorarbeiten zum Abschluss gekommen, als er 49 jährig an der Pest in Ausübung seines Berufes starb. Ein ähnliches Werk über die Medizin war erst teilweise in Angriff genommen; am weitesten gediehen war eine Geamtdarstellung der Lehre von den Heilmitteln und ihrer Herstellung. Nur der frühzeitige Tod hat Gesner gehindert, seine ungeheuren Pläne auch auszuführen. Aehnliche, kritisch gesichtete Gesamtdarstellungen gab es zu jener Zeit noch nicht; wären sie wie sein Werk über die Tiere zu Stande gekommen, hätten sie zweifel-

los die Grundlage gebildet für die Weiterentwicklung der abendländischen Naturwissenschaft. Seine Handbücher sind Kompilationen in dem Sinn, in dem auch jedes moderne Handbuch, das eine Gesamtdarstellung irgend eines Wissensgebietes versucht, naturnotwendig Kompilation ist.

Die beiden noch erhaltenen Codices, die sich auf der Universitätsbibliothek in Erlangen befinden, enthalten die wesentlichsten Vorarbeiten Gesners zu der geplanten Pflanzenkunde. Wann die beiden Bände ihre heutige Form erhielten, lässt sich nicht mehr bestimmen. Wahrscheinlich wurde Gesners Nachlass erst etwa hundert Jahre nach seinem Tod in Bände zusammengefasst. Die Reihenfolge der Blätter wurde aber zur Hauptsache noch von Gesner selbst bestimmt, indem er die einzelnen Blätter nummerierte. Diese Blätter waren ursprünglich von sehr verschiedener Grösse. Gesner scheint sie in seiner Wohnung auf über zweihundert Regalen einzeln aufbewahrt zu haben, sofern nicht auf diesen Regalen die getrockneten Pflanzen aufbewahrt wurden, was nicht mehr mit Sicherheit bestimmt werden kann. Wohl um die Mitte des 17. Jahrhunderts wurden die Blätter alle auf dieselbe Grösse gebracht, indem man ihnen verschieden breiten Rand anklebte; so wurden sie dann gebunden. Die Idee des Rand-Anklebens war vorzüglich. Vorderseite und Rückseite der Bilder mit ihren Notizen wurden so in ihrer ursprünglichen Form bewahrt. Der Vorteil dieser Methode ergibt sich vor allem bei einem Vergleich mit den Sammelbänden eines Felix Platters in Basel, der die Originalbilder den Konturen nach ausschnitt und auf gleichgrosse Bogen aufklebte, wobei dann die Rückseite und die Originalnotizen verloren gingen. Die zwei Bände mit Pflanzenbildern enthalten aber auch Blätter aus späterer Zeit, die Gesner nicht gehört haben können. Der Schluss des zweiten Bandes stammt von Gesners Schüler Kaspar Wolf. Wieviele der Gesnerschen Blätter im Lauf der Zeit verloren gegangen sind, lässt sich nicht mehr bestimmen, da Gesners Pflanzenverzeichnis bis heute nicht wieder aufgefunden worden ist; gar zu viele sind es aber wohl nicht gewesen.

Die beiden Bände enthalten auf zusammen etwa 490 Folioseiten an die 1500 Pflanzenbilder;die Zahl der Spezialabbildungen einzelner Pflanzenteile beträgt ebenfalls einige hundert.Die meisten Blätter sind beidseitig bemalt.Irgend eine ersichtliche Ordnung in der Reihenfolge besteht nicht.Meist folgen sich Pflanzen,die auf derselben Exkursion gesammelt oder gleichzeitig zugesandt worden sind.Dieselbe Pflanze kommt oft an verschiedenen Stellen in beiden Folianten vor.Stets suchte Gesner schlechte Bilder durch bessere zu ersetzen;die schlechten behielt er aber gleichwohl,schon wegen der Notizen darauf.Auch zeigen die verschiedenen Bilder derselben Pflanze nicht immer alle Pflanzenteile gleichzeitig oder gleich trefflich.Auf einem einzelnen Blatt können mehrere oder auch nur eine einzelne Pflanze abgebildet sein.Neben den Bildern der Gesamtpflanze findet man viele Spezialzeichnungen von einzelnen Pflanzenteilen,vor allem von Früchten und Blüten,nicht selten im Aufriss. Die Samenzahl ist sehr oft angegeben.Blattstellung,Blattform und Blattansatz wurden von Gesner genau wiedergegeben,Blattrand und Rippung deutlich dargestellt.Bei den Stengeln achtete er darauf, ob sie rund oder kantig,behaart oder unbehaart seien und auch die Farbennuancen suchte er in grosser Treue abzubilden.Besondere Sorgfalt schenkte er auch der Darstellung der Wurzeln.Seine Bilder geben den Gesamthabitus der Pflanze wie auch ihre einzelnen Teile in gleicher Treue wieder.Gesner legte hierauf um so grösseres Gewicht,als er zur Bestimmung der nähern oder weitern Verwandtschaft der einzelnen Pflanzen ,d.h.zur Bestimmung ihrer Stellung im Pflanzenreich, alle Pflanzenteile zum Vergleich heranzog und als erster auch Wurzeln,Blüten und Früchten besondere Aufmerksamkeit entgegenbrachte. Er erkannte (nach A.von Haller) als erster das richtige Prinzip der botanischen Methode,Geschlechter aufzustellen,die eine Anzahl Species

umfassen und Klassen als Inbegriff mehrerer Geschlechter.Neben Gattungen und Arten unterschied er bereits auch Arten und Varietäten.Es finden sich bei ihm schon reichliche Ansätze zur Ausbildung einer natürlichen Pflanzensystematik.Zur Bildung eines eigentlichen Systems kam er aber nicht mehr,schon wegen seines viel zu frühen Todes.Gerade seine Erkenntnis von der grössern oder geringern Verwandtschaft der einzelnen Pflanzen bei Fehlen eines eigentlichen Pflanzensystems erschwerte später die Herausgabe seines botanischen Nachlasses in besonderm Masse,da es nicht gelingen wollte,ein ordnendes Prinzip zu finden.

Die einzelnen Pflanzenbilder sind von sehr verschiedenem wissenschaftlichen und künstlerischen Wert.Weitaus die besten stammen aus Zürich,von Gesner selber oder von Künstlern,die unter seiner Anweisung arbeiteten.Gezeichnet wurde nach frischen oder getrockneten Pflanzen.Zuerst wurden die Konturen in Tusche gezeichnet; dann folgte die Kolorierung mit Aquarellfarben.Bei gewissen Bildern fehlt die Kolorierung vollkommen,bei gewissen zum Teil.Waren gewisse Pflanzenteile schlecht oder ungenau geraten,findet sich nicht selten nebenstehend eine bessere Zeichnung,diese wohl meist von Gesners Hand.Formen und Farben sind von grosser Naturtreue.Fehler in der Kolorierung finden sich naturgemäss besonders auf Bildern, die nach getrockneten Pflanzen hergestellt worden waren.Wie sein Schüler Dr.Kaspar Wolf berichtet,stammen etwa 150 Bilder von Gesner selber.Wenn heute auch nicht mehr festgestellt werden kann,um welche Blätter es sich dabei handelt,darf diese Angabe doch unbesehen als richtig angenommen werden,das Wolf Gesners langjähriger Famulus, Freund und wissenschaftlicher Testamentsvollstrecker war.Von den Künstlern,die für Gesner arbeiteten,ist uns leider nur wenig bekannt.Sie arbeiteten offenbar im Stundenlohn;wenigstens findet man auf vielen Blättern den Vermerk einer Zeitangabe wie 2 stund,5 stund a,H.,von verschiedenen Händen geschrieben.Signiert sind nur 6 Blätter

im ersten Band (fol.30, 38,103,117a,137b und 145),welche die Initialen des Zürcher Malers Jos Murer aufweisen (von Herrn Dr.Hugelshofer in Zürich identifiziert).Auf Seite 186c, unten links findet sich von Gesners Hand der Name Gryssi;ob das der Name des Zeichners ist,ist ungewiss.Auf Seite 143b wird ein Maler Antoni Leemann,den man sonst aber nicht kennt,genannt;ob er aber wirklich für Gesner gearbeitet hat,lässt sich nicht beweisen.Wahrscheinlich gehörte auch Gesners Verwandter J.Thomann zu seinen künstlerischen Mitarbeitern,ohne dass man aber wüsste,welche Blätter ihm zuzuschreiben sind.Mit den von Schmiedel aufgeführten Namen von Zürcher Mitarbeitern lässt sich nichts anfangen.Die oft zitierte Beteiligung des bedeutenden Zürcher Malers Hans Asper an Gesners Pflanzenwerk ist durchaus fraglich und nirgends belegt.Aus dem Ausland erhielt Gesner Bilder und Pflanzen aus England,Deutschland,Italien und besonders Südfrankreich,vereinzelt auch überseeische.Diese Bilder sind in der Regel viel schlechter, zum Teil vollkommen unbrauchbar.So entbehren zum Beispiel die Bilder,die ihm sein Augsburger Freund Occo gesandt hat,jedes wissenschaftlichen Wertes und sind nur aus alten Kräuterbüchern abgezeichnet.Sie fallen nicht nur durch ihre mangelhafte Naturtreue,sondern vor allem auch durch eine merkwürdige Stiliserungsmanier,besonders der Wurzeln,auf und können zu einem schönen Teil nicht genauer identifiziert werden.Aber auch die Bilder,die ihm von so bedeutenden Naturforschern wie Dalechampius,Aldrovandi und Calceolarius übermittelt wurden,stehen an Qualität den Gesnerschen Bildern weit nach.Vereinzelt stösst man auf ganz phantastische Bilder;so erhielt Gesner vom Sohn des Zürcher Antistes Bullinger ein Bild der blauen Wunderblume.Einen Vergleich mit den Gesnerschen Bildern halten höchstens die Pflanzenbilder von Weidnitz aus,die er für das Kräuterbuch von O.Brunfels gezeichnet hatte;die Originalzeichnungen finden sich heute im botanischen Nachlass des Basler Gelehrten Felix Platter in Bern.Leider wurde für die Gesnerschen Holzschnitte

ein viel zu kleines Format gewählt.Von der Schönheit und Vortrefflichkeit der Originalbilder geben sie kaum einen Begriff.Von besonderem Interesse sind noch einige,"Naturselbstdrucke" ,da sie von dan heute bekannten wohl die ältesten sind.

Von den Pflanzenbildern dürften etwa zwei Drittel aus der Schweiz stammen und zur Hauptsache in Zürich entstanden sein.Vor allem interessieren hier die zum grössten Teil erstmals dargestellten und beschriebenen Alpenpflanzen aus den Bergen Graubündens, aus dem Glarnerland,der Urschweiz,dem Berner-Oberland und dem Wallis. Nicht wenige Pflanzen besass Gesner auch aus dem Jura,vor allem von den Lägern.Auffallend reich ist auch seine Sammlung von schweizerischen Wasserpflanzen,vornehmlich aus dem Zürichsee,dem Katzensee bei Zürich,der Limmat und auch der Reuss.Die übrigen Schweizerpflanzen stammen meist aus der Umgebung von Zürich,der Nordschweiz,der Gegend um Chur,Basel und aus dem Wallis.Nicht wenige der Pflanzen wuchsen in Gesners zwei botanischen Gärten ,so auch die meisten Gartenpflanzen,deren Samen und Zwiebeln vornehmlich aus den Fuggerschen Gärten in Augsburg stammten.Einzelne Pflanzen erhielt Gesner aus England von Caius,Parkhurst und Gipson zugeschickt,etwas mehr aus Deutschland,besonders aus Bayern und Sachsen,vor allem auch aus dem herzynischen Wald.Die Namen der Freunde,die Gesner hauptsächlich mit Pflanzen und Bildern versahen,findet man im ersten Band der von C.Schmiedel herausgegebenen Opera botanica C.Gesneri angeführt. Reich ist Gesners Sammlung an mediterranen Pflanzen aus Südfrankreich,wenn auch die Bilder von wesentlich geringerer Qualität sind; nicht wenige erhielt er vom Lyoner Naturforscher Dalechampius.Aus Italien schickten ihm besonders Aldrovandi und Calceolarius Material. Ausser den Pflanzenbildern finden sich in den beiden Bänden noch etwa 130 Abbildungen von Drogen,Früchten,Rinden und Wurzeln,die wohl nur teilweise identifiziert werden können .Die meisten erhielt Gesner aus Frankfurt von einem gewissen Oppenheim.Sodann enthalten

die beiden Bände noch eine Reihe von Holzschnitten,die zum Teil aus gedruckten Kräuterbüchern stammen,zum Teil auch Einblattdrucke sind.

Ausser Bildern enthalten die Blätter noch zahlreiche Notizen, die im Lauf der Zeit immer ergänzt worden waren.Es wird darin vermerkt,wer die Pflanzen gefunden oder geschickt hat,wann und wo sie gewachsen sind,oft mit Angabe verschiedener Fundorte,wann sie geblüht haben,wie sie von den verschiedenen Autoren genannt werden und welche Volksnamen sie tragen,welchen Geschmack sie haben, und ob sie bitter oder sauer sind,ob feuchter oder trockener,warmer oder kalter Natur und in welchem Grad.Spärlich finden sich auch medizinische Notizen,häufiger Angaben,in welcher Beziehung die Bilder nicht ganz richtig gezeichnet oder gemalt wurden.In der Regel tragen sie auch Vermerke,auf welcher Seite man dieselbe Pflanze in anderer Ausführung nochmals findet.Ausser den Notizen von Gesners Hand finden sich noch solche von Kaspar Wolf,Pflanzendiagnosen von Johannes Bauhin und besonders häufig von Thomas Penny,einem englischen Naturforscher und Freund Gesners.Des Engländers Diagnosen sind ausserordentlich zutreffend (laut Urteil von Herrn Dr.Walo Koch,Konservator des botanischen Museums der E.T.H.in Zürich).;auch vermerkt er in der Regel,wo er die betreffenden Pflanzen in Frankreich und der Gegend von Genf und Savoyen gefunden hat.Hie und da fügt er auch englische Pflanzennamen bei.

Nach Gesners Tod erwarb sein Freund,langjähriger Mitarbeiter und Nachfolger als Stadtarzt,Dr.Kaspar Wolf,diesen botanischen Nachlass,von Gesner selber noch kurz vor seinem Tod mit seiner Herausgabe betraut.Wolf hat auch eine ganze Reihe von Gesnerschen Manuskripten im Druck herausgegeben und für das wissenschaftliche Andenken seines grossen Lehrers mehr getan,als irgend sonst jemand, wenn auch seine uneigennützigen Bemühungen bei der Nachwelt nicht die gebührende Anerkennung gefunden haben.Er hat sich alle Mühe gegeben,auch die Historia Plantarum Gesners herauszugeben;er voll-

endete noch die Vorarbeiten und schrieb die ersten Kapitel des geplanten Werkes, sah dann aber ein, dass dieses Unternehmen seine Kräfte und sein Können überstieg. Um aber die Herausgabe dieses Pflanzenwerks durch sein Unvermögen nicht zu gefährden, verkaufte er Gesners Nachlass zum gleichen Preis, wie er ihn einst übernommen hatte, nämlich zu 150 Gulden, im Einverständnis mit den Erben Gesners, an den Nürnberger Arzt und Naturforscher Joachim Camerarius, welcher ebenfalls mit Gesner persönlich befreundet gewesen war. So kam Gesners botanischer Nachlass im Jahr 1580 ins Frankenland, wo er bis zum heutigen Tag geblieben ist. Camerarius verwandte ziemlich viele Bilder aus diesem Nachlass zu eigenen Zwecken, leider ohne die Quelle anzugeben; den Nachlass als solchen vermochte er ebenso wenig im Druck herauszugeben. Nach seinem Tod ging dieser auf seinen Sohn über, der ihn in jeder Beziehung unbenützt liess. Nach dessen Tod ging der kostbare Besitz an eine Familie Nützli über und von dieser im Jahr 165[illegible] an den Nürnberger Arzt und Naturforscher J.C. Volckamer. Sein Sohn, der spätere Besitzer, bot die beiden Bände im Jahr 1711 der Bürgerbibliothek in Zürich zum Kauf an, die zu jener Zeit von dem berühmten Arzt, Naturforscher und Polyhistor J.J. Scheuchzer verwaltet wurde. Obschon der Preis nur 300 Gulden betragen hätte, kam der Verkauf doch nicht zu Stande. (Diese bisher unbekannte Tatsache entdeckte der Scheuchzerforscher Dr. Rudolf Steiger an der Zentralbibliothek in Zürich in einem Scheuchzerschen Briefband.) Im Jahr 1744 erwarb der Nürnberger Arzt Hofrat Ch.J. Trew den gesamten Nachlass Gesners, soweit er noch zusammenzubringen war und in seinem Auftrag gab der Erlanger Professor C. Schmiedel in den Jahren 1753-1759 einen Teil dieses Nachlasses in zwei prachtvollen Foliobänden heraus, etwa zweihundert Jahre nach Gesners Tod. Schmiedel hat mit diesem Werk eine ungeheure Arbeit mustergültig durchgeführt. Immernin ist vom ganzen Nachlass erst etwa ein Drittel herausgegeben worden; wegen der Ungunst der Zeit musste von einer weitern Publikation Umgang genom-

men werden. Mit der riesigen Bibliothek Trews kam auch der Gesnersche Nachlass nach seinem Tod an die Universität Altorf und nach deren Aufhebung durch ein königliches Dekret im Jahr 1818 an die Universitätsbibliothek von Erlangen, die ihn heute noch besitzt.

Bibliographie: Ueber C. Gesner und sein Werk ist grundlegend noch heute die von Schmiedel verfasste, lateinisch geschriebene Biographie im ersten Band der von ihm herausgegeben Opera Botanica C. Gesneri, 1759. In dieser Arbeit sind auch alle frühern, zum Teil verloren gegangenen biographischen Versuche berücksichtigt worden. - J. Hanhart: C. Gesner, ein Beitrag zur Geschichte des wissneschaftlichen Strebens und der Glaubensverbesserung im 16. Jahrhundert, Winterthur, 1824. - Willi Ley: Konrad Gesner, Leben und Werk (Münchner Beiträge zur Geschichte und Literatur der Naturwissenschaften und Medizin, Heft 15/16), 1929. - J. Mänlis Artikel über C. Gesner in der Allg. deutschen Biographie (Bd. 9, S. 107 ff) u.a.m.

Gesner als Botaniker: A. v. Haller: Bibliotheca botanica, Nürnberg 1772, p. 282-292. - Kurt Sprengel: Geschichte der Botanik, Leipzig, 1817. - P. Th. Bruhin: Aelteste Flora der Schweiz aus den Werken C. Gesners und seiner Zeitgenossen (Verh. der st. gallischen naturwissenschaftlichen Gesellschaft, 1864/65). - E. Meyer: Geschichte der Botanik, Königsberg, 1856. - H. Christ: Zur Geschichte des alten Gartens (Basler Zeitschrift für Geschichte und Altertumskunde, Bd. XVI), 1917.

Ueber Gesners botanischen Nachlass sind grundlegend, neben den allgemeinen Bemerkungen über Gesner als Botaniker, die Aufsätze von C. Schmiedel und Trew in den Opera botanica C. Gesneri. - Ueber die Neu-Entdeckung des inzwischen verloren geglaubten Nachlasses vergl. E. Hilt in neue Zürcher Zeitung, 1923, Nr. 1039.

Über Gesners Illustrationen vergleiche man P. Leemann-van Eick: Der Buchschmuck in C. Gesners naturgeschichtlichen Werken (Schweizer Sammler und Familienforscher, Jhrgg. 8, Bern, 1934; als erweiterter Sonderdruck herausgegeben von P. Haupt, Bern, 1935); diese Arbeit macht die frühern einschlägigen Arbeiten überflüssig.

Zur Geschichte der sogenannten Naturselbstdrucke vergleiche man A. Tiberghien: Phytotypie et Phytotypes. Notice sommaire, bibliographique et historique sur l'impression des plantes a l'aide des plantes elles-memes. (Bull. Soc. Royale de Bot. de Belgique, t. 64, fasc. 1; (1931), 81-91.

Heute besitzt die Zentralbibliothek Zürich diesen gesamten noch vorhandenen botanischen Nachlass C. Gesners in Form von Photographien (Band 1) und Photocopien (Band 2). Der Geschichte der schweizerischen Naturwissenschaft wurde durch die Leitung dieser Bibliothek durch dieses erhebliche Kosten verursachende Unternehmen ein sehr grosser Dienst erwiesen.

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This was not used

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ETHEL SARGANT.

(1863 - 1918)

A Study of the Mind of a Morphologist,

- by -

Agnes Arber.

The death of Ethel Sargant, early in 1918, leaves an irreparable gap in the ranks of botanical morphologists. Her earliest work - carried out under the direction of Dr. D. H. Scott (1893-4) - dealt with physiological anatomy, and she next devoted several years to botanical cytology, studying chiefly the formation of the sexual nuclei in the Turk's Cap Lily. But the most mature and fruitful period of her life's work was that represented by the series of papers published between 1898 and 1915 (1.), dealing with the vascular structure of the seedlings of the Flowering Plants. In applying the results of a study of seedling anatomy to the interpretation of the problems of race history, she initiated an entirely new departure. Her central paper on the subject - "A Theory of the Origin of Monocotyledons founded on the Structure of their Seedlings" (1903) - contains a mass of detailed information regarding a hitherto unexplored field, illuminated by a remarkable hypothesis which has had a

(1.) Papers 6, 8, & 10-17 in the accompanying list

great effect upon botanical thought. Her subsequent work was mainly concerned with the development of the lines of reasoning laid down in this paper and their extension to such special cases as that of the Grasses. In 1913 she was President of the Botanical Section of the British Association and her Address dealt on broad lines with the subject of seedling anatomy, considered as a branch of botanical embryology.

Since Ethel Sargant's death several notices of her life and of her botanical output have appeared (1). The intention of the present paper is to supplement these more general memorials by a sketch of one special aspect of her personality - her attitude towards scientific research in general and botanical morphology in particular. It forms an attempt to give an impression of her mode of scientific thought, illustrated chiefly from her letters and unpublished notes, and also, to some extent, from the recollection of innumerable talks. Analysis and quotation of her published writings have been deliberately avoided, since her memoirs are accessible to every student: it seemed more worth while to compile a record, however slight and inadequate, from other sources.

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(1) See especially an authoritative biographical notice by Dr. D. H. Scott, in The Annals of Botany, Vol.32. 1918. pp.i-iv. Also a letter by Dr. Scott in The Times Literary Supplement, Thursday, January 31, 1918, and brief notices by the present writer in The Cambridge Magazine, Vol.7, January 26, 1918, p.361, and Nature, Vol. 101, January 31, 1918, pp. 428 - 9.

From the scientific point of view, the most salient features of Ethel Sargant's character were her passion for research and her native and inherent capacity for its pursuit. To an unusual degree her whole personality came to fruition in her work, partly, perhaps, because she realised the need of analysing and accepting her ~~particular~~ individual qualities in order to get the best results from them. In her own words "in order to overcome difficulties one has to humour one's own peculiarities a little - just as a good sportsman humours his hunter, and so can get him over obstacles that would baffle a worse rider on the same horse." She believed firmly "in the part played by character in all sustained effort, even when purely intellectual", and she was indeed a living example of the truth of this dictum. She recognised the necessity for putting the best of oneself and all the resources of one's vitality into any original work that is to be worthy of the name: "research" she said, "cannot be done on anything less than beef-steaks." She worked with the utmost intensity, but for quite brief periods in the day, and with a strong preference for the early morning hours. "My own experience" she wrote, "is that so long as I can get the morning to 12 or 1 for my research, to have the rest of the day filled up with domestic occupations which do not hinge on myself is positively

beneficial." Her delight in her work gained in vividness from her experience of the depth of depression that lie in wait for the researcher. "Besides the even and daily pleasures of it as a pursuit", she wrote, "one gets glorious hours and days. Even the dark depths of despair have their charm, but I confess that it is hard to endure the dreary monotonous streaks." It was these monotonous streaks which made her describe her work as "twenty days of drudgery to one of pure research." She used to say that any student beginning really independent work - not the mere hewing of wood and drawing of water for his professor - must expect, sometime in the first six months, to go through a period when he is tempted to commit suicide.

Towards the manual part of her work, Ethel Sargant's attitude was highly characteristic. She mastered all the necessary detail with a thoroughness that was enhanced by the fact that, working at home, she dispensed with the trained assistance in setting up apparatus, etc., which is a feature of all public laboratories. "There is no such thing", she used to say, "as a manipulative difficulty that can't be overcome." She derided the proverb that the bad workman complains of his tools, and held that it is only the good workman who fully realises their importance. She was accustomed to ~~initiate~~ initiate and develop her own methods, and it may be recorded in this connexion that she was probably the first botanist in ~~England~~ this country to apply

microtome methods to the ~~study~~ education of plant structure. Her preparations and material were indexed in a complete and concise fashion of her own, which might well serve as a model for scientific book-keeping. Though her work dealt to a great extent with the minutiae of ~~structure~~ anatomy, she never lost herself in a maze of detail; she continually related the study of her sections to the external features of the plant, and also where possible, to the general skeletal system as seen in three dimensions, for instance by rendering the whole region transparent in strong carbolic acid. She insisted that it "is most important to be constantly orientating oneself in microscope work by means of the naked eye or ~~with a~~ simple lens". She trusted much to the effect of "getting one's fingers in the thing", believing that the actual handling of the material gave solidity and proportion to the biologist's conceptions. Her hypotheses grew, it might almost be said, through her fingers. Her geophytic theory of the origin of Monocotyledons arose of itself, as it were, out of the fact that she germinated the seeds of members of this group in large numbers, and, through a series of years, kept watch over the curiously dilatory development of countless geophytic seedlings.

I think this must stand as it is in Dictionary A.A.

The actual writing of Ethel Sargant's papers was done slowly and "at vast expense of nervous energy". That she

believed in allowing ~~ones~~ theories to ripen gradually is shown ~~by the following extracts from~~ in her letters to a student who had sent her a suggested ~~edition~~ solution of a certain botanical problem. "I like your hypothesis" she wrote, "and think it quite good enough to publish, but strongly advise you not to do so. It is the sort of idea to open a note-book about in Darwinian fashion.....It will be a very valuable bit of experience for you to have a subject in the back of your mind to be tackled by compiling facts, and later on you will find the advantage of having a few points handy on which to set research pupils. And I think it better for Science in general that you should chew the cud of an hypothesis even if it means delay in publishing." In a later letter she added, "I am glad your better self approves my advice in re your Little Notion. Beware above all things of the mental laziness ~~that~~ which wears the mark of industry! With that Copybook Maxim, I will close."

Ethel Sargant never held a teaching post, and she was, in the best sense of the word, an 'amateur'. This must not be taken however to imply that she suffered from any lack of training, for as a science student at Girton she became imbued with the Cambridge tradition, while later on she served an invaluable apprenticeship in research under Dr. D. H. Scott at the Jodrell Laboratory. She might rather be said to be an amateur by conviction. She was keenly

aware of
~~alive to~~ the jading effect of professional life ~~which she observed in other workers~~, and she felt that the converse drawbacks of isolation, and of inability to give full time to the subject, were more than compensated by the advantage in freshness which is reaped when the entire intellectual output ~~of the intellectual life~~ can be dedicated to research. Speaking of Charles Darwin, whom she regarded as the amateur par excellence, she asked, "can you imagine [him] in full health as reposing from his research by teaching and organising?" She added, concerning herself, "I am quite sure that teaching (as a regular occupation), and still more organising work on Committees and so on would stifle thought." Her appreciation of the amateur standpoint was reflected in her rooted objection to academicism - the danger to which the professional is most prone. In scientific writing she set great store by vitality of expression, which she valued more than academic correctness of form. On one occasion she swept aside some conventional alternatives - which the present writer had proposed for certain colloquial phrases occurring in a joint paper - with the remark, "I would rather be vivid than classical". In the same spirit she criticised the lucid, precise, and exquisitely arranged memoirs of various French botanists, on the ground that "they comb Nature's hair too much".

Both the strength and the weakness of Ethel Sargant's mind were determined by the fact that her intellect was, above all things, that of the researcher: the pursuit of the unknown was in her blood. She was enthralled by the process of investigation; she loved Keats' sonnet - "Much have I travell'd in the realms of gold", - because it expressed the very essence of the spirit of discovery. In such lectures as she occasionally gave, she deliberately set herself to be "suggestive not exhaustive", and she considered that in writing a book the essential thing was to lay stress upon "what we don't know". The work which was natural to her was pure research in which she was not tied down to any preconceived plan but could allow herself to be led largely by instinct, or, ~~to use more accurate terms~~ rather, by the results of what psychologists call subliminal mentation. A mind so strongly gifted in a rare direction, inevitably suffered, in some degree, from the defects of its qualities. Ethel Sargant considered irrelevant information to be stifling to research, and she had a real fear of it; this was probably one of the factors, in addition to uncertain health and exacting home duties, that prevented her acquiring quite that catholic knowledge of ~~her subject~~ botany which might have led to wider developments in her own work. It was a matter of rejoicing to her that the subject of the vascular anatomy of seedlings - when she

first embarked upon it - possessed the merest minimum of 'literature'. She said herself that in her research she was conscious of going too straight ahead, and that the fact that she was seldom tempted into side issues, though sometimes a source of strength, led in other cases to the overlooking of interesting new problems. In this connection she used to point to her failure to recognise 'double fertilisation' in Lilium Martagon, though she possessed preparations made for another purpose, which, when she came to look into the matter after Nawaschin had announced his discovery - were found to show the process distinctly.

For some years before Ethel Sargent's death she was occupied in collecting materials for a general book about the group of plants with which most of her research had been concerned. It seemed to the present writer that the prospect of this book, which she undertook by invitation and not spontaneously, had an unfortunate effect upon her. A piece of work which had, to a great extent, to be schemed out beforehand was naturally repugnant to her; she was the born explorer who preferred to plunge into the unknown and to be guided from point to point by clues as they appeared. She liked to leave her work free to grow under her hands, and she had a great distaste for committing herself beforehand as to its exact content. It is characteristic of her that, in

apologising for a certain discrepancy between the title and the substance of a lecture she was delivering, she said that at the time the title was decided upon she "didn't know what it would turn out." To map and elaborate in detail the features of a region concerning which a great deal was already known, was not in her line, and her peculiar gifts were wasted upon it. ~~She showed little facility for quickly perceiving the bearing and relation of miscellaneous facts which she had not herself discovered. The projected book also implied much study of the literature, which to her was painfully laborious, and on which - as is often the case with uncongenial tasks - she spent a disproportionate amount of time. Instead of rapidly tearing the heart out of each memoir,~~ she ~~abstracted in excessive detail, even making careful tracings of illustrative figures. It may perhaps be doubted whether she had~~ Hers was not the power to weld into an organic whole a mass of material, much of which must necessarily be ~~secondhand~~ derived from the ideas of others.

The fact that Ethel Sargant came of a family associated on both sides with the legal profession, had probably something to do with her appreciation of the qualities of reasoning, and her distress at looseness and inconsequence of thought, such as that which once led her to say of a certain biologist "His mind doesn't bite on an argument". She took a keen interest in the laws of evidence and regretted that students

Ethel Sargant employed the word "morphology" in a sense somewhat wider than that in which it is often used by botanists. She regarded the restriction of the term to the study of external form as an unwarrantable limitation, and held that the features of the vascular system frequently supply essential morphological characters. The divorce between systematic botany and anatomy, which is implied in the view that internal characters do not count in morphology, she attributed in part to the fact that the "whole classification of the flowering plants was built up

at least in its main outlines before the compound microscope had been improved so as to be a really useful instrument". She saw with regret that the gulf between the systematic botanist who rarely resorts to the compound microscope, and the vegetable anatomist to whom it is a tool in constant use, has given rise to "a most unphilosophical division of the whole science". She held that our knowledge concerning the lower plants "is on the whole in a more satisfactory condition than our knowledge of the structure of flowering plants because no artificial separation between external form and internal anatomy has been made", since "their classification was undertaken much later than that of the flowering plants and for the most part by botanists trained in the methods of anatomy".

Besides the dangers lurking in the unnatural disunion between botanical morphology and anatomy, Ethel Sargant recognised another and perhaps even more serious peril in the ease with which, under the influence of the academic mind, morphology may be divested of its essentially historical character. "All morphological problems" she wrote, "are questions of race history; they can therefore be ~~more~~ most precisely stated in historical terms". She considered that ~~all~~ the power to do good morphological work was conditioned by the existence of what might almost be called a distinct

'morphological sense', capable of analysis into two principal elements - a feeling for history and an instinct for form; she wrote, indeed, of the sense of form as "the basis of all morphology". She confessed that she observed the morphological instinct - and hence the power of fully apprehending morphological reasoning - to be rare among botanists: she said of one writer in whom these qualities were conspicuously lacking, "It is quite clear that he can't imagine any morphological evidence strong enough to satisfy him and must needs ask for a fossil miracle".

One peculiarity of morphological argument ~~of which Ethel Sargant never lost sight, peculiarity which to certain temperaments is highly distasteful~~ is that the criteria used can seldom be applied universally: a canon of criticism which is of proven validity in one piece of work, may yet turn out to be perfectly useless in attacking another problem which is apparently closely allied. "In weighing morphological evidence", ~~Ethel Sargant~~ she wrote, "each author has his own scale of values", (and it need scarcely be said that) the utmost perspicacity is ~~evidently~~ necessary if the researcher is to steer clear of the reefs and shoals thus introduced. Ethel Sargant ~~She Ethel Sargant~~ was fully alive to these dangers and ~~she had~~ possessed the saving grace of being able to laugh at her own reliance on certain criteria of whose validity in her special line of work she had become

convinced by experience. She replied to the present writer, who had shown scepticism about a certain canon, "Your question ..... brings out very clearly the extent to which every morphologist (the example to-day of course is myself) depends on his own scale of values. That scale becomes a part of one's mental equipment, and to criticise it really at first blush struck me (I abandon the general pseudonym, but I believe the phenomenon is general) as a sort of lèse-majesté".

constructed on the basis of Evolution: we stand or fall by it". She was herself a convinced Darwinian, though she had no sympathy with an uncritical acceptance of the natural selection hypothesis. She held that ~~writers such~~ only such workers as Bateson and de Vries, who continued the subject and studied it at first hand, were (worthy to be regarded as) Darwin's ~~true~~ followers; "he would" she wrote, "never have owned those who quote his words as the only true Gospel for his disciples". She looked upon Romanes' contribution as a brilliant corollary to Darwin's work, and felt that the more recent writer had never received quite the recognition ~~which~~ that was his due. She was fully aware that Darwin's explanation of evolution no longer held the field as once it did, but she thought that this was ~~entirely~~ largely due to a natural reaction, a swing of the pendulum, and that we should eventually come back to something much nearer to the Darwinian position than the present generation is likely to deem possible. But she was reluctant to express herself with any freedom about these topics, for she had come deliberately to the opinion that the 'how' and the 'why' of evolution do not directly concern the morphologist, and that his problems are essentially independent of any particular evolutionary theory. Her writings were, however, inevitably coloured by the Darwinian view of the relation of structure to function, and on this account her conclusions

may seem, from a more modern standpoint, to need some restatement; but such an alteration would ~~be largely a matter~~ deal almost exclusively with ~~of~~ their mode of expression and would leave their substance ~~almost~~ practically unaffected. ~~She~~ Ethel Sargant not only kept morphological considerations distinct in her own mind from evolutionary hypotheses, but she realised that the matter went deeper. She showed for instance that it would have probably made little difference to the Natural System of classification if evolution had become an accepted fact before instead of after the main outlines of that system had been laid down. We may take to serve as our conclusion a passage (1) in which she developed this idea and followed it up with what was perhaps her nearest approach to a confession of morphological faith.

"One is apt to think that the Natural System has been constructed in a shockingly haphazard way. But let us consider the possibilities. Suppose the doctrine of descent had been assumed from the beginning, how would the botanists of the eighteenth century have begun to build up a system on that foundation? Direct evidence of course is not available. Few fossils had been discovered, nor

would they have been of much service without the insight into the affinities of the Vascular Cryptogams and Gymnosperms which we owe to the compound microscope. The early botanists must have fallen back on comparative observations. They would be driven to examining and describing their plants and guessing at their relationships to each other, just as Linnaeus and his successors did observe and describe and guess. Any artificial system would be avowedly provisional, and we may conclude that there would be fewer constructed. But on the whole the Natural System would be built up from the accumulated experience of generations, as indeed it really was built up; profiting much from the inspirations of such genius as that of Linnaeus, and not a little from the painful toil - and even from the mistakes - of lesser men.

It would seem that morphologists can only advance in this way - like a blind man with a stick, who in spite of sounding every step before he takes it is always liable to stray from the path. We assume that a more or less probable guess is true, and if the consequences are unsatisfactory we give up that guess and make another. No hypothesis is ever proved in morphology; the most universally accepted is only probably true. Indeed we are forced at times to put up with a very slender degree of probability. Yet though

our methods seem so inconsequent, though we gain ground by a series of blunders, we can point with pride to our results. Systematic botanists built up the Natural System from a mass of detail, without any consistent theory to guide them but believing in order underlying that detail. In fulness of time the principle of that order was found to be relationship by descent".

T.O.

Memoirs by Ethel Sargant.

1. [Conjointly with D. H. Scott] . On the Pitchers of Dischidia Rafflesiana (Wall.). Ann. of Bot. Vol. 7. 1893 pp. 243 - 269, 2 pls.

2. Some Details of the First Nuclear Division in the Pollen-Mother-cells of Lilium Martagon, L. Journ. Roy. Micr. Soc. 1895. pp. 283 - 7. 10 text-figs.

3. Direct Nuclear Division in the Embryo-sac of Lilium Martagon. Ann. Bot. Vol. 10, 1896, pp. 107 - 8, ~~1 text-fig~~.

4. The Formation of the Sexual Nuclei in Lilium Martagon, I. Oögenesis Ann. of Bot. Vol. 10, 1896, pp. 445-77, 2 pl.

5. The Formation of the Sexual Nuclei in Lilium Martagon II Spermatogenesis. Ann. of Bot. Vol. 11. 1897, pp. 187-224, 2 pls.

6. [Conjointly with Rina Scott]. On the Development of Arum maculatum from the Seed. Ann. Bot. Vol. 12. 1898, pp. 399 - 414, 1 pl.

7. On the Presence of two Vermiform Nuclei in the Fertilised Embryo-sac of Lilium Martagon. Proc. Roy. Soc. Vol. 65. 1899. pp. 163 - 5. 1 text-fig.

8. A New Type of Transition from Stem to Root in the Vascular System of Seedlings, Ann. Bot. Vol. 14, 1900, pp. 633 - 8, 1 pl.

9. Recent Work on the Results of Fertilization in Angiosperms. Ann. Bot. Vol. 14, 1900, pp. 689 - 712.

10. The Origin of the Seed-Leaf in Monocotyledons. New Phyt. Vol. 1. 1902, pp. 107 - 13, 1 pl.

11. A Theory of the Origin of Monocotyledons founded on the Structure of their Seedlings. Ann. Bot. Vol. 17; 1903, pp. 1 - 92, 7 pls. 10 text-figs.

12. [Conjointly with Agnes Robertson (Arber)]. The Anatomy of the Scutellum in Zea Mais. Ann. Bot. Vol. 19, 1905, pp. 115-123, 1 pl.

13. The Evolution of Monocotyledons. Bot. Gazette, Vol. 37. 1904, pp. 325 - 45, 6 text-figs.

14. The Early History of Angiosperms. Bot. Gazette. Vol. 38. 1905, pp. 420 - 3.

15. The Reconstruction of a Race of Primitive Angiosperms. Ann. Bot. Vol. 22, 1908, pp. 121 - 86, 21 text-figs.

16. The Development of Botanical Embryology since 1870. Presidential Address to Section K (Botany) Brit. Assoc. Rep. Birmingham, 1913, pp. 692 - 705, 1 text-fig.

17. [Conjointly with Agnes Arber]. The Comparative Morphology of the Embryo and Seedling in the Gramineae. Ann. Bot. Vol. 29, 1915. pp. 161-222, 2 pls. and 35 text-figs.

10.

Plate -

E T H E L S A R G A N T

From a lithograph by F. Ernest Jackson, 1910.

microtome methods to the study of plant structure. Her preparations and material were indexed in a complete and concise fashion of her own, which might well serve as a model for scientific book-keeping. Though her work dealt to a great extent with the minutiae of structure, she never lost herself in a maze of detail; she continually related the study of her sections to the external features of the plant, and also where possible, to the general skeletal system as seen in three dimensions, for instance by rendering the whole region transparent in strong carbolic acid. She insisted that it "is most important to be constantly orientating oneself in microscope work by means of the naked eye or with a simple lens." She ~~had a great belief~~ trusted much to the effect of "getting one's fingers in the thing", ~~and held~~ believing that the actual handling of the material gave solidity and ~~concreteness to one's views~~ proportion to the biologists conceptions. Her hypotheses grew, it might almost be said, through her fingers. Her geophytic theory of the origin of Monocotyledons arose of itself, as it were, out of the fact that she germinated the seeds of members of this group in large numbers, and, through a series of years, kept watch over the curiously dilatory development of countless geophytic seedlings.

The actual writing of Ethel Sargant's papers was done slowly and "at a vast expense of nervous energy." That she

Morphology, in that historical aspect on which Ethel Sargant so constantly insisted, is closely bound up with evolution. As she wrote, "all modern morphology is

(1) This passage and some other quotations in the present paper are taken from Ethel Sargant's notes for ~~five~~ four lectures on "The Methods of Morphology" which she addressed to Girton students in 1915.

A/10 (By Miss Sargant — written on the Sunday when we were all in such suspense before war was declared — the day of the gale)

In the Old Rectory Garden ---- Aug. 9. 1914

The wind has blown since dawn — the restless wind —
Waking the leaves & murmur like the sea;
The twilight veils the earth in mystery
But cannot still the leaves, nor soothe the mind
Stirred by the breath of war. No rest we find
From thought, forerunner of calamity,
Suspense consumes us; better far be free
To face the worst, no doubt remain behind.

Be still! Our life is fed through the same ties
That bind us drably in a narrow place.
Like the green leaf, torn from its resting-place,
The soul that breaks its bonds untimely dies.
Ev'n at the altar, kneeling to be fed
By God Himself, He gives no earthly bread.

An 11 (by Miss Sargent) 2

To:
My Prospective Tenant.

Tax not the Village Dame with vain expense,
With ill-matched aim weep not for paper'd walls,
The Rich hang papers in their gilded halls
But whitewash should content the Man of Sense —
It pamper's his taste & saves my pence.
The wise man shuns the plumber's frequent calls,
Nor, e'en when gutters leak & plaster falls,
Condemns his landlady to indigence.
Smooth are your lines, designed to touch the Heart,
And turn the Mind from any thought of ill,
Yes — even in childhood's hour I scorned the art
Man taught the Jam to hide the bitter Pill.
When you concocted wads of flattery
Did you see aught of verdant in my eye?

Les Lois de l'Evolution,

par

Louis Dollo,

Conservateur au Musée royal d'Histoire naturelle,
à Bruxelles.

—

Bulletin de la Société belge de Géologie, 1893, Vol. VII, p. 164.

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(Résumé).

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« I. — Selon la conception géniale de l'immortel Charles Darwin (1809-1882):
L'évolution, — la transformation des Organismes, — résulte de la fixation, — sous l'influence de la sélection naturelle, — provoquée par la lutte pour l'existence, — des variations individuelles utiles.
Toutes les espèces, — animales ou végétales, — qui existent ou qui ont existé, — depuis l'apparition de la vie sur le globe, — doivent leur origine à cette loi fondamentale.

II. — Mais:

1. Quelle est la cause des variations individuelles?
2. Quelle est leur amplitude? — Est-elle faible? Est-elle grande? — (p. 165)
L'évolution fut-elle extrêmement lente? Ou se fit-elle par sauts assez brusques?
3. D'un autre côté, l'évolution est-elle réversible? — Un Organisme peut-il retourner (totalement ou partiellement) à un état antérieur, déjà réalisé dans la série de ses ancêtres? — Soit qu'il y arrive d'un seul coup; soit qu'il traverse à rebours, pour l'atteindre, les diverses phases qui lui ont donné naissance.
4. Enfin, l'évolution est-elle limitée? Ou indéfinie? — Tout Organisme porte-t-il en lui une puissance de métamorphose sans bornes? — Ou s'éteindra-t-il nécessairement après avoir parcouru un cycle déterminé?

III. — La solution de ces questions est d'une importance capitale pour le biologiste. Et cela, non pas simplement pour l'intérêt énorme qu'elles offrent en elles-mêmes, mais à cause de leurs applications.

IV. — M. Dollo est d'avis :

1. Que l'évolution se fit par sauts assez brusques.
2. Qu'un Organisme ne peut retourner, même partiellement, à un état antérieur, déjà réalisé dans la série de ses ancêtres.
3. Que tout Organisme doit nécessairement s'éteindre, après avoir parcouru un cycle déterminé, — qui peut, d'ailleurs, être extrêmement long.

C'est ce qu'il exprime en disant :
L'évolution est discontinue, — irréversible, — limitée.

V. — L'auteur expose, ensuite, les raisons pour lesquelles, selon lui, il faut qu'il en soit ainsi.

Puis, il cite de très nombreux exemples, — tirés, tant des Animaux vivants ou fossiles que des Végétaux actuels, — pour appuyer sa manière de voir.

VI. — A cette occasion, M. Dollo est heureux de constater que ses idées ont été admises par son Maître, M. A. Giard, professeur à la Sorbonne, et par son excellent ami, M. P. Pelseneer, professeur à l'École normale de Gand.

Il remercie ces deux naturalistes des cas de discontinuité ou d'irréversibilité qu'ils ont bien voulu lui communiquer (M. Giard : Crustacés, Végétaux ; M. Pelseneer : Mollusques).

Il remercie également deux autres de ses

meilleurs amis : M. J. Wassart, assistant à l'Institut botanique de l'Université de Bruxelles, qui lui a signalé beaucoup de faits intéressants relatifs à la discontinuité et à l'irréversibilité chez les Végétaux, et M. G. A. Boulenger, du British Museum, qui a appelé son attention sur divers points de la structure des Reptiles vivants, d'une portée considérable dans ces questions. p. 166

Il mentionne aussi avec satisfaction que M. L. Errera, professeur à l'Université de Bruxelles, se rallie, au moins partiellement, à ses vues.

Enfin, il annonce, pour terminer, que M. P. Hallez, professeur à la Faculté des Sciences de Lille, à la suite de ses dernières études sur les Vers, conclut à la discontinuité de l'évolution.

VII. — Ce sont les recherches spéciales que M. Dollo poursuit, depuis douze ans, sur les Ossements fossiles du Musée de Bruxelles, qui l'ont conduit à ces généralisations. Il les fit connaître, pour la première fois, dans son cours à l'Institut Solvay (Université de Bruxelles) (Leçon autographiée du 12 novembre 1890).

Ultérieurement, il y revint, notamment dans le Bulletin de Giard (20 septembre 1891) et dans le Bulletin de la Société (25 octobre 1892).

VIII. — L'auteur a remarqué avec plaisir que ses idées ont été adoptées sans réserve par M. A. Lameere, professeur à l'Université de Bruxelles, dans son Esquisse de la Zoologie (Bruxelles, 1892) et dans le syllabus de son Cours sur le Transformisme.

(Extension universitaire ; leçon III ; 1895).

IX. — M. Dollo se propose de réunir en un petit volume illustré tous les cas importants de discontinuité, d'irréversibilité et de limitation recueillis par ses amis et par lui.

X. — Est-ce à dire que, dans la pensée de l'auteur, les lois ci-dessus énoncées soient les seules qui régissent l'évolution des Organismes ? Nullement. Il y en a bien d'autres, et des plus fondamentales. Exemples : la loi de la récapitulation, la loi de la régression nécessaire, etc. »

An 13

A RECENT DISCOVERY IN SIXTEENTH CENTURY BOTANY

By Professor Walther Rytz. Das Herbarium Felix Platters. Ein Beitrag zur Geschichte der Botanik des XVI. Jahrhunderts. (verhandl.d.Naturforsch. Gesellsch. in Basel, vol.xliv, part 1) 222pp., 22 figures, 1933.

By Professor Walther Rytz. Pflanzenaquerelle des Hans Weiditz aus dem Jahre 1529: die Originale zu den Holzschnitten im Brunfels'schen Kräuterbuch. 44 pp., 15 coloured plates, Bern, 1936.

When, a few years ago, Professor Walther Rytz of the University of Bern was reviewing the collections in the Botanical Institute, he brought to light an herbarium in nine folio volumes, whose existence 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 ~~dealer~~ bookseller in Bern from ~~a dealer~~ an antiquary in Zurich who owed him ~~five~~ 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 set out in fully illustrated form in the memoirs cited above. Of the nine folios, the herbarium occupies eight, while the ninth contains illustrations alone. The herbarium is far from complete; indeed there is reason to believe 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; ~~it includes plants from~~ Switzerland, Italy, France, Spain and Egypt. It also represents 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 today, but most formidable in the eyes of the men of earlier centuries. The dried plants are well preserved and arranged, and some of them have retained their colour admirably; this point must have been regarded as of special importance, for, in some campanulas the difficulty that the

corollas turn brown on drying has been met by replacing them by imitations cut out of larkspur flowers! There are a number of inscriptions on the sheets, and all the information which can possibly be gleaned from these has been brought together and analysed by Dr. Rytz, who has also made an exhaustive study of the paper used for mounting - a study which reveals no less than forty more or less different watermarks. All this research leads directly to the conclusion that the collection was formed in the second half of the sixteenth century by some botanist who was in relation with Charles de l'Ecluse(1525 - 1609), Conrad Gesner (1516-1565) and Joachim Camerarius (1534-1598), from whom he received specimens. After a process of delicate detective work, too complex and detailed to be summarised here, Dr. Rytz decides that the herbarium was undoubtedly the work of Felix Platter, an eminent physician of Basle, who lived from 1536-to 1614. Fortunately the facts of Platter's life have been fully recorded and a contemporary portrait was available for reproduction. From 1552 to 1557 he is known to have studied medicine at Montpellier, like so many botanists of his day - for instance Conrad Gesner, Jaques Dalechamps, Charles de l'Ecluse, Jean Bauhin, Pierre Pena and Jean de l'Obel. In his diary of 1554 Platter speaks of collecting "viler kreuter, die ich in papier zierlich immacht", so it is clear that he had already begun a herbarium soon after the middle of the sixteenth century. Dr. Rytz believes that all European herbaria can be traced back to the influence of the Italian scientists Luca Ghini, from whom the "Father of British Botany", William Turner, learned to dry plants. Rondelet, Felix Platter's teacher at Montpellier, was also probably taught the art of herbarium-making by Ghini, and then disseminated it among his pupils. The interchange of dried plants between savants played a very important part in the beginning of scientific systematics, and illustrations often seem to have been drawn from them. This is shown by the fact that in August 1563 Conrad Gesner wrote to Jean Bauhin, "At this time I cannot occupy the artist with dried plants : he can scarcely now paint all the fresh and green examples: I put off the dried specimens to the winter, when there will be no opportunity of getting the living".

The oldest herbaria usually consisted

of dried plants alone, but the collections of ~~Caspar~~ Gaspard Bauhin and Felix Platter are exceptions in including figures as well as actual specimens. In the Platter herbarium there are 650 woodcuts; most of them are from well known herbals of the period, but there is also a rough but specially interesting set of pictures, which appear to be proofs taken from the blocks prepared by Leonhard Fuchs for a projected new edition of his herbal, which was destined to remain unpublished.

Felix Platter did not confine himself to botany: he was an enthusiastic collector of natural and artistic treasures of all kinds, and foreigners ~~were accustomed to visit~~ who visited his "cabinet" ~~for instruction and entertainment.~~ Those ~~in whose lives~~ Michel, Sieur de Montaigne, ~~plays a part, must feel a glow of pleasure in realising that it was Platter's herbarium - now again accessible to the curious -~~ which was examined with admiration by ~~Montaigne~~ when he passed through Basle in 1580 on his way to Italy. An ~~herbarium~~ was evidently a new toy to him. He writes of "un livre de simples...au lieu que les autres font peindre les herbes selon leurs couleurs, lui a trouvé l'art de les coller toutes naturelles et proprement sur le papier.", He notes with surprise that the pages could be turned over without the plants dropping out, and that some of them were actually more than twenty years old.

The ninth folio, which ~~contains~~ is of illustrations alone, seems to be the last survivor out of a set of similar volumes, of which no less than twenty-three have ~~been lost~~ disappeared. ~~perhaps this rare treasure trove will reward future search.~~ The surviving volume ~~includes~~ contains 667 woodcuts, mostly derived from printed herbals, and a few copperplate etchings. There are also water-colour drawings, which are of peculiar interest, since they include a number which Dr. Rytz recognised at once as corresponding closely to the woodcuts by Hans Weiditz in the great Herbarum Vivae Eicones of Otto Brunfels(1530)

made. They are outline pen-drawings in sepia, ~~painted~~ washed in watercolour. In the second of the two memoirs under review, a number of these paintings are reproduced in colour, and botanists can themselves compare them with the cuts in Brunfels' herbal. It may seem surprising that Weiditz should have taken the trouble to colour the drawings, when they were to be reproduced as woodcuts, but Dr. Rytz has shown convincingly that the colour was chiefly intended to assist the man who would copy the outline on to the block, and also the woodcutter, who would complete the process. The colouring is not used for its own sake, as in Albrecht Dürer's inimitable plant studies, but is employed with the definite object of heightening the comprehension of the form, and thus giving confidence to the copyist and enabling him to achieve a free and virile outline. Weiditz did his drawings on both sides of the paper - a luckless economy which led Platter, who was a man of method, to mangle the drawings cruelly in cutting ~~them~~ out as many as possible, so as to stick them into the appropriate places in his collection. On the backs of some of them, which have been unstuck for ~~the purpose~~ examination, fragmentary inscriptions in the handwriting of Weiditz have been detected. They include directions to the craftsmen, and, on one fortunate page, the date "1529" has escaped Platter's scissors.

In a summary such as this it is impossible to do justice to the indefatigable scholarship with which Professor Rytz has extracted and evaluated every particle of ore from the rich vein which he has struck. His study ~~is full of~~ has many interesting ~~sidelights~~ aspects which cannot be indicated here, though one of the parallels which he suggests may be cited in conclusion. He shows that there is a certain correspondence between the history of botany and the history of human anatomy. He compares the importance ~~in~~ to botany of Hans Weiditz' drawings, with the importance ~~in~~ to anatomy of the drawings of Leonardo da Vinci and of Vesalius. Indeed after reading Dr. Rytz's work, one is left with an enhanced sense of the ~~high~~ significance of the rôle of the artists in the biological renaissance of the sixteenth century.

Agnes Arber

Rytz, W

Das Herbarium Felix Platters.
Ein Beitrag zur Geschichte der Botanik
des XVI. Jahrhunderts. (Verhandl. d.
Naturforsch. Gesellsch. in Basel. Bd
XLIV, Teil 1., [illegible]), 222 pp. 22 figs. 1933

Das Herbarium Felix Platters

Nine folianten (bulky but not overloaded) came to light in the Botanical Institute of University, Bern in 1930. These contain dried plants & also methods for old herbals. Drawings

p4.

These 9 volumes form only the remains of the larger herbarium other 8 collection. They consist of the feature collection in one collection. The 9 volumes belong to the feature collection. They are all different [illegible] & size volume. The binding (about 40 X 30 cms) [illegible] binding shows some slight difference in binding. Form of collection

The herbarium volumes also include wood cuts & the (p6) plants are well [illegible] [illegible] have retained their colours. Delicate pressing

pressed & arranged admirably.

p7 Campanulas in order to preserve the fair colour, In some [illegible] brown or drying, in order to keep the flowers' blue tint, to campanula flowers were replaced by flower bells cut out of Delphinium flowers!

~~p9 It was [illegible] that there were originally 50 volumes~~

p8 Some [illegible] plants are stuck to a thin paper, they have been cut on the underside of the pressing mounts. The present make-up of the herbarium is therefore not the original one.

1870 Ry Lankester Ann. Nat
Hist VI 36 + 39.

the general definition:
"Homologous". "Having same relation, proportion, relative position, etc; corresponding."

Wordcourt Libes 439. c. 93.45

plato Comp 180. c. 92.307

Historia animalium Teubner (edn 1907)

R. 707. d. 1

12

p12 subjects of careful analysis
all information on localities & references to botanists
& gardens are carefully brought together & analysed
Plants were received from Carolus Clusius (1525 – 1609)
& Joachim Camerarius (1534 – 1598)

Details of the collection

p14
The collection was made in the 2nd half of the 16th
century & includes plants from the garden of Platter,
& from various districts of Switzerland, Italy,
S. France, Paris, Savoy, Spain, Egypt.
Herbarium was not made for one of the reasons
whether the maker himself collected the plants he
includes from Palatina, Monte Baldo & the
mountains of Savoy. These mountains ~~were~~ ~~frequently~~ ~~no~~
~~mountains~~ ~~no~~ ~~difficult~~ to the wider Alpinists, seem to be
precautions ... as ... the ... Alps
were to be known. In 1536 ... Paster
Müller & some Paster friends ascended the
Stockhorn in the Bernese Oberland & collected
plants & a ... later then Paster made Alpenreisen

p15. leaves of 9 volumes show over 40
The 1800 water marks which are described in
more or less detail, three being figured. These water marks
show that the paper was ... (2 only 1870
sheets) ~~is~~ ~~of~~ ~~originally~~ was made in Basle
The watermarks indicate dates between 1556 & 1604
By an ingenious study of examples in these plants which
have been inserted & applied to
an old paper to another deduces that up to
a later one the herbarist was a store of
due 1586 on old paper. (I can't get
this being clear)

Study of mounting of plants in relation to the paper

p26 3

In the arrangement of the plants Bauhin's Phytopinax is followed. But not the nomenclature. It suggests that the plants were collected & named before the appearance of Phytopinax, since subsequently arose in accordance with it. There seems also to have been a later influence from the Pinax.

see better

p29

Probably there were originally 18 or 19 volumes of herbarium of which 10 & 11 are lost, though they may one day come to light

To add [illegible]

p9 Bern took the 9 volumes, for a ~~four~~ four francs d'or

A dealer in Zurich who acquired them [illegible] the [illegible] with

when he was unable to pay. [illegible] J. S. Wyttenbach [illegible] blames [illegible]

was sold for one Louis d'or to [illegible] (1740–1830) a well known ~~[illegible]~~ the herbarium

[illegible] of Bern. For [illegible] the ~~[illegible]~~ herbarium of nine of

p29–30. [illegible] the present [illegible] to-day [illegible] of

~~Rytz~~ volumes of [illegible] contributes [illegible] to the collector of the

men of Bern, Felix Platter (1536–1614) [illegible] portrait. He studied

he gives. delightful contemporary portrait. [illegible] his return to

in Montpellier when he collected plants 1552–1557, & on his return to

his native Basle he continued to work as botanist

both in the field & in his garden.

p115 The whole remained in hands of descendants of Felix Platter until 1770?

influence of Bauhin's Pinax) an due to

p31

He traces the [illegible] of ~~after the~~ Platter's death, and [illegible] to his

[illegible] appeared that Bauhin was a friend of Platter's [illegible] of his [illegible]

communication with him. [illegible] the ~~Platter's~~ handwriting of Platter's

Rytz has also compared ~~Platt~~ specimens

in the Herbarium with

spread [illegible] herbarium

1 sheet [illegible]

Then Johann Gessner's hands until his death in 1790 & was bought in 1806 by [illegible] Bern from [illegible] dealer in Zurich

The history of the herbarium from 1552 to ~~1996~~ [illegible] is known except for 1790–1806

Script in the University Library, Basle, & this comparison indicates that the writing is Felix Platter's.

p 33
Felix Platter studied medicine at Montpellier with so many botanists of his time — Charles Conrad Gesner, Jaques Dalechamps, Pierre Pena, de l'Écluse, Jean Bauhin, Pierre Pena, Jean de l'Obel etc. He speaks of collecting "vil[e]r kreuter, die ich in papier zierlich inmacht" (1554 p44) The beginning of herbarium 34 comments Platter than this

p 35
He returned to Basle & became a very successful physician & teacher of medical students p 36 He was fond of animals & was often & to keep Canaries in Basle.

p 37
He was a catholic collector & no foreigner neglects to see his "Cabinet" of natural & artistic treasures. The catalogue of his collection survives. Montaigne mentions it.

Montaigne. Michel de Journal du voyage de Michel de Montaigne en Italie. 1906
p 77 who describes herbarium new & him & describes dried flowers as evidence of admiration
"un livre de simples ... au lieu que les autres font peindre les herbes selon leurs couleurs, lui a trouvé l'art de les

p35
coler toutes nouvelles et fraischement sur le papier, que les moindres feuilles et fibres y apparoissent, comme elles sont ---- des simples qui y estoient collés, y avoit plus de vint ans."

p44
A nineteenth century biographer writes of him "He viewed sharply, finely & singly & without preconceived ideas the phenomena which nature offered him in their connexion in which they directly appeared to him & without through theories or artificial hypotheses bringing or forcing the remotest into union with the near .... he sought the truth above all." He was nearly 78 when he died

p45
He does not say from whom he learnt the art of making a herbarium, but seems to take it for granted as something already known. It seems probable that the making of herbaria was introduced & encouraged by Rondelet, Platter's teacher at Montpellier, who may have learnt the art at Pisa from Luca Ghini, from whom our English herbalist

p46
William Turner learnt to dry plants. Rightly treats these herbaria on these "monotypic" origin.

p49
Mars how very important the interchange of dried plants & of drawings between savants was in the renaissance of botany in the 16th century.

p50 — In August 1563 ~~Johannes~~ Conrad Gesner

In making of herbaria

Importance of herbaria in 16th cent.

writes of Johannes Bauhin "At this time I cannot occupy & attend ~~on~~ dried plants: he can scarcely now paint all the ~~living~~ above recent, living examples: I put off the dried ones till winter, when there will be no opportunity of getting living ones."

In another place he writes that his artist painted dried plants even better & more vividly than living ones.

p 57
It was the newly awakened feeling for objective observation of nature which formed the basis both of the illustrated herbals & of herbaria.

p 51
The herbarium contained 813 species.

p 54–55
Includes an a/c of early history of tulip

p 56–57
U.S.A. The herbarium contains various (recently introduced) American plants, then cultivated in European gardens, Agave americana, Zea mays, Canna indica, Helianthus annuus, Phaseolus vulgaris.

p 59
The oldest herbaria consisted of dried plants alone, except in the case of the herbarium of Felix Platter, Caspar Bauhin & others of both, within included figures as well as dried specimens. In the Platter herbarium the illustrations are woodcuts (generally coloured) & water colours. The woodcuts are mostly from well-known herbals — Fuchs, Lobelius, Mattioli, Clusius etc.
(p50) (p60)

Woodcuts as well as herbaria

7

p60, 61
But in addition there are a number of " poor, rough prototype plates Fuchs prepared for a new edition of his herbal which was never published.

p71 The volume of pictures of 667 wood cuts: are drawn for most of principal herbals. There are also 11 copperplate etchings

p73
It appears that there were probably another 23 volumes of pictures in addition to the one which has survived.

A number of the water colours are attributed to ... Basle artists by Rytz.

The water colours of Hans Weiditz should rather be described as pen with (sepia) drawings tinted in watercolour.

The woodcuts are somewhat simplified from the ~~drawings~~ water colours, which confirms the idea that the water colours are the originals.

p80
Brunfels himself speaks of woodcuts as "durch den hochberümpten meyster Hans Weydetz von Strassburg gerissen und contrafayt."

pp 88-89 Comparison of the woodcuts & Brunfels & the water colours, shows that the hypothesis appears true. In the Herbal is "Eberwurtz" = Carlina acaulis in turned upside down labelled.

water colours of his [illegible] water colours there are ~~[illegible]~~ = the herbal

p92 studies of the parts which were not used = flower prior details of vegetative structure.

8

Weiditz had pg 3-4 apparently used both sides of paper & Plötter had cut out what he wanted after many years the figures on both sides of they did not happen to overlap.

pg 6
Indicates in some water colours drawn upon which is the writing of Hans Weiditz
Rytz thinks that the painter himself wrote a card a number, a date, Erstellung, the plant name & sometimes remarks about the use & other details.
He reproduces one inscription giving 1529 pg 8
This inscription includes an A capital curiously like Durer's familiar initial. ~~He [illegible] that [illegible]~~ Durer was Does this have as an influence exerted by Durer over Weiditz?

pg 104
Rhytz's study of the woodcuts of or in the herbal & their confirmation of their authorship

p 106
Rytz thinks that then Weiditz painted the plants from nature, Brunfels ~~[illegible]~~ on his preface seems to make a distinction between "the painter" & the other artists who worked for him. These men seem to have worked very much independently of him & he had to use the cuts they chose to supply him with.

Full bibliography, herbarium identifications critical accounts of the herbarium & modern identifications of the water colours of Weiditz

Walther Rytz. II Pflanzenaquarelle des Hans Weiditz aus dem Jahre 1529. die Originale zu den Holzschnitten im Brunfels'schen Kräuterbuch. 15 ~~tafeln~~ pl. ~~in Offsetdruck~~ 44 pp Bern 1936

~~Brunfels~~ Weiditz [illegible] [illegible] [illegible] [illegible] [illegible] title page [illegible] — Weiditz [illegible] [illegible] [illegible]
Illustrator, [illegible] [illegible]

Der ~~Schweiz~~ Schweizerischen Bibliophilen Gesellschaft have been ~~responsible~~ for the publication. — made [illegible] publ. of figures

p. 5. [illegible] drgs smaller [illegible] of drawings
The woodcuts are [illegible] [illegible]
than original watercolours

pp 6–7 — How Platter [illegible] [illegible] drawings [illegible] [illegible]

· He [illegible] two water colors cut about — an [illegible] [illegible] sometimes in part [illegible] volume [illegible] manner. They were [illegible] [illegible] to [illegible] actually cut off [illegible] the woodcuts. This [illegible] Weiditz [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] his water colors [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] in order [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] Platter [illegible] [illegible] [illegible] [illegible] place, [illegible] ~~[illegible]~~ to [illegible] [illegible] [illegible] [illegible] ~~[illegible] figures~~ [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] mutilation. ~~[illegible]~~ [illegible] [illegible] [illegible] [illegible] ~~[illegible]~~ P. had [illegible] [illegible] [illegible] each drawing [illegible] [illegible]

p. 8 The [illegible] [illegible] [illegible] drgs [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] the plant inscriptions, [illegible] [illegible] [illegible]

2

drawn on the verso of leaf may survive on the underside. Some of the sketches were undertaken and their backs examined*. The figures unexpectedly thus disclosed sometimes reveal traces of directions to the Reisser (draughtsman on the wood) or the wood cutter. For the nature of these directions they seem to have been written on the behest of the painter himself. We may therefore conclude that we have here the actual [illegible] of Hans Weiditz, whose [illegible] was only known in a [illegible] for [illegible]

* In cases where viewing the drawing as a transparency disclosed something of apparent interest on the verso

Type 1 gray

Aquarellierte ~~Bestan~~ Pflanzenmodelle & Bastre - Federzeichnungen

Technique of the work were done p. 19 [illegible] admirably

Technique outlines p. 14 done with the pen

Technique of Dürer p. 8 Dürer's plant water colours were done in the brush only.

It seems curious that Weiditz should have coloured drawings intended for reproduction by woodcuts

p. 19 It seems as if it was Johannes Schott who was primarily responsible for the herbal, and the text of Brunfels [illegible] to the wishes of Weiditz commentary. The wonders were neither bespoken nor superintended by him to illustrate [illegible]

Herbarum vivae eicones made of origin & related to Weiditz

The publisher [illegible] to [illegible] was only to help the colour [illegible] of the blocks & the [illegible]

p. 15. He tried to colour in outlines or of the blocks in his wood cutter. The way in which the man who could copy [illegible] seems primarily to designed to help colour the [illegible] [illegible] upper [illegible] [illegible]

p 20 The work seems to have been all done within the year.

p 21 The way of technique is thus entirely different [rapidly] from that in Durer's drawings which were intended [of Durer] works of art in themselves.

They must be regarded as studies for the special aim of reproduction in woodcuts.

The work was pushed on in great hurry, the drawings all being done in 1529 while Brunfels wrote the text at the same time—Spring in 1530

(He agrees to arrangements [Brunfels] Fuchs rather [deprecate] the [critics] of Brunfels. On this point then my [knowledge] of both the Brunfels and the Fuchs work leads to the [opinion] in Fuchs [there] was much more complete collaboration between artist and [author]; the result is more sophisticated, and has an artistic [value] which is equally present tho' [differing] in a somewhat different plane. The artist has worked unashamedly from faded specimens. AA)

[Fuchs of Brunfels]

p 25 R. points out that Fuchs sometimes represents the plants in flower with the ground leaves (which would in their time be dead) still flourishing to show them.

The leaves spread out in order to show them more perfectly.

[Important of action in teaching, but rare]

p 34-5 He compares the history of botany with the history of human anatomy & the magnificent Leonardo da Vinci's drawings of those 1510-13, had not published them. [Wendely's] drawings [influence] Vesalius great work De Humani corporis fabrica 1543

[I propose to add to the [illegible] that the renaissance was very important in botany. AA]

Discovery 1.

Form of herbarium 1. original size 3 no. of types 6

Relation of pressing 1 American plants 6

analysis of information – localities etc 2

Volumes 2

origin of plant nomenclature 3

Alphabetic of Platter order 3

Hist of herbal since Platter made 3

Life of Platter 4

His collection – Montaigne .4–5

~~16 cent connoisseur~~

Importance of herbarium in 16 cent 5

Value as well as ~~herbarium~~ dried plants 6,7

Value of pictures 7

Volume / plates 7
Wordsworth letters to Kearn — 9 Marks. II 1
W.C.2
Lond

mode of publ. of II — II 1

Evidence of derivation of ~~do~~ cuts from drawings II/I 7 1

relation of woodcuts in HVE & drawings ~~II~~ I 7

the cutting up of watercolours their II 1-2

mss/rights I. 8

~~mode~~ technique of water colours II 2

cf Dürer II 2 II 3

reason of coloration II 2 II 3

Herbarum vivae eicones II 2, I 8

mode of page / II 3

regularity of work

cf Fuchs & Brunfels II 3

importance to artist & to history of Bot & Art II 3

Proofs to Dr Agnes Arber, 52 Huntingdon Road, Cambridge

Arb 5

ON A FRENCH VERSION OF THE HERBAL OF LEONHARD FUCHS.

The great and beautiful folio herbal of Leonhard Fuchs - "De Historia stirpium", published at Basle in 1542 - was the source of a series of reduced and variously degraded French versions. A number of these are dismissed collectively by Pritzel (Thesaurus Literaturae Botanicae, Ed. 2, 1877) as "libelli miserrimi", but although the figures are mostly poor and crude copies of Fuchs's admirable wood-engravings, the texts and their provenance might well repay a thorough comparative study. In the present note I propose to consider only a single example of these little herbals - "Histoire generale des plantes et herbes avec leur proprieté par M. Leonard Fuchs", printed in 1580, "A Rouen, De l'Imprimerie de Robert Mallard, rue de L'orloge à la grand Nef". The British Museum possesses two undated books which are both apparently later editions of this work. On of them (catalogued "1700?")is from the press of another Rouen printer, "Jean le Cousturier, rue Escuyere, au Chappeau Rouge". The other was printed at Troyes; it is catalogued as "1620?". I have before me an example of the 1580 edition which was formerly in the library of Dr. Edmond Bonnet and then in that of Miss Gubielma Lister, to whom I am indebted for help in its study. This copy has been somewhat cut down; the pages now measure about 11·6 cms. in height and 7·7 cms. in width.

On the verso of the title-page is the following disarming little poem, addressed by the printer to the reader, who is referred to elsewhere in the book as "amy Lecteur":-

Ce iourd'hui t'est, ce livre presenté,
En beau frangoys proprement translaté:
Auquel, pourras, prendre (si bon te semble.)
[Et] guerison, et plaisir tout ensemble:
Car il n'y a de mal aucune espece,
Qui n'ayt ici, sa guerison expresse.
Par ce moyen cognoistras le desir,
Des imprimeurs à te faire plaisir.

Dont recevras un profit incroyable

Estant c'est oeuvre a tes yeux agreable.

This copy of verses is succeeded by wood-cuts and text relating to seventy-one herbs, interspersed among which are a few descriptions with no pictures appended. This part of the book occupies 150 pages, and is followed by a short section (five pages) treating of Tobacco. This concludes the portion of the little volume which can strictly be called an herbal, but there still remain about an hundred pages of miscellaneous medical recipes, beginning with plague remedies.

Such botanical interest as the herbal possesses, lies chiefly in the descriptions of the plants enumerated; these diagnoses, however, are often curiously sketchy. Cow Parsley (Persil), for instance, receives no description beyond the statement that in the month of May the places where it grows are almost entirely white with its flowers; this, though true and picturesque, is scarcely adequate for purposes of identification! But occasionally something more in the modern manner is achieved. In treating of Cyclamen, the translator adds the information that it is to be found in abundance in the forest of Orleans; the description, derived from Fuchs, states that "It has Ivy leaves of purplish colour, and mottled above and below by white blotches, the stem four fingers long, naked and leafless, in which flowers are formed like Roses of purplish colour: the root is black, like to the Turnip".

In the sixteenth century the way in which the phenomena of sex extend to the plant world was not understood, and the words "male" and "female" were used in senses that now sound strange to our ears. In our version of Fuchs's herbal we meet with the old belief that the scarlet and blue varieties of the Pimpernel are respectively masculine and feminine - a belief which also finds expression in the English herbals of Henry Lyte and William Turner. The record runs as follows:- "Il y a masle et femelle: qui ne different en aucune chose fors en couleur de fleur le masle porte fleur de couleur incarnate, et la femelle de couleur d'azur".

A great part of the herbal is taken up with an account of the

"virtues " of the plants; some of the Medicines recommended, such as Marsh-mallow for coughs, have survived to the present day. And it is rather a pleasure to find that the practice of giving Chickweed to caged birds is of respectable antiquity - as might indeed be guessed from the English name. We read that "les petits oiseaux se delectent à manger de ladicte herbe [Mariolaine, Chickweed]. Les Oiseleurs donnent de ladite herbe à manger aux petits oysillons en cage quand ils ont perdu l'appetit de manger". Another of these survivals is mankind's appreciation of Asparagus; we are told that, when cooked according to the directions given, it is "une grande viande et un des principaux mets des grands seigneurs". In turning over the pages of the herbal, one is struck by the frequency of the remedies for loss of hair - the Nettle, Vine, Cyclamen, Waterlily and two kinds of Fern are each in turn offered for this purpose; it seems to suggest that baldness may have been particularly rife in the sixteenth century. Some of the objects for which medicaments are proposed are, happily, out of date today; we are, for instance, directed to mix Maidenhair Fern with the food of cocks and quails to embolden them, and encourage them to joust and combat.

Quite a large number of the recipes transgress the boundary line between medicine and magic. For instance, one of the herbs recommended for tertian fevers must be gathered with the left hand and with the eyes averted, while naming the patient. In the case of Vervain, the third node is to be collected for tertian fevers, and the fourth for quartan fevers; while , if Borage is used, a decoction should be made of a three-stalked plant for tertian, and a four-stalked for quartan fevers. Various ~~plants~~ herbs are credited with remarkable protective qualities. Wild Angelica , for example, has power "contre ensorcelemens, ou enchantemens, si on la porte avec soy". Tansy is particularly valuable, as it protects him who carries it from poisons and wild beasts and sun-stroke, and saves him from feeling any fatigue in travelling. Wild Thyme, when burnt, drives away all serpents and venemous animals, and it is recommended to mix it with the food of harvesters, so that if, peradventure, in their weariness they be overcome by sleep, they may rest in security, safe from the attacks of poisonous beasts.

Tobacco had not reached Europe when Fuchs produced *De Historia Stirpium*, so the section of our little volume dealing with this herb is a new feature. It includes a wood-cut of the Tobacco plant, with a smoking head beside it; I find that the source of this engraving is the rare *Stirpium Adversaria Nova* of P.Pena and M. de l'Obel, published by T.Purfoot in London, 1570/71. It is a curious thing that in Pena and l'Obel's herbal, the figure of the Tobacco plant did not form an integral part of the book, but an appropriate space was left in the text, so that a detached leaf bearing the picture might be pasted in later. In our little French herbal, the figure of Tobacco is poorly copied from that of de l'Obel, and the smoke is so unrealistic in character as to suggest that the woodcutter had never seen a pipe in use, and was mystified by the lines with which the original draughtsman had tried to indicate the emerging cloud. The same picture of Tobacco, though without the smoking head, had already been pirated in 1577 in an English book, "Joyfull newes out of the newe founde worlde,...Englished by Jhon Frampton Marchaunt. Imprinted at London in Poules Churche-yarde by Willyam Norton". This is a translation of a work by the Spanish physician Monardes, *La Historia medicinal de las Cosas que se traen de nuestras Indias Occidentales*, which appeared at Seville in its complete form in 1574. Tobacco is dealt with in the second part of this book, which was originally published in 1571, and which contained a very inadequate portrait of the plant; the English translator certainly did well to use de l'Obel's picture instead of that of Monardes. In a former book ("Herbals", Cambridge University Press, 1912) I reproduced this figure (p. 105), but I did not know at that time that it owed its origin to de l'Obel.

The letterpress relating to Tobacco in the French version of Fuchs which we are studying, is not directly derived either from Monardes or de l'Obel, and I have not been able to trace its provenance. We are told that the herb, which is lauded as "premiere entre les medecinales", derives its name "Nicotiane, from "Maistre Jean Nicot Conseiller du Roy ambassadeur de sa majesté au Royaume de Portugal, es annees 1559.60.61." The description of the plant is

strikingly good and clear. The stem, we read, "is very straight, not inclining to one side or the other, thick, hairy and viscous. The leaves broad and long, green, tending to yellow, bearded, soft, thready, not dissected, larger near the root than higher up. It puts forth its flower almost like those of the Rose Campion, in hue whitish and carnation-coloured, having the form of a little bell, emerging from a goblet-shaped envelope". We are also told that the smoke, "receuë speciallement avec un cornet l'effigie duquel voyez au coste de l'herbe appaise la faim et soif".

In the latter part of the book are collected together a mass of medical recipes under such headings as "Diverses Receptes", etc. Some of them remind us how highly perfumes were valued in the days before disinfection in the modern sense was understood. For instance, if you go into a place where plague is suspected, it is well to attach to your person "un sachet de Sandal cramdisi", containing fine pounded pearls, fine coral, ambergris, musk, and other ingredients, or you may carry in your hand "une pomme d'odeur", including a number of scents and drugs. Some of the other remedies enumerated must have depended on a more facile faith than the doctor of today can expect from his patients. For example, if a fish bone is stuck in the throat, you have merely to wreathe the throat externally with Periwinkle flowers, put the sufferer to sleep, and next morning he will awake cured.

But despite this and other absurdities, a rather unexpected vein of common sense runs through the compendium of recipes. Rules for distilling herbs are given, and special stress is laid on the importance of collecting each leaf, flower and root at that exact moment of the year when it is in its fullest perfection; it would be satisfactory if one could feel assured that this point was always as conscientiously attended to in modern commercial herb-gathering! Our herbalist, again, has enough mother-wit not to be unreasonably jealous for his craft, for though he commends Henbane and other remedies against toothache, he adds the honest confession, "mais si la dent est creuse, bon est la faire arracher". He tilts against the idea that expensive and out-

landish medicaments are better than those that are cheap and homely, and declares, for example, that he has found the horns of deer and goats more efficacious than the rare product of the unicorn. He professes that he would rather himself be cured by the use of a mean remedy, than "die with all the syrups, all the oils and all the sumptuous medicines of the Orient , or Occident". He notes that if you want to speak contemptuously of any man, you say that you hold him of no more account than your old shoes, but he objects to this proverb, on the ground that old shoes are in reality extremely valuable: for, if you reduce them to ashes, you have an excellent remedy for a blistered heel, which these cinders cure "by antipathy", just as a scorpion, when applied to the wound which it has itself inflicted, immediately makes it whole.

Our author quotes the ancients with respect, but nevertheless he inveighs against the notion that all medical truth is already in man's possession, "for God always reserves something for the judgment and experience of later generations". Though his work is admittedly a compilation, it reveals a personality, and we may feel that he achieved his concluding wish - not to be numbered with those "who fail to leave anything to posterity whereby it may be known that they have lived in happy labour".

Newnham College,
Cambridge

AGNES ARBER

(Name of Reader) Agnes Arber

(Date) May 8. 1925 (Letter and Number of Seat) E.9.

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Press Marks should be quoted from the **General Catalogue, not from the Subject Index.**

Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
547. b. 8	Fuchs, L	1545

This space for official use only.

Title of Work.
(If part of a series, specify the name of the series and the volume or part required.)

Historia Generale de Plantes

P.T.O.

(Name of Reader) Agnes Arber

(Date) May 8. 25 (Letter and Number of Seat) E.9.

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
546. b. 20	Monardes, N.	1571

This space for official use only.

Title of Work.
(If part of a series, specify the name of the series and the volume or part required.)

Segunda Parte .... Indias Occidentales

P.T.O.

(Name of Reader) Agnes Arber

(Date) May 8. 25 (Letter and Number of Seat) E.9.

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
C. 81. c. 20.	Monardes, N.	1574

This space for official use only.

Title of Work.
(If part of a series, specify the name of the series and the volume or part required.)

Primera y segunda y Tercera -- Indias Occidentales

P.T.O.

(Name of Reader) Agnes Arber

(Date) My 8 1918 (Letter and Number of Seat) E. 9

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Press Marks should be quoted from the **General Catalogue, not from the Subject Index.**

Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
447.8.3.	Pona, P + L'Obel M. de	1570 ca

Title of Work.
(If part of a series, specify the name of the series and the volume or part required.)

Stirpium Adversaria Nova

This space for official use only.

P.T.O.

(Name of Reader) Agnes Arber

(Date) My 8.1918 (Letter and Number of Seat) E. 9.

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Press Marks should be quoted from the **General Catalogue, not from the Subject Index.**

Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
447.8.4	L'Obel, M. de	1576

Title of Work.
(If part of a series, specify the name of the series and the volume or part required.)

Plantarum seu Stirpium Historia

This space for official use only.

P.T.O.

Monardes
Segunda parte del libro de las cosas que se traen de nuestras Indias Occidentales,

Seville 1571

Opens on Tobacco [illegible]. figure [illegible] [illegible] is reproduced in the 1574 ed.

(Name of Reader) Agnes Arber

(Date) May 8. 28 (Letter and Number of Seat) E. 9.

Permission to use the Reading-Room will be withdrawn from any person who shall write or make marks on any part of a Book, Manuscript, or Map belonging to the Museum.

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Press Mark. (From General Catalogue.)	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
970. a. 12.	Fuchs, L	1620?

This space for official use only.

Title of Work. (If part of a series, specify the name of the series and the volume or part required.)

Historia Generalis Plantarum

P.T.O.

(Name of Reader) Agnes Arber

(Date) May 8. 28 (Letter and Number of Seat) E. 9

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Press Mark. (From General Catalogue.)	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
546. c. 10	Monardes, N	1569

This space for official use only.

Title of Work. (If part of a series, specify the name of the series and the volume or part required.)

Dos Libros ... India Occidentals

P.T.O.

P. Pena et Ma. de Lobel
Stirpium Adversaria nova. London 1571
Thomas Purfoot 1571 colophon. but 1570 London on title page.

p 252

Figure of Tobacco with the smoking head, pasted in on appropriate space being left in the text - the text not derived for Lobel.

B M. 447. f. 3

Later Edn. Nova Stirpium Adversaria antwerp 1576 bound up with the Stirpium Observationes of M de Lobel Antwerp 1576 the same space is left & same figure inserted.

At side of figure in both cases, is figure of smoking head & word

Nicotiana inserta in infundibulo Indi ex quo hauriunt fumum et in nauseam

Another figure is inserted in the same way of Ithyphallus & marked with the page where it is to go, but no space left for it as for Nicotiana. This is also true of the 1570-71 edn.

(Date) Jan 10. 28 (Name of Reader) Agnes Arber

(Letter and Number of Seat) B B 8

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Press Marks should be quoted from the **General Catalogue, not from the Subject Index.**

Press Mark. (from General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
547. l. 8	Fuchs L	[1700?]

Title of Work.

(If part of a series, specify the name of the series and the volume or part required.)

Histoire Generale des Plantes

① How is proprietor spell in title.

② + name and address / printer.

p. 1. / ms

This space for official use only.

③ 2 Et guerson line 4 poem

P.T.O.

Food

Asparagus 1.

Use of children's [illegible] 7

Descriptions

Tansy .1.

Fern .1.

Senna 4

Cyclamen 4

Red [illegible] pepper 5

[illegible] 6

Borage & [illegible] 7

[illegible] 8

Remedies [illegible] - use

[illegible] .1.

Embodying [illegible]

1-2.

5

Remedies of ballads

Nettle p 2, 3

Vine

Cyclamen 4

Waterlily 5

Fern 5

Names

Adders Tongue 2

5-3-7 10

2 16 5

8 : 0 . 6

2 18

10 18 .11

C 1.22 . 15 . 15

.10 . 18 . 11

11 1 16 11

As if to make up for our lack of evidence of the Neophytic flora in the British Cretaceous, we have a singularly complete series of successive floras of Eocene & Oligocene age from more than ~~at least~~ half a dozen successive horizons. In these unfortunately leaf impressions constitute practically the sole evidence except in the case of the floras of the London Clay & the upper Oligocene. Consequently we still know very little about these floras of a reliable nature. One fact however is clear. The flora which then existed in Britain, at any rate in Eocene times, is not the assemblage of plants native to these islands today. This however is not to be regarded as a statement implying that no plant now occurring in Britain existed here in Eocene times. We are not in a position to make any definite statement on this point. So far as we can judge from the fruits & leaf impressions, the Eocene & perhaps also the Oligocene flora contained a considerable number of genera which are not represented in Britain today & which at the present time

Thyme & chary venus anus

2

Beehives

2

To preserve books by destroy wh / absent 3

Cosmetics

Elus p 3

Lost money

3

Dupting 6

To drive away dress

3

Magus — making quarts for

4

5

6

7

Organ sorcery

3

Spells Tansy

6

For cheerfulness Venus

4

As we have already intimated the Cretaceous history of a Neophytic flora is practically wanting in this country. The Cretaceous, Lower & Upper fossils of this nature occurring in Britain are extremely few & tell us practically nothing of importance on this point. The earliest Dicotyledonous woods are supposed to occur in the Lower Greensand, but leaf impressions of this group are unknown in any quantity until we reach the Woolwich & Reading beds of the Lower Eocene, where fruits & seeds first occur in abundance in the London Clay of the same formation.

Hence the evidence lacking in this country we must search the Cretaceous records of Western Europe. These at present have not been brought to a satisfactory scientific status from which accurately results may be drawn. We do not know how far our flora was local or regional, or exactly in what respects it differed from the vegetation of today in the same region

Compare w 1542 Fuchs

I 20 fig. copied but not reversed

Small plantain reversed
Large "

Asparagus. not reversed

Arum reversed
Descr. / Arum seen adapted ~ very different form from Fuchs.

Gelanum copied, not reversed
Mentions taken & final in the four- / orleans.
"Forma" & "Locus" taken from Fuchs

// Order / but not the same as Fuchs

Blanc d'eau
Nymphaea candida
French Fuchs
Tempus (not reversed)
Forma + Locus / seen adapted Fuchs
virtue due

Cf un Syte

Sum smaller + reversed — [illegible]
Asarum

Asarum . smaller + not reversed

(Name of Reader) Agnes Arber

(Date) Jan 10. 28 (Letter and Number of Seat) B B 8

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
469. f. 2	Fuchs, L.	~~1542~~ 1555

This space for official use only.

Title of Work.

(If part of a series, specify the name of the series and the volume or part required.)

L'Histoire de Plantes (Fuchs Translation)

P.T.O.

(Name of Reader) Agnes Arber

(Date) Jan 10. 28 (Letter and Number of Seat) B B 8

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
988. b. 3.	Fuchs, L	1549

This space for official use only.

Title of Work.

(If part of a series, specify the name of the series and the volume or part required.)

Hestoire des Plantes

P.T.O.

(Name of Reader) Agnes Arber

(Date) Jan 10. 28 (Letter and Number of Seat) B B 8

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
970. a. 12	Fuchs L	1620

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Title of Work.

(If part of a series, specify the name of the series and the volume or part required.)

Histoire des Plantes

P.T.O.

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Press Mark. (From General Catalogue).	Name of Author (with Initials) or other Heading of Work.	Date of Publication.
442. h. 7	Fuchs (Leonhard)	1549

This space for official use only.

Title of Work.

(If part of a series, specify the name of the series and the volume or part required.)

Commentarii in. epistolas

P.T.O.

Historie generale des Plantes et
Herbes ... (same letters of herbes)

à Rouen
chez Jean le Cousturier,
rue Escuyere, au Chappeau Rouge

L'Imprimeur au Lecteur

Ce iourd'huy t'est ce livre presenté,
En beau François proprement translaté,
Auquel pourras prendre (si bon te semble)
Et guerison, et plaisir tout ensemble:
Car il n'y a de mal aucune espece
Qui n'ait ici sa guerison ex-presse,
Par ce moyen cognoistras le desir,
Des Imprimeurs à te faire plaisir:
Dont recevras un profit incroyable,
Estant cét oeuvre à tes yeux agreable.

(Very crude engrav. ends on tobacco on the main head)

[547.6.8]

Histoire generale des Plantes et herbes

M. Leonard "Fucas" Same letters J. Lesters.

Troyes

small square ? 16 mo

~~Degraded~~ cuts
Tobacco comes in end & no figure.

Histoire des plantes de M. Leonhart Fuschsius, avec les noms Grecs, Latins, et Francoys. Paris 1549

Many large figures. 8vo. not nearly so degraded (? reduced & copied fr folio Fuchs)

L'Histoire des Plantes mis en commentaires par Leonart Fuschs medecin tres renomme Chez Guillaume Rouille Lyons. 1558

Quarto Larger smaller illustrations than those above ? fr the folio Fuchs

---

Commentaires tres excellens de l'hystoire des plantes, Composez premierement en latin par Leonarth Fousch, medecin tres renommé. Eloy Maignan the translators name is written in as

Paris 1549 - [Reduced fr the large but bigger than the Octavo a block abt 4 3/4 in]

271, High Road,
Ingatestone,
Essex.

23.12.27

My dear Agnes

This comes to bring you & Muriel much love & best of good wishes for Christmas & 1928. I believe you will enjoy this old faithful portrait of the Narcissus that grows "wild" between Golden Cap & Charmouth. To Muriel I send the yellow-little pencil, hoping that it may come in useful. Will you be having a festive time with your brother & his family? — I hope so. We had a happy card from Dolly after her arrival at Funchal, where sun & flowers gave a pleasant welcome. — I think she is wise in flying south, away from our frosts & thaws, &

the Sollas friends are my trust.
Many thanks for so kindly giving me
the list of the editors of Flora Danica
up to a certain date. I have not got any
further yet as to the artists who illus-
trated the earlier volumes & want our
friend B. D. Jackson to help! –

Do you know a little 12.mo entitled
'Histoire Générale des Plantes et Herbes avec
leur propriétés, par M. Leonard Fuchs
La Figure & vertu des petum ou nicotiane
vulgairement appellé herbe royne?
Avec un nouveau preservatif contre la
peste ... À Rouen. de l'imprimerie
de Robert Mallard, rue de l'orloge à la
grand Nef' 1580.' ?
It has an illustration of tobacco, after Monardes,
with the addition of a man's head smoking a
roast cigar. – The receipts & remedies
are amazing. If you do not know
this little volume & would care to borrow
it I will very gladly lend it you, or
give it, for you will make far more
out of it than I should. I bought it sometime ago.

Goodbye dear Agnes with my loving wishes
Very lovingly yours G. Lister

Joyfull newes out of the newe
founde worlde, ... Englished by Jhon Frampton Marchaunt
Imprinted at London in Paules Churche-yarde, by
Willyam Norton 1577

Sym. 7.57.7

p4 The same part of book begins
~~in tabaco~~
"Of the Tabaco, & of his greate Vertues"

1565

The orignl edn is Sevilla,
Dos libros ...

p3+4 The orignl for tabacco part of new is
Segunda parte del libro
1571.

These two were combined into
Primera y segunda y tercera
partes de la Historia medicinal de las cosas
que se traen de nuestras Indias
Occidentales Sevilla 1574

See Joyfull newes out of the Newe Founde Worlde ...
by Nicholas Monardes ... Englished by John Frampton
... With an Introduction by Stephen Gaselee. 2 vols The Tudor
Translations London New York. 1925.
(edited by Charles Whibley)

[~~Sym.~~ S.700.c.92.
9-10]

p 2

Auronne femelle
corumbres côme petits raisins reluisans
de splēdeur d'or" [? Tansy

L'Asperge

"On amasse son espic pour manger; lequel
pour sa tendreté les frians ont tourné en
plaisir de gourmandise. Aujourd'hui l'Asperge
cuite en potage, puis mise en huyle, sel & vi-
vinaigre est une grande viāde et un des
pompeux mets des grands seigneurs

Guymauves (Sprout Au)
les fueilles seiches bouillies
en Lait font bonnes pour soudain
guerir la plus mauvais toux du monde.

[= abrotanum, Southern-wood]
Avronne or Garderobe
As. remedy gain scorpions

Saxifrage. Picture looks like Wall rue. "C'est
une herbe branchue qui a les joncs deliez (slender)
~~black, short~~ noirs, courts. The leaves polished within, & the
on on the the other side pointes afichees on the
back, within flower, within seed, the root
blah? of no utility." (page opposite Asparagus) "cette

Maidenhair Fern

herbe meslee avec la viande des cocqz et ~~des~~ cailles emboldens them & encourages them to joust & ~~to~~ guards combat."

"The cabbage engenders "melancholy", it hinders sleep by dreams & ~~reveries~~ rêveries (= raving, delirium as well as revery)

Arum. Pied de veau (this the modern name)

Nettle (opposite Ba) "Elle reuvrist honnestement de poil les places pelées."

p 26 Brionie couleuvrée = adders Bryony (apparently ~~White~~ Black Bryony) because adders love & shelter under its shade.

Serpolet [Wild Thyme] p 32

"Quand on le brusle, il chasse de son odeur tous serpens et animaux venimeux, et ~~parce~~ par ce, le mesle on en la viande des moissoneurs à ce que si paraventure quand ils font las sommeil les surprend, ils puissent seurement reposer, et qu'icelles bestes qui ~~f~~ iettent leur venin ne leur facent mal"

Melisse [Balm] 33-34

If one rubs the beehives with Balm, the bees will not ~~fly away~~ take their departure!

~~Lys~~ ~~Los~~ Lysimachie (p 35-6) "est de grande efficace, contre les playes et escorcheures qui se font par les souliers qui sont mal aisez."

Vine p 38
le cendre de l'escorce restitue les cheveux perdus, et les multiplie.

Absinthe p 48
"L'eau en laquelle ceste herbe a trempé mise en l'encre a escrire, garde les livres d'estre rongez des rats et souris."
p.46 "pour sa grande amertume empeschant allegresse et gayeté"

p 49-50
l'Orme
L'humeur qui a la production des premieres fueilles se ~~trouvent~~ dedans ~~la~~ ses vessies fait le peau belle, et la face plus resplandissante.

Anis p 14-15.
Estant pendu au chevet du lict tellement que les dormans le puissent sentir, il oste les songes.

p 58-59
Le Chardon benist
Les modernes disent que le Chardon benist... vaut contre,, la memoire perdue;

p 59
Angelique sauvage p 61 N: sauroit-il hors paver" contre ensorcelements, et enchantemens, si on la porte avec soy:"

p 64
La Rose est cognuë de tous, il en ya de rouges et de blanches, de domestiques, et de sauvages."

4

p77

Le Sené & les gousses courbees en forme de croissant de la Lune, la semence large et pointue comme le cœur d'un homme.

~~Du Ci~~ p78

Du Cilament ou pain de pourceau

Il s'en trouve en abondance en la forest-d'Orleans.

Il a feuilles de Lyerre de couleur purpurine et bigarees dessus et dessous de taches blanches, la tyge longue de quatre doygts, nue et sans aucunes feuilles, en ~~haut~~ laquelle se forment fleurs comme Roses de couleur purpurine: la racine est noire, semblable au naveau. Il croist en lieux ombrageux, parmi les hayes et dedans les buissons, signamment sous les arbres.

drops
spell to

*

p80

Gelem: remedy of baldness

p82

Lepidion: used again the bites of serpents

p83

Esparquette [Spergule] Parthenium, Millefolium, Matricaire p85 "Les magiciens pour en user contre fievres tierces, commandent l'arracher avec la main gauche et ce faisant dire pour qui on la cueille, et n'y regarder point. Puis mettre la fueille sous la langue du malade, afin qu'il avale ~~soudain~~ soudain avec dix drachmes d'eau."

p85

Verveine: couleur of flowers "tirant sur le pers" (Pers is an obsolete word meaning bluish

p86

"l'on dit que si on arrouse une sale de l'eau ou la Verveine aura trempé ceux qui assisteront au banquet, s'en

p87

travaux resjouis. Le tiers noeud de l'herbe
en montant droit depuis la terre jusques
en haut prins avec ses fueillets, est utilement donné
en breuvage contre les fievres tierces, comme le
quatrième contre les fievres quartes"

p90

Quand les Foynes se veulent battre contre les serpens,
ils se fortifient en mangeant devant d'icelle Rue"
[Foyne = not in my dictionary]

p97
Water lily — Blanc d'eau or lis d'estang

p98
remedy f baldness

p99
Polythrie des Officines [Officine = apothecary's laboratory
(Fern)

p99
remedy f falling hair

p100
battle cocks — fortitude more "belliqueux" if mixed with their food

p105
Angallis

"On marche par tout dessus, par les champs et par les vignes, et n'est rien si vulgaire, et de quoy l'on face moins de compte. Il y a masle et femelle: que ne different en aucune chose fors en couleur de fleur: le masle porte fleur de couleur incarnate, et la femelle de couleur d'azur."

p 108 (6

Pour an ten Euphrasie has two (?) flowers
double yellow (in note p 109) but the

"Certainement. si tu consideres diligemment
et de pres les fleurs d' Euphraise, tu cognoistras
qu'elle ne sont du tout ~~[illegible]~~ jaunes, ni aussi du
tout blanches. Car elles sont tachees et marquees
de trois couleurs, rouge blanc, et noir."

p 110

Euphrasy "enferme merveilleusement la memoire,
et la repare, quand elle est perdue, si on la boit en
vin blanc avant reduite en poudre."

p 118 Dead nettle (white, yellow or purpurine)

Ortie morte (no doubt includes several plants)

p 119

~~si on met~~ dit-on que si on met la racine de
cette (Ortie) moyennant qu'elle soit Automnale)
sur le bras de ~~et~~ celuy qui a la fievre tierce,
pourveu qu'on la cueillant on nomme le patient
par son nom, (et qu'on dise qui, et a qui, et pour
le fils de qui on l'arrache) qu'il perdra entierement
la fievre".

P. 120 p 111 Janaisie ou herbe Saint Jean.

"l'on dit aussi que ceux qui l'ont sur eux
ne peuvent estre endommagez ni de poisons, ni
de medicamens venimeux, ni de bestes, ni mesmes
du Soleil. ... On tient aussi que les
voyageurs l'ayans liee sur eux, ne sentent
lasseté aucune.

p 135

Mariolaine (Unchanged)

les petits oiseaux se delectent à manger de ladicte herbe. Les oiseleurs donnent de ladite herbe à manger aux petits oysillons en cage quand ils ont perdu l'appetit de manger."

p136

La Bourroche est semblable au Bouillon blanc, ayant la fueille desprimee en terre, aspre plus noire, non dessemblable à la langue d'un boeuf : la fleur percee et belle et plaisante : laquelle description convient tellement à ceste herbe, qui est aujourdhuy ~~appel~~ appelee en nostre langue Bourroche, qu'il n'y a homme (s'il n'est plus aveugle qu'une taupe) qui ne voye que c'est la Bourroche des anciens

p137

Borage (contd) Use a decoction of 3 plants gainst tertian fever + 4 gainst quartan fever.

Persil (Parsley)
"au mois de May, les lieux ou ils croist sont quasi tous blancs, des fleurs d'icelles"
[This is all the description gives]

p 151

L'Herbe nicotiane premiere entre les medecinales."

Ceste herbe est appelee Nicotiane à cause de la premiere cognoissance qu'en a donné en ce Royaume Maistre Jean Nicot-Conseiller du Roy, ambassadeur de sa maiesté au Royaume de Portugal, es annees 1559. 60. 61.

p 152

"ayant la tige fort-droite, ne declinant ça ne la, grosse, velue (hairy), et viqueuse (viscous). Les fueilles larges et longues, vertes, tirant sur le iaune, barbues (beard), douces, filandrez (threadly), non decouppez plus grandes pres de la racine que haut. Elle jette la fleur presques semblable a celles de la Nielle*, de couleur blanchatre, et incarnatte (carnation colour), ayant la forme d'une petite ~~clo~~ clochette (bell) sortant d'une ~~coffe~~ cosse *[thimble] en forme de gobelet

* Rose-campion

An elaborate-ser) cultural directions of Tobacco

p 255

Ladite fumee receuë specialement avec un cornet l'effigie duquel voyez au coste de

l'herbe appaise la faim et sif sans qu'elle enyure aucunement; chose approuvee ~~&~~ iournellement par les mariniers

p 255

Faut pour secher les fueilles les enfiler ensemble, puis les mettre en une chambre au plancher à l'ombre, non au Soleil, vent, ni au feu.

p 256

Le Benefice commun.
Recueil de divers auteurs avec le moyen de composer plusieurs souveraines pour toutes maladies Et premierement la composition des pilules contre la Peste

p 269

Nouveau preservatif contre la Peste avec Remedes contre icelle approuvees cette annee 1580. en ville de Paris.

Ore / du preservatif :

Faut prendre une Figue grasse, en icelle mettre la moitié d'une vieille noix, et cinq ~~ou~~ au lieu fueilles de Rue, et le manger au matin à jeun : ou mis au bout d'un couteau sur les charbons."

Rules of distilling

p166

" Item voulant distiller les fleurs, comme de Roses,
Ougan, Romarin, geneste, [illegible] et
telles autres, tu dois observer et prendre
garde au temps, auquel icelles fleurs font en
leur meilleur estat, et plus grande et
parfaite beauté. Cela ie dis, pour autant que
toutes fleurs ne viennent pas en une mesme
temps, ains varient selon la saison : pourquoy
te faut suyvre leurs dispositions.

Item si tu veux distiller eau de racines
p167 de herbes, il faut attendre le temps qu'elles
soyent hors de graine, et que les fueilles
cheent. Cela se fait au commencement
d'octobre, et dure jusqu'en Fevrier asseurément;
(?)
car alors toute la puissance des herbes est à
racine *, ains se consomme en la fueille et à
la tyge. ~~Cela doit estre mise~~

* car comme elles se commencent à
fueiller hors. Tu dois savoir que l'amour
n'en plus à la racine

p.168

Various ways / mainly used with an little expense.

"Roses fresches posees sur un blanc linge, mis et estendu sur un bassin et couvertes d'un vaisseau rempli de charbon ardant, distillant dans icelluy bassin beaucoup d'eau, bien odorante."

p.170 "l'eau de vie"

medicine seule et souveraine sur toutes les autres medecines ... à toutes maladies guerit, tant passees comme presentes et futures."

... Premierement, prens bon vin vermeil, le meilleur que tu pourras trouver. ... ultimately apparently distilled & redistilled this to give almost anhydrous ~~[illegible]~~ alcohol.

p.172
Elle donne liesse et bonne memoire, repare l'ouie et aussi semblablement elle procure et enjoint à la personne plusieurs autres biens

p.173
Si ceste eau est mise en aucun vaisseau qu'on la touche d'une chandelle, elle s'allumera incontinent."

p.182
"Et note qu'abstinence est le souverain remede contre toutes fievres, mais qu'elle soit faite par attrempance (?).

p 190

Remedy for toothache

Prenez racine de Jusquiame, autrement dite Hannebanne, et la faites bouillir en vinaigre et eau Rose, puis mettez dudit vinaigre dans la bouche du malade, et cela luy donnera guerison."

"mais si la dent est creuse, bon est la faire arracher.

p 201

Contre ~~les~~ arreste de poisson estant en la gorge.

Prenez de la Pervenche, et en liez au tour du col de celuy auquel y a arresté quelque chose et qu'il aille dormer, et le matin il sera gueri."

p 215

A very good remedy when you go into a place suspected of the plague.

Take fine pound pearls, fine coral, ambergris + musk + other ingredients in a ~~scent~~ "un sachet de Sandal cramoisi".

or you take "une pomme d'odeur" including a number of scents & drugs & hold it in your hand.

~~p226~~

~~Pour ne d'ess~~

p234

"en suyvant ceux qui ont par modestes voyes cerché la verité

p239

After marvells cure described by the docteurs after the funds ~~collect~~ in bad faith

~~Car~~ "C'est une chose plus que prodigieuse. 2
Car le lendemain noz Medecins desesperant du patient, furent plus estonnez que fondeurs de cloches quand ils virent cheminer par les rues celuy qu'ils avoyent tant chappelé."

p243

+ Reyses ~~pr~~ dit "donne splendeur au teinct de la Dame" fort beau et gracieux

p146

~~En quoi~~
"le sotte curiosité des hommes cerchans bien loing, et à grans frais, les choses, lesquelles ne font en rien à comparer à choses, par opinion viles."

p253

Des vieux souliers

On dit en commun proverbe. Je tiens aussi grand conte de luy, que de mes vieux souliers: comme si on vouloit de monstrer, que vieilles savates ("simply means" old shoes") ne servent à rien. Et ~~tuteffois~~ tout-esfois si celuy qui tient tels propos ~~[illegible]~~ scavoit la grande efficace desdites savates, il les auroit en grande singularité. Car les savates redigées en centre guerissent toute iarseurs, et ~~[illegible]~~ meurtrisseures (bruises) des talons comme par une (cave-folks) antipathie, ainsi que nous voyons aux scorpions, lesquels appliquez sur leur pyqure mortelle, la guerissent sur l'heure.

p256

Nut-shells = remedy f baldness

p257

Nos Modernes Docteurs, font un grand cas de la corne d'une beste, nomment Monoceros, que nous appelons vulgairement Licorne (unicorn). ....ils en font comme un alexiteu et garentissement de tous maux. Toutefois estans studieux de si grandes proprietez, lesquelles ils attribuent à ladicte Licorne, j'ay bien voulu experimenter en plus de dix, au temps de pestilence, mais n'en trouvay onques effect louable, et trop plustost me repose ovie (? ouie) sur la corne de ~~Corvo~~ Cerf ou de Chevre, que sur celle de Licorne:

p258

~~Lecteur~~ "Lecteur amy"

Justs auttats "car ~~cé~~ ne suis si arrogant de vouloir me donner la premiere invention"

p 255,
"la maistresse des arts, experience,"

p 290 (misprint p 260)

speaks of Arab physicians: "les Sinyes Arabes [contemp.] tant beaucoup n'ayans l'usage des langues, voulans cindre le noir avec le blanc ... des deux mots grec, et latin, en font un ... corrompu" (...)

p 291

~~j'aymerois beaucoup~~ le nid des Irondelles cuit avec vin blanc, guerit ces subitement par une specifique propriété, Il ... s'on suffera affections du gosier illiné par dehors, si est-ce toutefois que j'aymerois qui voudra beaucoup mieux estre delivré, d'une si estrange maladie, avec choses de si peu de courage, que de mourir avec tous les sirops, toutes les huiles, et medecines somptueuses qui font en Orient, en Occident.

p 292 de la Suye

Des vertus de la Suye

Les Docteurs n'ont point traité de la Suye commune, laquelle se concrée en noz cheminées. Mais trop bien ont traité de la Suye des Encens, de Mirrhe, de Terebinthe de Stirax de poix (pitch) de Cedre, En quoy toutefois ne faut temerairement condamner la puissance de nostre vulgaire Suye, car les anciens n'ont tout cogneu, et Dieu garde tousjours quelque chose au jugement, et à l'experience des posterieurs.

p 293

Je serois ~~longtemps~~ longs temps, si ie voulois par le menu raconter les singulieres proprietez des choux, en la louenge desquels de grandissimes personnages ont employé tous les effors de leur engin". He advocates use of the cabbage slath of the cure of vanis its ~~vanis~~ [illegible] to be known [illegible]. Certa people "folsez called Galenists & the poor miserable ~~[illegible]~~ Neoteriens" will accuse him of being empiric: ~~[illegible]~~ pour ce qu'ils ne trouvent tel remede en leur Recepte. Ausquels ~~je~~ ie respondray, Dieu aydant, à mon plaisir.

p 294

Recommends spiders webs for stopping ~~of flood of blood~~ ~~for wounds~~ bleeding

p 368

A laquelle [la societé humaine] orner tant qu'il ~~plaira~~ au maistre de l'oeuvre, nous employerons tous nos ~~diurnes~~ et nocturnes efforts, ne voulons suyvre ceux desquels la memoire se pert avec le son, c'est à dire qu'ils ne delaissent à leur posterité chose par laquelle on puisse entendre qu'ils ayent vescu en heureux ~~labeurs~~ labeur".

~~He does not wish~~

His desire is not to follow those whose name notting of their posterity by which one may know that they have lived in happy labour.

Nature printing leaves in a 15th cent. MS, see Fischer, H. Mittelalterliche Pflanzenkunde. München 1929 p125, & pl. XIX

Nature -printing

Bradbury, Henry (1855): On Nature-Printing Proc. Roy. Institution of Great Britain, vol. II, 1854-8, pp. 106-118, 3 plates. [P. 340.1.C.135.2]

Experiments in getting impressions of plants seem to have been made in the 16th century, and in 1650 de Monconys, in his Journal des Voyages describes the technique used by a Dane, Welkenstein, (who dried and pressed the plants and then smoked them all over in the smoke of a candle or oil lamp. Then they were placed between two soft leaves of paper, and rubbed down with a smoothing-bone so that the soot was imprinted on the paper. See more accurate copy from original on next page)

Kniphof about a century later published a book illustrated in a similar way, but with printers'-ink substituted for lamp-black, and flat pressure for the polisher ~~smoothing-bone~~. (Kniphof & Hoppe's methods were used by Twining of Nottingham who in 1847 made prints of plants which were exhibited at Botanical Society of London.) (p 112)

(There is a copy of his work in the University Library:- M_A.62, 29-31

Kniphof, J.H. (1757-61): Botanica in originali seu herbarum vivum...elegantissima ectypa...opera et studio J.G.Trampe. Halae Magdeburgicae.)

The impressions are coloured by hand in rich strong colour, which much detracts from the delicacy of the nature-prints)

Another book illustrated with nature prints was :-

Hoppe , D.H.(1787-93) Ectypa plantarum ratisbonensium. Regensburg.

There is a copy at the British Museum (Bloomsbury, 36.g.13), and at B.M.Nat.Hist.)

but not so far as I know in Cambridge.

~~So far as I know~~, Kniphof and Hoppe ~~were~~ seem to have been the only people actually to apply the direct ectype method to the book illustration of flowering plants.* My impression is that the anonymous ~~collection~~ set of Mss. sheets at St John's college with manuscript names was made by this process probably late in the eighteenth century. It does not appear to me that they were made by an amateur. I have compared The handwriting of the plant names ~~strikes me as not unlike that~~ with that of Dr William Heberden (1710-1801), which is reproduced in T.J.Pettigrew's Medical Portrait gallery, vol. III, No 7 (n.d. ~~1839~~) 1840) but I do not think that is his script. All the same certain slips in the Latin names which a ~~Like most medical men of his time Heberden may~~ well ~~have ben a botanist~~ classical scholar, such as he was, would not have made ~~but I know of no evidence that he was.~~ It ~~would be interesting to compare the labelling of the nature print figures with any original labels wich may remain in connexion with his materia medica cabinet.~~

(margin: for herbarium specimens)

The next advance in nature printing was due to a Danish goldsmith and engraver Peter Kyhl, who, instead of printing direct from the plant, got an impression of the plant in metal and used this to print from. He describes his method in a manuscript dated 1833. He put the dried plant between a steel plate and a thoroughly heated lead or other soft metal and ran these two plates between two steel cylinders, so that the impression of the plant was left in the softer lead plate., which was then used to print from.

In 1847 A later improvement was the electrotyping of the soft metal plate.

Henry Bradbury (of the publishing family) (1831-1860) perfected the technique, which he had learnt when working at the Imperial Printing Office in Vienna. He coloured the ~~actual~~ electrotype plate and printed from it, instead of using hand colouring afterwards. After his early death nature printing seems to have fallen into disuse, in England.

The books for which Bradbury prepared the illustrations were

Johnstone, W. G. & Croall A (1859) The Nature Printed British Sea Weeds. Nature printed by Henry Bradbury. London 1859 (4 vols in 2 in V. & A. MD. 36.46,47

~~Moore, T. (1855) British Ferns. Nature Printed by Henry Bradbury. [illegible]~~

~~(there is also [illegible])~~

In Vienna it was used for Ettingshausen's illustrations of fossil leaves in 1877 etc. (Jackson, B.D., Botanical Illustration from the invention of printing to the present day. Journ. Roy Hort. Soc., vol. 49, 1924, pp.167-77.

p450

"Monsieur Walguestein Danois, nous apprit chez Monsieur Tevenot à imprimer toutes sortes d'herbes sur du papier, en les fumant sur la flamme d'une lampe, puis les mettant entre deux papiers et passant un polissoir dessus. (Confirm no wonder [illegible] polissoir means "smoothing bone" as Bradbury translates)

Monconys, de (Balthasar) Journal des Voyages Part II

Lyon 1666. O.3.45

Moore, T. (1855): The Ferns of Great Britain & Ireland. ed by J. Lindley. Nature-printed by Henry Bradbury. London Bradbury & Evans. [illegible]

Bradbury, Henry. On Nature-Printing.
Proc. Roy. Inst. of Great Brit. V XII 1854-8 P. 340. 1. C. 135. 2
pp 106 — 118. 3 plts
Techniques devd. in Imperial Printing Office in Vienna
p108 Experiments from 1650 on lean-[illegible] impressions of plants.
Plants — dried & smoothed over with [illegible] [illegible]
through place betw 2 [illegible] sheets of paper & rolled down with smoothing bone.

MA. 62. 29 —

Kniphof (Erfurt) Herbarium Vivum
[illegible] [illegible] large black & [illegible] [illegible] for printers ink [illegible] smoothing bone.
p110 A further devs. placing a dried plant between a heated lead plate, & the a polished steel plate — & [illegible] [illegible] between 2 plates [illegible] [illegible] between a [illegible] [illegible] steel cylinders.
p112 1847 Tourney, Nottingham printed ferns & grasses exhibited by Bot. Soc. of London

Some of the [illegible] [illegible], electrotyping [illegible] [illegible] [illegible] [illegible]

J. H. Kniphof.
Botanica in originali seu herbarium vivum .....
"elegantissima ectypa"
... opera ac studio J. G. Trampe.
Halae Magdeburgicae
1757 — 1861

Linnean names
Very few [illegible] prints [illegible] spoilt by the heavy colouring.
no plate mark
MA. 62. 29, 30, 31, 32
Wire drawn paper very [illegible] to St. Johns collection.
Wide [illegible] [illegible] 8 [illegible] 2 [illegible] [illegible] — [illegible] [illegible] [illegible] V.L.
[illegible] [illegible] [illegible] [illegible] [illegible] blank.

FROM THE LIBRARIAN
SAINT JOHN'S COLLEGE, CAMBRIDGE

15. v. 65

Dear Mrs Arber.

Certainly you may have the nature-print at your house for further investigation. If you will call in at the library any morning between 9 & 1 p.m., we will hand you the parcel. Many thanks for your interest

Yours sincerely
F. Puryer White

The Nature Printed British Sea Weeds
N. S. Johnstone + A Cowall.
London. Bradbury & Evans.
Nature printed by Henry Bradbury
1859

4 vols in 2.
no plate mark. Colored
MD. 36. 46, 47

British Ferns by Thos Moore
Nature Printed by Henry Bradbury
Colored ed. London 1855

MD. 36. 37, 38
colored. no plate mark.
(Octavo edn) & folio
1855

Moore, T. (1855) The Ferns of
Great Britain & Ireland, ed. by J. Henry
Lindley. Nature-printed by Henry
Bradbury. London, Bradbury & Evans,
Whitefriars.

Auer, A (1853) Die Entdeckung
des Naturselbstdruckes.
Denkschriften d. k. Akad.
Naturwiss. Wien. Math.-Nat.
Classe. VI V, 1853, pp 107-
110

T. 340.3.c. 1.6.

A trumpet blowing account of achievements in Nature printing of the Vienna k. k. Hof- und Staatsdruckerei. 12 magnificent plates — plants, lace, etc. & a fossil fish. Impression on not all the plates shown on plate margin

M H. 6.40

Lindley & Sprengel speak of it as "the first English attempt at applying Nature-Printing to Botanical Science". Large folio magnificent plates. Much raised pictures. — back of ~~plat~~ paper deeply grooved by axes & rachises. Thus not a plate mark.

Santolina Chamaecyparissus S. Eur.
Solidago canadensis N Am.

Labelled ?
St Johns
College

Cynoglossum lusitanicum
not Linn. ? may be
the lusitanicum of Lam.

Ononis non-spinosa
() suppose this means it is not spinose

Potamogeton crispus written crispum
The Latin dict. gives it as feminine

Lychnis (a pre-Linnean form) Crantz 1766
Lychnis = Louse.

Alisma cordifolia (written cordifolium)

Astragalus Monspeliensis
? for monspessulanus.

Heraclium for Heracleum

Bupuleurum for Bupleurum

Valeriana Dioica
Cyp D.

Carduus scandiacus
Roth tent. Fl. Germanica
= C. Anthriscus Huds.

Viscum Carsubica

If for 59/60 flowering plants, nearly all Linnean ones
with Tuberum compositum a Linnean name since
issued 1765

Comarum palustris
Phlomis lychnitis
? Phlomis Lychnitis

May 27 1945 Dr Raven found some time later the names Gentian Lutea & G. Pneumonanthe are
wholly wrongly applied, suggesting that the labelling was written by someone
knowing no botany

Leonardo da Vinci. Quincentenary Exhibition
1952. Diploma Gallery. Royal Academy.

Catalogue p 95.
No. 359. Pen and ink (C.A. 72.v.a)
Reproduction.
Leonardo wrote: "This paper should be painted with candle-black mixed with soft paste & then leaf painted with white lead in thin oil, as is done with printing type, & then printed in the usual way; and thus the shadows will appear dark in the hollows & light on the prominences"; which appears here reversed.
(C.A = Codice Atlantico, Biblioteca Ambrosiana, Milan, compiled in the end of the 16th century from several notebooks written between 1483 & 1518)

Leonardo da Vinci's Nature Printing.

ON A FRENCH VERSION OF THE HERBAL OF LEONARD FUCHS.

THE great and beautiful folio herbal of Leonhard Fuchs—*De Historia Stirpium*, published at Basle in 1542—was the source of a series of reduced and variously degraded French versions. A number of these are dismissed collectively by Pritzel (*Thesaurus Literaturae Botanicae*, Ed. 2, 1877) as "libelli miserrimi," but although the figures are mostly poor and crude copies of Fuchs's admirable wood engravings, the texts and their provenance might well repay a thorough comparative study. In the present note I propose to consider only a single example of these little herbals—*Histoire generale des plantes et herbes avec leur proprietē par M. Leonard Fuchs*, printed in 1580, "A Rouen, De l'Imprimerie de Robert Mallard, rue de L'orloge à la grand Nef." The British Museum possesses two undated books which are both apparently later editions of this work. One of them (catalogued "1700?") is from the press of another Rouen printer, "Jean le Cousturier, ruë Escuyere, au Chappeau Rouge." The other was printed at Troyes; it is catalogued as "1620?". I have before me an example of the 1580 edition which was formerly in the library of Dr. Edmond Bonnet and then in that of Miss Gulielma Lister, to whom I am indebted for help in its study. This copy has been somewhat cut down; the pages now measure about 11.6 cms. in height, and 7.7 cms. in width.

On the verso of the title-page ~~is the following~~ disarming little poem, addressed by the printer to the reader, who is referred to elsewhere in the book as "amy Lecteur":—

Ce iourd'huī t'est, ce livre presenté,
En beau françoys proprement translaté:
Auquel, pourras, prendre (si bon te semble.)
[Et] guerison, et plaisir tout ensemble:
Car il n'y a de mal aucune espece,
Qui n'ayt icy, sa guerison expresse.
Par ce moyen cognoistras le desir,
Des imprimeurs à te faire plaisir.
Dont recevras un profit incroyable
Estant c'est oeuvre a tes yeux agreable.

This copy of verses is succeeded by woodcuts and text relating to seventy-one herbs, interspersed among which are a few descriptions with no pictures appended. This part of the book occupies 150 pages, and is followed by a short section (five pages) treating of Tobacco. This concludes the portion of the little volume which can strictly be called an herbal, but there still remain about an hundred pages of miscellaneous medical recipes, beginning with plague remedies.

Such botanical interest as the herbal possesses, lies chiefly in the descriptions of the plants enumerated; these diagnoses, however, are often curiously sketchy. Cow Parsley (Persil), for instance, receives no description beyond the statement that in the month of May the places where it grows are almost entirely white with its flowers; this, though true and picturesque, is scarcely adequate for purposes of identification! But occasionally something more in the modern manner is achieved. In treating of Cyclamen the translator adds the information that it is to be found in abundance in the forest of Orleans; the description, derived from Fuchs, states that

It has Ivy leaves of purplish colour, and mottled above and below by white blotches, the stem four fingers long, naked and leafless, in which flowers are formed like Roses of purplish colour: the root is black, like to the Turnip.

In the sixteenth century the way in which the phenomena of sex extend to the plant world was not understood, and the words "male" and "female" were used in senses that now sound strange to our ears. In our version of Fuch's herbal we meet with the old belief that the scarlet and blue varieties of the Pimpernel are respectively masculine and feminine—a belief which also finds expression in the English herbals of Henry Lyte and William Turner. The record runs as follows:—

Il y a masle et femelle: qui ne different en aucune chose fors en couleur de fleur le masle porte fleur de couleur incarnate, et la femelle de couleur d'azur.

A great part of the herbal is taken up with an account of the "virtues" of the plants; some of the medicines recommended, such as Marsh-mallow for coughs, have survived to the present day. And it is rather a pleasure to find that the practice of giving Chickweed to caged birds is of respectable antiquity—as might, indeed, be guessed from the English name. We read that "les petits oiseaux se delectent à manger de ladicte herbe [Mariolaine, Chickweed]. Les oiseleurs donnent de ladite herbe à manger aux petits oysillons en cage quand ils ont perdu l'appetit de manger." Another of these survivals is mankind's appreciation of Asparagus; we are told that, when cooked according to the directions given, it is "une grande viande et un des principaux mets des grands seigneurs." In turning over the pages of the herbal, one is struck by the frequency of the remedies for loss of hair—the Nettle, Vine, Cyclamen, Water-lily, and two kinds of Fern are each in turn offered for this purpose; it seems to suggest that baldness may have been particularly rife in the sixteenth century. Some of the objects for which medicaments are proposed are, happily, out of date to-day; we are, for instance, directed to mix Maidenhair Fern with the food of cocks and quails to embolden them, and encourage them to joust and combat.

Quite a large number of the recipes transgress the boundary line between medicine and magic. For instance, one of the herbs recommended for tertian fevers must be gathered with the left hand and with the eyes averted, while naming the patient. In the case of Vervain, the *third* node is to be collected for tertian fevers, and the *fourth* for quartan fevers; while, if Borage is used, a decoction should be made of a *three-stalked* plant for tertian, and a *four-stalked* for quartan fevers. Various herbs are credited with remarkable protective qualities. Wild Angelica, for example, has power "contre ensorcelemens, ou enchantemens, si on la porte avec soy." Tansy is particularly valuable, as it protects him who carries it from poisons and wild beasts and sun-stroke, and saves him from feeling any fatigue in travelling. Wild

thyme, when burnt, drives away all serpents and venemous animals, and it is recommended to mix it with the food of harvesters, so that if, peradventure, in their weariness they be overcome by sleep, they may rest in security, safe from the attacks of poisonous beasts.

Tobacco had not reached Europe when Fuchs produced *De Historia Stirpium*, so the section of our little volume dealing with this herb is a new feature. It includes a woodcut of the Tobacco plant, with a smoking head beside it; I find that the source of this engraving is the rare *Stirpium Adversaria Nova* of P. Pena and M. de l'Obel, published by T. Purfoot in London, 1570/71. It is a curious thing that in Pena and l'Obel's herbal, the figure of the Tobacco plant did not form an integral part of the book, but an appropriate space was left in the text, so that a detached leaf bearing the picture might be pasted in later. In our little French herbal, the figure of Tobacco is poorly copied from that of de l'Obel, and the smoke is so unrealistic in character as to suggest that the woodcutter had never seen a pipe in use, and was mystified by the lines with which the original draughtsman had tried to indicate the emerging cloud. The same picture of Tobacco, though without the smoking head, had already been pirated in 1577 in an English book, "Joyfull newes out of the newe founde worlde, . . . Englished by Jhon Frampton Marchaunt. Imprinted at London in Fenles Churche-yarde by Willyam Norton." This is a translation of a work by the Spanish physician Monardes, *La Historia medicinal de las Cosas que se traen de nuestras Indias Occidentales*, which appeared at Seville in its complete form in 1574. Tobacco is dealt with in the second part of this book, which was originally published in 1571, and which contained a very inadequate portrait of the plant; the English translator certainly did well to use de l'Obel's picture instead of that of Monardes. In a former book ('Herbals,' Cambridge University Press, 1912), I reproduced this figure (p. 105), but I did not know at that time that it owed its origin to de l'Obel.

The letterpress relating to Tobacco in the French version of Fuchs which we are studying, is not directly derived either from Monardes or de l'Obel, and I have not been able to trace its provenance. We are told that the herb, which is lauded as "premiere entre les medecinales," derives its name, Nicotiane, from "Maistre Jean Nicot Conseiller du Roy ambassadeur de sa maiesté au Royaume de Portugal, es annees 1559.60.61." The description of the plant is strikingly good and clear. The stem, we read, "is very straight, not inclining to one side or the other, thick, hairy and viscous. The leaves broad and long, green, tending to yellow, bearded, soft, thready, not dissected, larger near the root than higher up. It puts forth its flower almost like those of the Rose Campion, in hue whitish and carnation-coloured, having the form of a little bell, emerging from a goblet-shaped envelope." We are also told that the smoke, "receue specialement avec un cornet l'effigie duquel voyez au coste de l'herbe appaise la faim et soif."

In the latter part of the book are collected together a mass of medical recipes under such headings as "Diverses Receptes," etc. Some of them remind us how highly perfumes were valued in the days before disinfection in the modern sense was understood. For instance, if you go into a place where plague is suspected, it is well to attach to your person "un sachet de Sandal cramoisi," containing fine pounded pearls, fine coral, ambergris, musk, and other ingredients, or you may carry in your hand "une pomme d'odeur," including a number of scents and drugs. Some of the other remedies enumerated must have depended on a more facile faith than the doctor of to-day can expect from his patients. For example, if a fish bone is stuck in the throat, you have merely to wreathe the throat externally with Periwinkle flowers, put the sufferer to sleep, and next morning he will awake cured.

But despite this and other absurdities, a rather unexpected vein of common-sense runs through the compendium of recipes. Rules for distilling herbs are given, and special stress is laid on the importance of collecting each leaf, flower and root at that exact moment of the year when it is in its fullest perfection; it would be satisfactory if one could feel assured that this point was always as conscientiously attended to in modern commercial herb-gathering! Our herbalist, again, has enough mother-wit not to be unreasonably jealous for his craft, for though he commends Henbane and other remedies against toothache, he adds the honest confession, "mais si la dent est creuse, bon est la faire arracher." He tilts against the idea that expensive and outlandish medicaments are better than those that are cheap and homely, and declares, for example, that he has found the horns of deer and goats more efficacious than the rare product of the unicorn. He professes that he would rather himself be cured by the use of a mean remedy, that "die with all the syrups, all the oils and all the sumptuous medicines of the Orient, or Occident." He notes that if you want to speak contemptuously of any man, you say that you hold him of no more account than your old shoes, but he objects to this proverb, on the ground that old shoes are in reality extremely valuable: for, if you reduce them to ashes, you have an excellent remedy for a blistered heel, which these cinders cure "by antipathy," just as a scorpion, when applied to the wound which it has itself inflicted, immediately makes it whole.

Our author quotes the ancients with respect, but nevertheless he inveighs against the notion that all medical truth is already in man's possession, "for God always reserves something for the judgment and experience of later generations." Though his work is admittedly a compilation, it reveals a personality, and we may feel that he achieved his concluding wish—not to be numbered with those "who fail to leave anything to posterity whereby it may be known that they have lived in happy labour."

Agnes Arber,
Newnham College, Cambridge.

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

~~Thomas Johnson is chiefly remembered~~ It is as the apothecary and botanist who edited the greatly improved second edition of Gerard's Herball, ~~which appeared in 1633~~. Despite ~~Johnson's~~ his importance in the history of British botany, and the gallant part which he played in the Civil War, no comprehensive study of his life has hitherto been attempted. The task, as Mr. Wallis Kew and Mr. Powell point out in the book before us, presents special problems of a disheartening character. At the outset every student of Johnson is confronted by the difficulty that the combination of two such common names makes all identifications precarious. Even when the field is limited to contemporaries of the same profession, and to neighbours in London, we find that the Court Book of the Society of Apothecaries for 1617 - 1651 include five Thomas Johnsons, and that there were two other men of this name, as well as the herbarist, living in the parish of St. Sepulchre. ~~Moreover~~, another Thomas Johnson, Apothecary, practised within seven minutes' walk of our Johnson's Snow Hill house; ~~and~~ there was also a Barber-Surgeon of the same name with whom he has been ~~some times~~ confused. The consciousness of these stumbling-blocks increases our gratitude to the authors of Thomas Johnson for having given us a work in which all ~~the~~ authentic records of the botanist's activities have been laboriously collected, and in which every direction that might be expected to yield facts about his life has been explored systematically. Their painstaking and minute researches have revealed much that is of interest, ~~but his~~ private life remains wholly obscure. We have no certain information about the year of his birth, the names of his parents, the place of his education, nor whether he married and left descendants. His history as a field botanist, however, can be traced from point to point in his published work, and from the botanist we can, to some extent, deduce the man.

It seems probable that Thomas Johnson was born somewhere about 1600. In 1628 he became a free brother of the Society of Apothecaries -

~~apothecaries in those days representing general practitioners as well as druggists.~~ In the succeeding year he published a relation of his plant-hunting excursions - "simpling voyages", as he called them - into Kent and to Hampstead Heath. This was the first printed account of such expeditions to appear in this country. On the journey into Kent, the party, ~~which consisted of ten persons~~, travelled by two boats from St. Paul's to Gravesend, encountering a storm on the way. At Queenborough their journey was delayed by the Mayor, who desired the attendance of three or four of them to know the business of so large a party of travellers in those parts. Fortunately ~~he~~ accepted their explanations, and the interview ended with the drinking of healths in excellent ale. On the Kentish expedition more than 250 plant species were collected, while 72 were obtained from Hampstead Heath and the country round.

The Herball of John Gerard had been published in 1597 and in the succeeding thirty-six years there had been no new edition, nor had any subsequent book taken its place. It contained many errors, which were partly accounted for by the fact that the text was a translation from Dodoens, rearranged according to the method of Lobel, and illustrated by a collection of figures which had been used by Tabernaemontanus. In 1632, the successors of the original publisher, being alarmed by the idea that a competing herbal by Parkinson was about to appear, commissioned Johnson to ~~herbal~~, allowing him only one year for the work. This was a colossal undertaking. Not only was it necessary to correct Gerard's errors and add original matter, but, to illustrate the book, a different and larger collection of 2766 figures had to be fitted into the text; these were the wood blocks used in the famous series of herbals published by Plantin of Antwerp. Johnson himself speaks of "the hast of the Worke, whereby I was forced to performe this ~~task~~ within the compasse of a yeare". One can but marvel at the high standard which he attained, though working under such pressure. Considering his ~~period~~, his scholarly scrupulousness in editorial work was remarkable. He evolved an elaborate system of marking the text to distinguish the degrees to which he had altered or rewritten Gerard's descriptions, and those accounts

of plants, which he had received from his friend Goodyer, were printed in a form which made them readily recognisable.

We have so little knowledge of Thomas Johnson's personal life, that it is a pleasure to find that there is in existence a letter, relating to the Herball, indicating that a friendship existed between him and the poet, Sir Henry Wotton, the author of that perfect distich upon Lady Morton:-

"He first deceased; she for a little tried
To live without him, liked it not, and died".

The letter in question is addressed "To my verie loving and learned friend Mr. Johnson Apothecarie, at his howse on Snowe Hill, London". Wotton explains that he is sending his servant with the request that Johnson will tell him "where he may buy one of your Gerrards, well and strongly bound: Next, where I may have for my monye, all kinde of coloured Pynkes to sett in a Quarter of my Garden or any such flowers as perfume the Ayre". We can easily guess what directions Johnson gave to Wotton's servant, for in the herbal, after describing "Gillofloures, Pinkes and the like", he recommends "such as are addicted to these commendable and harmlesse delights" to "repaire to the garden of Mistresse Tuggy ...in Westminster, which in excellencie and varietie of these delights exceedeth all that I have seene".

In 1639 Johnson made his last herborizing excursion, the famous Welsh journey, in the course of which he ascended Snowdon, and found alpine plants such Silene acaulis, the Cushion Pink. Though his fame is founded on his edition of Gerard, in reality his most important work was the Mercurius Botanicus, which was based primarily upon the results of his various plant-hunting expeditions. This work, which was published in two parts in 1634 and 1641, was, in a sense, the earliest British flora, for it was the first work in which the attempt was made to enumerate all the known British plants, and to deal with them alone; the herbals, on the other hand, had aimed at comprehensiveness, and had not concentrated on the plants of this country. He had indeed planned to carry this undertaking much further, and, in collaboration with John Goodyer, to produce a regular

descriptive and illustrated flora. Though fate prevented the fulfillment of this ambition, Johnson's work, incomplete as it was, remained until the time of Ray the best guide to our native plants.

When the Civil War broke over England, it put an end for ever to Johnson's scientific activity. He gained reputation as a soldier - a fact which was more surprising to the Victorians than it can be now, after the countless examples of such transformations in the Great War. Johnson joined the Royalist forces at Oxford, and was sent to Basing House, where he took part in the long defence, which is discussed in detail in the book before us. On November 7, 1643, the Parliamentarians obtained possession of certain outbuildings, and the garrison decided to try the dangerous remedy of sallying out and firing the barns. "Lieutenant Colonell Johnson coragiously ventured out into the very Grange yard, with 25 men onely, and encountring with Clinson [Captain-Lieutenant to Waller], grappled with him, and was too farre ingaged, when two or three stout fellowes of the Garrison hasted to his rescue, where Captain Clinson received his deaths wound". It was not until the Autumn of the next year that Johnson received the shot, from the effects of which he died, "no lesse eminent in the Garrison for his valour and conduct, as a Souldier, then famous through the Kingdom for his excellency as an Herbarist, and Physician".

THOMAS JOHNSON

Botanist & Royalist

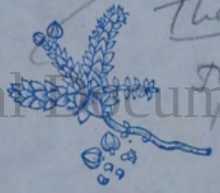
H. WALLIS KEW & H. E. POWELL

LONGMANS

Made in Great Britain

THOMAS JOHNSON

Botanist & Royalist



H. WALLIS KEW & H. E. POWELL

Thomas Johnson Botanist & Royalist H Wallis Kew & HE Powell. Longmans Green & Co. 1932.

Venn Venn's Alumni Cantabrigienses (1751) includes 35 Thomas J.'s & Foster's Alumni Oxonienses (1714) 19. The Soc. of Apothecaries Court Book 1617–1651 includes five.

All taken then John practised as a London Apothecary there was another T.J., Apothecary, practising with several ... Snow Hill where John lived; moreover there were two other Thomas Johnsons in his parish of St Sepulchre. There was also a Thomas Johnson, Barber Surgeon ... what J his ... been confused

p11 No contemporary account of his birth ... given.

Fuller describes as ... Basing House wrote

p12 "A man of such modesty, that knowing so Much, he would own the knowledge of Nothing" "When in Basing House a dangerous piece of service was to be done, the Doctor (who publicly pretended not ordinarily ... performed it."

p13 Born in Yorkshire & apparently ... Lincolnshire.

p15 Apothecaries – their ... ... Goods ... dangerous of their ...

p14 Exact date of birth uncertain, but it was probably that it was somewhere round about 1600

p17
In 1626 he travelled in the northern parts of England.

p19 Flora of bog Pimpernel for his drawing.
+ 20 ths northern counties produced a number of first records of England, such as [illegible] Selsden, Bog Pimpernel, Great Bell flower

p20 In 1628 he became a free brother of the Society of Apothecaries, & examined Aug 1628. Nov. 28. Thomas Johnson apprentice to Mr Willm Bell was examined & found sufficient was made free pd his fees & gave a spoone."

p21 His famous herborizing excursions "simply voyages" as he called them, to Kent & Hampstead Heath (the first in 1629) & their narratives were the earliest printed ~~of the kind~~ undertakings made in this country.

pp22-23. The journey to Kent occupied 5 or two weeks of ~~[illegible]~~ The party of 10 persons went by boat from St. Pauls to Gravesend but encountered a storm & one boat had to put in at Greenwich for repairs. At Queenborough their journey was delayed by the Mayor who desired to know the business of their journey, a [illegible] of [illegible] He accepted the abundance of [illegible] travellers & [illegible] so large a party & their explanations & troubles ended with the drinking of healths in excellent ale.

p28
At Hampstead Heath expedition they found ~~[illegible]~~ ~~[illegible]~~ Whortleberries, Lilies of the Valley

p32

The original Gerard published 1597 & no new [and subsequent ... had taken its place] (3

edition appeared until Johnson's in 1633. Unfortunately

Johnson was obliged to complete the new edition in a year,

because the publishers were afraid of competition of Parkinson's

Theatrum Botanicum then in the course of preparation.

33 It seems incredible that so much should have been done in the

year — even the arrangement of fifty — the ~~now~~ different &

p48 large collection of (2766 woodblocks) illustrations & rectify Gerard's innumerable

errors would have taken twice the time but Johnson also

added much original matter.

Johnson translation of Ambroise Paré pub 1634.

p41 Did some drugs himself

p42 Received ~~[illegible]~~ from Bermudas

a bunch of bananas of which he gives a good description & figure — "the fruit or meat was very soft &

tender, & it did eate somewhat like a

Muske-Melon."

p 52. Gerard had fitted the figures of Tabernaemontanus

with the Dodoens text — p 50. They were the

figures used in "Tabernaemontanus' Neuw

Kreuterbuch (1588-1591) & Eicones Plantarum

(1590) also 16 new ones by added — Gerard misapplied

many of the Tabernaemontanus figures.

p51 Gerard had changed the general method [illegible] of

Lobel

p 53 Johnson
Used to figures in whole towards of Dodoens, 5
Lobel & Clusius were found printed

p 53
Johnson had a good deal of the scrupulous feeling of the modern editor, for he tried in all but a few [illegible] distinguish in the text [illegible] distinguishing the degree to which he had altered, rewritten, [illegible] Gerard's figures [illegible] [illegible] [illegible] descriptions of Goodyer he printed in a form which makes them easy recognisable p 1071

p 54
Johnson's Address to the Reader he was able to write:– "If there be any defect ~~therein~~ [~~to the Reader~~] therein (as needs there must be in all humane works) ascribe it in part to my haste and many businesses, and in some places to my want of sufficient information, especially in Exotike things.

p 58
The business to Plant-collectors

p 57 Travellers for [illegible] usual of Johnson was rightly the ~~block~~ figures, ~~taken to date~~ the [illegible] herbal years in putting of Lobel: 1576, [illegible] or closely copied herbals by Dodoens, the block is used ~~[illegible]~~ Clusius, ~~Gerard~~ Gerard, Johnson, Parkinson, Salmon, Bauhin, Chabraeus

p 63
"The hart of the Worke, whereby I was forced to performe this taske within the compasse of a yeare"

p 69
Mentions the gardens of Parkinson in Long Acre, Tradescant in Sout Lambeth, Ralph Tuggy's in Westminster. Mistress Tuggy continued the garden

The authors conclude from internal evidence that the translator of ~~Ambrose Pa~~ "The Workes of that famous Chirurgion, Ambrose Parey" which appeared in 1634 under the name of Thomas Johnson, is rightly attributed to Johnson the Botanist.

p 84

It appears that he had in view the ultimate production of a work on the whole of the plants native to the County with their localities. p 105. Jointly with John Goodyer "wee accurately drawn figures." (p 103) The numerous herbalists multiplying with the war – apparently the 2 friends ... meaning botanizing in those.

p 1634

~~He wrote the account~~ of the plants found on a journey to Bath & desc of the Batt hot springs & Bath and the botany had diverted both

p86 Iournies, ~~Bath~~ on the hot springs of Bath.

1637 p 89

Letter from Sir Henry Wotton to Johnson "To my verie loving and learned friend Mr Johnson an Apothecarie, at his howse on Snowe Hill, London." He sends his servant with the request that Johnson will tell him "where he may buy me, of your Gerrard, well and strongly bound: Next, where I may have for my monye, all kinde of colourd Pynkes ~~seed~~ to sett in a Quarter of my Garden or any such flowers as perfume the Ayre." Sir Henry ~~Wotton~~ Probably Mistress Tuggy's Westminster Wotton was referring to

garden as the best place for "Clove Gilliflowres, & Pinkes, & the like" — exceeds all others in the excellency & variety of their commendable delights."

p93
1639. July & August, Johnson made his famous Welsh journey which lasted 3 weeks or more. Johnson took with him Edward Morgan as interpreter.
p96 They ascended Snowdon & found Arctic Plant with plants such as Silene acaulis,

p108 This was his last — his account of (1641) was his last published work

p98
They were disappointed in their descent & ascent — mountain near Bangor where they were told they would find plants there because the guide said he feared the eagles nesting there.

= p106 The two catalogues that Johnson published under the name of Mercurius Botanicus he intended to be an enumeration of all the British plants then known. He enumerated c. 898 — first British records of the total 47 are

p109-110
~~The last was begun in 1642~~
1643 Johnson joined the royalist forces at Oxford & in 1643 University gave him the honorary degree of Doctor of Physic. His relations there while at Oxford was his pleasure that they should be creditors in debt to families & those who had given him service in battle or had given them shelter — this continued until (rendered after) stringent petition ~~~~ against ~~~~ creditors.

p 112
Johnson joined Colonel Rawdon in Basing House in Hampshire which was held for the King under Marquis ... then and ...

(A plan given p. 1 (x))

Detailed description

p 114
The Marquis of Winchester who owned Basing House had with them, but he was ... & his gentlemen were not numerous enough for defence, so he solicited the King for one hundred musketeers, ... & later ... Colonel Rawdon by the ... of his regiment ... Johnson ... in the defence. On November 7, 1643, ... outbuildings to Parliamentarians ... decided to seek to ... the garrison ... setting fire to the buildings ... setting fire to ... Johnson distinguished himself: "He courageously ventured into the very Grange yard, with 25 men only, & encountering with Clinson [Captain-Lieutenant of Waller], then ... fierce engaged, ... was too ... for him, ... two or three stout fellows of the garrison hastening to his rescue, where Captain Clinson received his deaths wound!"

p 118
Later in November Waller retreated & Basing House was left in peace until the following Spring. It was not until September 1644 that Johnson received a shot wound from the effects of which he died, "no lesse eminent in the garrison for his valour & conduct, as a Souldier, than famous throughout the Kingdom for his excellency as an Herbarist & Physician." p 124–5 The garrison held out until Cromwell's storming & sack of the house in 1645

p136 8

Thus Johnson's reputation was established by his edition of Gerard, the more important of his works was the Mercurius Botanicus published in two parts in 1634 & 1641. This was in a sense the first British Flora, for it was the first work in which the British plants were enumerated & separated from those known of the Herbals & dealt with alone. The nearly ... of the plants of Britain had gradually become the main business of his life. While still an apprentice he was engaged in describing plants then he believed Ob new. In 1629 & 1632 he published descriptions of his two Kentish journeys, the Iter ... & in his 1633 Gerard he included the Excursions, & in these 3 works resulting from these excursions Britain alone 120 plants together he recorded as not before so recorded by any author. In the Mercurius he described his journeys into Wales, the Isle of Wight ... & Wales, & in 1636 ... he had determined "to travel over the more parts of this Kingdome for the finding of more plants."

p137 For the Johnsons Catalogues (in the Mercurius) contain all the plants of native growth, with their synonyms, to help of their localities, which his journeys had made known to him, & the books of authors had made known. Altogether over 858 plants were enumerated & of those about 167 had not before been recorded as British species.

p138 The works of 1629 & 1632 were the first published in Britain which described botanical journeys & enumerated the plants of any well-defined area in this country.

140 9

Ray was 8 more [illegible] came in
to world when Johnson ~~initia~~. indicates.
His Catalogus Plantarum Angliae, 26 yrs
after Johnson's death, presented British botanists
with a sound guide to native flora. But
even this work contained no descriptions & did not
meet the need for regular description & illustration
of flora which had been recognized by Johnson &
Goodyer. In 1641 Johnson expressed his
determination to publish (with notes) of plants in a
joint work with Goodyer & would figures of as
many of them as he was able. And thus (but
for the war) these two botanists would have
forestalled [illegible] work the like of which was not
published during their century, or for many years
later

~~He~~ Johnson died of the effects of a shoulder wound while assisting "in the defence of Basing House, John Paulet's," ~~defeat~~ "no less eminent in the garrison for his valour & conduct as a soldier, than famous throughout the Kingdom for his excellency as an Herbarist & Physician."

We know so little of Johnson's private life, ~~that~~ that the glimpse to [illegible] any [illegible] but is welcome, as in [illegible] some year. letter to him from Sir Henry Wotton addressed "To my verie loving & learned friend Mr. Johnson, Apothecarie, at his house on Snowe ~~H~~ hill, London", asking where ~~he~~ he could be bought "one of your Gerrards, well and strongly bound: all kinde of [illegible], when [illegible] have for my moneye, coloured Pynkes to sett in a Quarter of my Garden & many such flowers as perfume the Ayre."

B

Proofs to A. Arber
52 Huntingdon Road
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Arber

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

The most famous of the English herbals, that of John Gerard, appeared in 1597 and held the field without a competitor for more than a generation. Though the book was full of errors, no further edition appeared during this time; if was not until rumours arose that John Parkinson would soon produce a new herbal to take its place, that the successors of Gerard's original publisher were brought to the point of undertaking a second edition. In 1632 they commissioned Thomas Johnson, a well-known London apothecary and botanist, to carry out the work, with the proviso that it must be completed in a year. This was a heavy task. It not only included the correction of Gerard's frequent mistakes, and the incorporation of an entirely different set of over 2500 wood blocks from Antwerp (which had formerly illustrated the works of Dodoens, de l'Ecluse and de l'Obel) but also the writing of a comprehensive historical introduction. Johnson achieved all this with remarkable success. His editorial methods show a scholarly feeling which strikes one as surprisingly modern; he evolved an elaborate system of marking the text to distinguish the degrees to which he had altered or rewritten Gerard's descriptions, while those accounts of plants which he had received from his friend Goodyer, were printed in a form which made them readily recognisable.

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

The fact that Johnson has hitherto lacked an adequate biography, is partly accounted for by the extreme difficulty of tracking down the history

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

A.A.

An 17 [~~These notes were produced~~ My mother produced these notes in reply to a query from Miss Helen Gardner of Oxford in connection with the quotation below.

Muriel A. Arber
November 19, 1960]

JOHN DONNE: 'The Extasie', lines 33- 48.

But as all severall soules containe
   Mixture of things, they know not what,
Love, these mixt soules, doth mixe againe,
   And makes both one, each this and that.
A single violet transplant,
   The strength, the colour, and the size,
(All which before was poore,and scant,)
   Redoubles still,and multiplies.
When love, with one another so
   Interinanimates two soules,
That abler soule, which thence doth flow,
   Defects of lonelinesse controules.
Wee then, who are this new soule, know,
   Of what we are compos'd, and made,
For, th'Atomies of which we grow,
   Are soules, whom no change can invade.

<u>Poems of John Donne</u>, ed. H.J.C.Grierson, 1912,i.53.

1660 ed 1 p 30 (p 60)
Sharrock, R. 1672 ed. 2 of History of Propagation
"~~And~~ it is usually believed that divers single flowers may be changed ~~to~~ into double by frequent transplantations, made into better grounds"

my copy ed 1 + Hh. 1917 ed. 2

Notes on The Extasie (Agnes Arber, July 24, 1958)

In looking up references to violets in early literature, one has to remember that the name was formerly used widely for many different plants, especially the sweet-scented. The term Violet survives even today in a number of English compound names of flowers quite remote from the Violet family, e.g.. Water Violet (Hottonia, Primrose family), Corn Violet (a Campanula) Dames' Violet (Hesperis, a Crucifer), etc. William Turner, in The Names of Herbes (1548) (English Dialect Soc. Reprint, 1881) calls the Sweet Violet Viola nigra seu purpurea, but he also uses the term Violet for Wallflowers and Stocks.

But I do not think there is any reason to doubt that Donne was thinking of the sweet March Violet. Lyte's Herbal of 1578 says that "The sweete garden Violet, groweth under hedges, and about the borders of fieldes and pastures in good ground and fertyle soyle, and it is also set and planted in gardens". And he also says, "Of this sorte, there is another kind planted in gardens, whose floures are very double, and full of leaves".

My impression is that Donne's comparison is not precise, for there is no indication that he was thinking of two plants, or two seeds, intermingling in any way. Indeed it would be scarcely possible that he should have realised the existence of sex in plants. This was not understood until quite the end of the 17th century, and even after this it was much disputed. The use of the terms 'male' and 'female' by sixteenth-century herbalists bore no relation to sex; they

called plant varieties characterised by strong colour, male, and paler ones female. Otto Brunfels, and William Turner, for example (following Dioscorides) called the scarlet Pimpernel, male, and the blue variety, female. The first statement that the stamens were male organs came in 1682 from Nehemiah Grew, who quotes a conversation in which Sir Thomas Millington had suggested this to him, thus confirming an unpublished view which Grew himself already held. But it was long before the idea was proven, or so far accepted as to become part of the intellectual background of the period. My own tentative opinion is that the suggestion for Donne's analogy in The Extasie must have come to him, not through any idea of sex in plants, but because he was misled by a mistaken bit of terminology which has found its way from common speech into botany — I mean the use of 'single' and 'double' for normal flowers on the one hand, and, on the other hand, flowers in which (in botanical jargon) the petals are monstrously increased at the expense of other organs especially the stamens'. It is easy to see how inadequate the expressions 'single' and 'double' are, when we compare the 5-petalled briar rose and the 'cabbage' rose, with its appropriate Latinist name, centifolia. But to Donne, who (I imagine) was more interested in language than in natural objects, the expressions 'single' and 'double' would call up primarily the 'one' and 'two' idea, which at the moment dominated his mind, and he might easily overlook the fact that his analogy (though ~~representing~~ symbolizing an enlargement and enrichment of singleness implemented by an improved environment) was based merely on changes of outward circumstances and not on the union of two beings.

'Violet' was formerly used very widely as the name of many different plants, especially the sweet scented.

The typical one is certainly <u>Viola odorata</u>, <u>sweet or March violet</u>, but even today there is Hottonia <u>Water Violet</u> (Primulaceae), <u>Corn Violet</u>, Campanula hybrida L (Campanulaceae) & Dame's or Damask Violet, Hesperis matronalis, a crucifer.

See R. C. A Prior, Popular Names of British Plants, 1879

William Turner. <u>The Names of Herbes</u>. 1548
Reprint English Dialect Socy 1881.
calls the Violet, <u>Viola nigra seu purpurea</u>
but he calls Wallflowers & stocks also ~~Leucoion~~ violets.

~~The~~ Sex in plants was not understood properly until quite the end of the 17th century. ~~Previously~~ The sixteenth-century herbalists called vigorous plants with stronger colour 'male'. Brunfels (following Dioscorides) called the scarlet pimpernel, male & the blue, female, & he also called purple-red dead nettle male, & white, female.

The first definite statement that the stamens were male organs came in 1682 from Nehemiah Grew, who quotes a conversation with Sir Thomas Millington who suggested the idea to him, a view which Grew himself happened also to have arrived. Some 18th century [illegible] when trans-sex [illegible] plants was only made its way with difficulty.

Lyte's Herbal 1578

There be two sortes of Violets: the garden and the wilde Violet. The Garden violets are of a fayre darke or shining deepe blewe colour, and a very pleasant & amiable smell. The wilde Violets are without savour, & of a fainte blewe or pale colour

. . . . . .

The sweete garden Violet, groweth under hedges, & about the borders of fieldes & pastures in good ground & fertyle soyle, & it is also set & planted in gardens.

. . . . .

Of this sorte, there is another kind planted in gardens, ~~those~~ whose flowers are very double, & full of leaves.

I think that Dunne was perhaps led away with by a bad piece of ~~botanical~~ terminology which has found its way from common speech into botany: it is the use of "single" & "double" for normal flowers on the one hand, & flowers in which the petals ~~[illegible]~~ are monstrously increased on the expense of other organs especially the stamens". The "one" & "two" significance of "single" & "double" is lost sight of when double flowers are spoken of..

~~Flowers~~.

In looking up references to Violets in early literature one has to remember that the name was formerly used widely for many different plants, especially to sweet-scented. The term Violet has been incorporated in a number of English compound names for flowers quite remote from the Violet family e.g. (Hottonia Water Violet = (Hottonia) Primrose family) Corn Violet (a Campanula ~~Lychn~~) Dame's violet (Hesperis, a Crucifer) etc.

William Turner in The Names of Herbs (1548) (English Dialect Soc. Rep. 1881) calls the sweet violet Viola nigra seu purpurea but he also ~~calls~~ uses "violet" for Wallflowers, Stocks, ~~violets~~.

~~But there is little doubt~~ It is pretty evident that Donne himself was thinking of the sweet Marsh violet.

Lyte's Herbal 1578 says that "The sweete garden Violet, groweth under hedges, & about the borders of fieldes and pastures in good ground & fertyle soyle, it is also set & planted in gardens." And he also says "Of this sorte, there is another kind planted in gardens, ~~those~~ whose flowers are very double, & full of leaves.

(If there is not undue stress on the word "weake" & there is ~~the term~~ is ~~weak~~ a doubt the variety of flowers...) My impression is that Donne's ~~writing~~ comparison is not precise, ~~for~~ It would be scarcely possible that he should have realised the existence of sex in plants. This was not understood ~~properly~~ until quite the end of the 17th century, & even after this it was much disputed. The use of terms male & female by early herbalists to describe plant varieties ~~was a strong~~ characterized by strong colour 'male'

July 25. 58

I suggest in my notes to Miss Jardine that either The Extasie was inspired by The Phoenix & Turtle, or that Donne and Shakespeare wrote The Phoenix & Turtle, probably before 1598 when many of 1601.

July 24 1958
Suggest to Helen Gardner who already denied that Donne could have written the Phoenix & Turtle

3.

If, recognising that I am an ignoramus in these

studies, I may venture an opinion on the whole poem, it is that it is inspired by Shakespeare's The Phoenix and Turtle

1601), or alternatively, that The Phoenix and Turtle was written
, probably between 1598 & his marriage in 1601,
by Donne/ not Shakespeare /.

An 18

Nature. Semi final
no page references

NEHEMIAH GREW

(1641-1712)

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 plants, but 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 finely 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 fully recognised; indeed his reputation in this line is so deservedly great that it has tended to overshadow the other facets of his output. It seems worth while, therefore, in this, his tercentenary year, to draw attention to certain less specialised aspects of his scientific work.

Grew's general attitude towards ~~science~~ biology cannot be understood unless one realises 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 hardly necessary to look for specific sources. It was owing to the mechanistic view-point of that period, that the microscope, for instance, was hailed as an instrument which was destined to clear away all inconvenient mysteries. Hooke hoped that by the help of glasses "we may perhaps be enabled to dis-

cern all the secret workings of Nature, almost in the same manner as we do those that are the productions of Art, and are manag'd by Wheels and Engines, and Springs, that were devised by humane Wit." Grew enlarges upon this analogy between the world and a man-made machine, and seems to find it entirely satisfying. He says that "all Nature is as one great Engine made by and held in" the hand of God. He regards this engine as having been set in motion by the Great First Cause, to which all subsequent effects can be traced back; he considers that the original causation was all that was necessary, and that , in the normal course of events, no subsequent interference has occurred. "And as it is the watch-maker's Art," he says, "that the Hand moves regularly from hour to hour, although he put not his finger still to it: so it is the demonstration of Divine Wisdom, that the Parts of Nature are so harmonicously contrived and set together as to conspire to all kind of natural motions and effects without the extraordinary-immediate influence of the Author of it". This particular philosophy led Nehemiah Grew to regard it as a pious duty to discover a mechanistic"cause"for eahh phenomenon, ~~or "effect"~~; he defines " an intelligible account" as "such as is grounded upon the Notions of Sense, and made out Mechanically". This mental bias gave him an over-simplified conception of causation, and a "cause" became to him almost something tangible and visually imagable. He thought that "one property agreeing to divers Vegetables" should have one cause: for although the scope and end may vary, yet the cause, as it is the cause of that property, must be one". His reasoning thus induced him to underestimate the ~~doubt and difficulty~~ lack of security which always pervades the realm of causes, and which ~~was~~ were even more impenetrable in those days, when biochemistry and biophysics were non-existent. Grew was ~~endlessly~~ perennially sanguine, and he was liable to believe that he had succeeded in solving problems of causation before which the boldest spirits might quail even today. As an example we may take his answer to the question of why

certain elements of plant tissues are elongated and cylindrical. "Succiferous Vessels", he says, "from their Sal Alkali grow in length; for by that dimension chiefly this Salt always shoots...And as by the saline Principles the Vessels are long, so by the oleous ...they are Cylindrical"; but for the "oleous Principle" they would be flat or angular "as all sacline Shoots of themselves are, as those of Alum". The striking point about this explanation is not that it happens to be in itself a failure, but that Grew at that early date should have made such a valiant effort after a causal-mechanical interpretation of form.

Grew's mechanistic theory of the universe had the very great advantage that it opened his mind to the mathematical aspects of biology. In 1620 Francis Bacon had lamented that "Nothing in Natural History is found to be ... numbered up, nothing weighed, nothing measured", and Nehemiah Grew, in his Catalogue of the Royal Society's Museum, published more than sixty years later, reiterates the same complaint; for after noting that he had included in his descriptions the "just Measures", he adds, "Much neglected by Writers of Natural History". Grew certainly took great trouble to give the exact dimensions of the specimens he studied, and many of the plates in this book are accompanied by a line divided into inches to show the degree of reduction. Elsewhere he made the suggestion that the figures in herbals ought all to be "drawn by one Scale; or at most, by Two; one for Trees and Shrubs; and another for Herbs." He realised that, for general descriptive purposes, words of more exact connotation than the "great" and "small", of the usage then current, were needed; he proposed that leaves 5 in. or over in length should be called "great"; 1 -5 in., "mean"; and 1 in. or less, "small".

When objects of microscopic size were in question, the biologists of the seventeenth century were faced with the difficulty of not having any adequate standards of measurement. Grew observed, for in-

stance, that the vessels of roots showed a range of about 20 degrees in size, but he had no means of assessing for these degrees individually, and all he could say was that "Some of these in the Vine, being of the greatest Size; appearing through a good Glass, at least one third of an Inch in Diametre". When dealing with things seen through the microscope, Grew is indeed often reduced to naming some object the size of which was recalled by the size of the image as he saw it in its magnified form. For instance, he describes the spore-case of the hart's-tongue-fern, when seen through "a good Glass", as being "about the bigness of a Cherry-stone". In other places he uses "about $\frac{1}{5}$ part as big as a Cheese-Mite", and "the breadth of a Marsh-mallow-Seed or little Spangle", as terms of comparison. From a twentieth-century standpoint, units of this kind may seem laughably futile, but we have to remember that, when people are forced to use them for lack of a more advanced technique, a certain degree of accuracy can be achieved. When the original pennyweight was defined in terms of grains of wheat, an effort was made to secure uniformity in the grains. A grain of sand, again, sounds to us completely indefinite as a standard, but Dobell has shown that Leeuwenhoek, Grew's contemporary, had in mind a grain of about $\frac{1}{100}$ in. in diameter, when he spoke of a "fine sandgrain, while a "coarser" grain was about $\frac{1}{30}$ in.

Grew not only measured the objects he described, but he recognised that "The Arithmetick of Nature" is "every where suitable to Her Geometry" - an idea which gave him an interest in computations. He came to realise that the permutations and combinations of a few characters might open up a range of differences comparable with the great "Variety, a few Bells, in the ringing of Changes, will produce". In discussing the tastes of plants, to which great attention was then paid as a guide to their medicinal virtues, he made a mathematical analysis of possibilities, and gave a table showing how many three-fold tastes would arise by the combination of ten simple tastes, each

of which has at least five distinguishable degrees of strength. He calculates that this would lead altogether to 1800 "sensible and defineable Variations of Taste".

Grew did not rest content with mere measurement and numbering; he also thought of these relations in more general terms. He speaks, for instance, of the parts of the plants as being "as punctually , for their Place and Number, composed together; as all the mathematical Lines of a Flower or Face".

His mechaniatic theory of the universe not only inclined Grew to mathematical interpretations, but it led directly to his wholehearted adoption of the atomic theory. He uses the word "principles " as synonymous with "atoms", which he regards as being indivisible, immutable, and of divers kinds. He says that "in the self same analogous way, as the Letters of the Alphabet, are the Principles of Words; so Principles, are the Alphabet of Things." He draws the logical conclusion that , if such unchangeable atoms are the structural basis of the world, "the Formation and Transformation of all Bodies, can be nothing else, but the Mixture of Bodies."

Whenever Grew grasped an idea, he pondered it until he had wrung from it everything that, for him, it contained. The idea of atomicity, and the consequent significance of mixture, led him to certain conclusions which bore no fruit at the time, but which foreshadowed developments in science which did not actually come into being until the nineteenth century. One of these developments, of which Grew had a premonition, was the production of organic compounds in the laboratory. "Art it self", he says, "may go far in doing what Nature doth. And who can say, how far? For we have nothing to Make; but only to mix those Materials , which are already made to our hands. Even Nature her self , ... Maketh nothing new; but only mixeth all things. So far, therefore, as we can govern Mixture, we may do what Nature doth". In another passage he is more specific about this hope: "we

may be taught to Imitate the Productions of Nature...Of Vegetables, ...a Milk, Mucilage, Rosin, Gum ...I do not say I can do all this; yet if, upon good Premisses, we can conclude this possible to be done; it is one step to the doing of it."

Another corollary , which Grew derived from his notions about atomicity and mixture, related to the sexual process. Though he had never heard of a nucleus, and could not have had any conception of the exact nature of fertilisation, he anticipated on general grounds the independence of the parental contributions in the fertilised egg. He emphasizes that "the most perfect Mixture of Bodies, can go no higher than Contact. For all Principles [i.e. atoms] are unalterable; and all Matter is impenetrable...In the most visible, and laxe Mixture, there is Contact; and in the most subtile and perfect, as in Generation it self, there is nothing more". Nehemiah Grew's philosophy is sometimes dismissed as though it were merely secondhand cartesianism; but though he was influenced by Descartes to some extent, it is doubtful if this influence went at all deep. It is significant that he parted company with Descartes altogether on the question of the structure of the universe. He was , as we have just seen, a confirmed atomist, whereas Descartes held the view that atoms do not exist.

Grew's whole personality seems to have been so closely integrated that his biological work, and his attitude to philosophical problems, were inseparably knit together. Great as were his specific contributions to the actual knowledge of plant structure, we are at least as much in his debt for his analysis of the relation between thought and observation, and for his recognition that the dissociation of the two is fatal to scientific work. In his own words: "Thoughts cannot work upon nothing, no more than hands; he that will build an house, must provide Materials . And on the contrary, the Materials will never become an house, unless by certain Rules he joyn them all together. So it is not simply the knowledge of many things, but a multifarious copulation of them in the mind, that becomes prolifick of further knowledge".

Roy Soc 126 K

~~The two refs to book checked before returning to R.S.~~

(~~But has Concurrence cap~~ (?) concurrence in l.c.)

((2) ~~26~~, notes for ed 2. + l., which is described as much enlarged
transfers to this case

V. 11

1st ed. Oxford. Printed by A. Lichfield, Printer to the University, for Tho. Robinson. 1660

R. Sharrock. Fellow of New College.

Contents of Chap VIII + pp 1-4 of Preface missing in copy of Sharrock 1st ed 1660 R.S.

309

Sharrock, R.(1660): The History of the Propagation and Improvement of Vegetables By the Concurrence of Art and Nature. Oxford.

V 11

Sharrock, R. (1660). The History of the Propagation and Improvement of Vegetables By the C~~o~~oncurrence of Art and Nature. Oxford. [p. [illegible]]

Ryl Soc. 126 K

The two refs in book checked before return to R.S.

~~(But I cannot state if Concurrence has capital C over my photostat shows "c" or not")~~ ? Concurrence in L.C.

I. 6.

IX. 3.

See ~~Myt 2~~ 26 copy of notes from 2nd ed transferred to this case

wrote: "everything, in so far as it is simple and undivided, remains, as much as in it lies, in the same condition, and suffers no change except from external causes"[1]. But SPINOZA's manner of dealing with the subject in the Short Treatise is decidedly unlike this highly generalised statement by DESCARTES, and in fact shows more affinity comes much nearer to the words of BOETHIUS. The rather startling association of "Providence" with self-preservation - which is scarcely characteristic of SPINOZA, and produces what POLLOCK has called the "curious" Chapter V of Part I of the Short Treatise[2] - ceases to be puzzling if we may take it to represent a possible connexion of ideas carried over from BOETHIUS, which did not harmonise altogether perfectly with SPINOZA's general scheme. When he laid his predecessors under contribution, SPINOZA recalls SHAKESPEARE in his capacity for transmuting what he took into something of far greater value. Whereas in the Short Treatise his account of the principle of self-maintenance remains much at BOETHIUS' level, in the work of his maturity, the Ethics, he expressed it in this form : "conatus, quo unaquaeque res in suo esse perseverare conatur, nihil est praeter ipsius rei actualem essentiam"[3]; that is to say, "the striving by which each thing endeavours to persevere in its own being, is nothing else than the actual essence of the thing itself". This formulation becomes of great importance in its application to living creatures, since SPINOZA does not stop at the idea of self-maintenance as merely one of

1. "unamquamque rem, quatenus est simplex et indivisa, manere quantum in se est in eodem semper statu, nec unquam mutari nisi a causis externis". R.DESCARTES, Principia Philosophiae, Amsterdam, 1644, Part II, Cap. xxxvii, p. 54; see also F.POLLOCK, l.c., p 108.

2. F.POLLOCK, l.c., p. 109.

3. Ethices, III, Prop. vii, p. 132.

Sharrock Mpr ② 26 ...

Monodelphy, Avena
note on this

Here Grew indicates, if somewhat confusedly, the existnce of the pericyclic corky layers which so commonly occur in the root, and outside which the tissues exfoliate. He recognises that the shelling off of these tissues may leave the xylem close to the root surface; as he says, " the very Vessels themselves, in many Roots, coming under an apparent view, and standing in the utmost surface of the Root.

He also had an accurate idea of the main anatomical differences between the centralised vascular core of the root and the more disseminated bundle system of the stem, "in the Root the Lignous Body, [vascular cylinder] being in proportion with the Cortical, but little, and all lying close within its Center", while in the leaves and stem "it is comparatively of greater quantity, and also more dilated,... divers of its Branches standing more abroad towards the Circumference". As a corollary to his general idea of root structure, he recognised the endogenous origin of lateral roots.

The growth of stems in thickness naturally engaged Grew's attention, and he reached a sound general conception of the secondary developemnt of wood, though he could not get at the details with the means at his command, neither did he ralise that there was an increase of phloem as well as xylem. In his own words: "Every year there grows a new Ring of Sap-vessels on the inner margin of the Bark. Which Ring, hardening by degrees, at the latter end of the year, is turned into a dry and hard ring of perfect wood...the inmost portion of the Bark, is annually distributed and added to the Wood: the Parenchymous part thereof making a new addition to the Insertions [rays] within the Wood; and the Vessels, a new addition to the Lignous pieces betwixt which the insertions stand" [i.e. the wedges of secondary wood]

It was not only root and stem anatomy which interested Grew; he also examined leaf structure, and arrived at a distinct

the Root with laudable and sufficient aliment". What we, by a luckless misnome, call the "vascular system" of the seed, he names the "inner body". He describes the way it branches within the cotyledon, and uses the term "seminal root" for the brush of bundles, saying that the parenchyma is related to the "seminal root" as the earth is related to the plant root itself. This extended use of the term "root" is somewhat startling, but it is of course true that the function of the veins in the cotyledon is to draw supplies from it and pass them to the young plumule, as the roots in a pot of mould absorb water and salts, and pass them on to the growing regions.

When Grew turns to the construction of the mature plant, we find that he has a perfectly clear idea of the nature of buds, and the process of their development into shoots; "the Germen", as he says "being prolonged, and so displaying its several parts, as when a Prospective or Telescope is drawn out, thus becomes a Branch". He notices with interest the precocious development of leaves in the bud. The "Buds of all Trees", he writes, "consist of a great number of Leaves, all perfectly formed to the Centre; where, notwithstanding, they are sometimes, not half so big as a Cheese-Mite. So that all the Leaves which stand upon a Branch ...of one whole Years Growth, were actually existent in the Bud". How pleased he would have been with the twentieth-century discovery that in the horse-chestnut winter-bud, not only are all the leaves of next season formed, but also the two first bud scales of the succeeding year. Grew observed also how long before their appearance the development of flowers occurs. For instance he noticed and figured next year's flower in a tulip bulb in September, with the perianth, stamens and gynaeceum already in being. Such facts suggested to him that, since flowers are already in existence in the winter, they might be forced to expand in the cold season, "by keeping the Plants warm, and thereby enticing the young lurking Flowers to come abroad".