FAMILIAR

LECTURES ON BOTANY,

PRACTICAL, ELEMENTARY, AND PHYSIOLOGICAL,

WITH

A NEW AND FULL DESCRIPTION

OF

THE PLANTS OF THE UNITED STATES,

AND CULTIVATED EXOTICS, &c.

FOR THE USE OF

SEMINARIES, PRIVATE STUDENTS, AND PRACTICAL

BOTANISTS.

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Philosophy, &c.

NEW EDITION, REVISED AND ENLARGED;
ILLUSTRATED BY MANY ADDITIONAL ENGRAVINGS.

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PREFACE.

This work was prepared, originally, with the view of being used as a text book in the class-room, and by private students, teaching in a simple and inductive manner the Science of Analytical Botany, as also Vegetable Physiology. It did not profess to contain a sufficient number of descriptions of genera and species to furnish a complete manual for the Botanist in collecting and labelling plants; those which were described were chiefly the more common, such as the student would be most likely to meet with in his botanical excursions, or could readily be collected for illustrations before classes, and for teaching the mode of analysing and classifying.

The extensive circulation of this work has encouraged the author and publishers to incur new labor and expense to adapt it more fully to the demands of the public. These demands, according to the testimony of teachers in various sections of the country, are for a greater number of generic and specific descriptions of plants. We have, therefore, added extensively to the catalogue of Southern and Western plants, as also to that of more northern latitudes. So that the book will now contain descriptions of most of the plants of the United States, and cultivated exotics. We except such of the Cryptogamia and Grasses as are too obscure in their characteristics for the attention of the general student; as also some new Species, which appear to have been separated from their proper and established relations, in order to gratify the vanity of imaginary discoverers, or to enable them to compliment their friends by giving their names to the supposed new Species.

With the Flora of Northern, Southern, and Western plants now presented to the public, in connexion with the Familiar Lectures on Botany, we hope to have rendered our work such as will fully answer public expectation.

FAYMORE FEMALE INSTITUTE,
(Ellicott's, near Baltimore, Maryland.)
March 1, 1845.
TO TEACHERS.

The author indulges the hope that this book will not only afford assistance but gratification to Teachers, in the pursuit of the severe and often公用ious duties of their profession. It is hoped that it may serve to interest and quicken the dull intellects of some pupils, to arrest the fugitive attention of others, and to relax the minds of the over-studious, by leading them all into paths strewn with flowers, and teaching them that these beautiful creations of Almighty Power are designed, not merely to delight by their fragrance, color, and form, but to illustrate the most logical divisions of Science, the deepest principles of Physiology, and the goodness of God.

The last time for commencing botanical studies seems to be that of the opening of flowers in the spring; though, where circumstances render it convenient to begin in winter, assistance is offered by engravings. The arrangement of subjects might be altered, in pursuing the study without the aid of natural flowers. The second part, which treats of the various organs of plants, the formation of buds, and other subjects connected with vegetable physiology; the fourth part, which gives the history of the science, with the distinctions in the kingdoms of nature, might be studied to advantage, before attending much to the principles of classification, which are more illustrated in the first and third parts.

On the first meeting of a botanical class, after some explanation as to the nature of the study they are about to commence, each member should be presented with a flower for analysis. The flower selected should be a simple one, exhibiting, in a composite manner, the different organs of fertilisation; the lily and tulip are both proper for this purpose. The names of the different parts of the flower should be thus explained, and each pupil directed to dissect and examine the flower. After noticing the parts of fertilisation, the pupils will be prepared to understand the principles on which the artificial classes are founded, and to trace the plant to its proper class, order, &c. At each step, they should be required to examine their flowers, and to answer simultaneously the questions proposed; as, how many stamens has your flower? Suppose it to be a lily, they answer six. They are then told it is of the sixth class. How many petals? They answer one—they are told it is of the first order. They should then be directed to take their books and turn to the sixth class, first order, to find the genus. To each step in the comparison they should be questioned as above described, until, having gone in what respects their plant agrees with each general division, and differs from each genus under the section in which it is found, they ascertain its generic name. They should be taught in the same manner to trace out its species: they will perceive at each step some new circumstance of resemblance or difference, until they come to a species, the description of which answers to the plant under consideration.

Technical terms should be explained, as the pupil proceeds. The advantage in this kind of explanation, over that of any other idea, is, that it is manifested to the senses of the pupils by the object before them. If a teacher attempts to define the words region, order, &c., or any other abstract terms, there is danger that the pupil may, from misunderstanding the language used in the explanation, obtain a very confused and imperfect idea of the definition; and, indeed, what two authors or philosophers give to abstract terms the same definition? Though mankind do not, in the purely mental operations, exhibit an entire uniformity, yet, in their external senses, their seldom disagrees. A flower which appears to one person to be composed of six petals, with corolla bell-form, and of a yellow color, is seen to be so by another. Pupils who find it difficult to understand their other studies (which in early youth are often too abstract), are usually delighted with this method of analyzing plants; they feel that they understand the whole process by which they have brought out the result, and perhaps, for the first time, enjoy the pleasure of clear ideas upon a scientific subject.

It is necessary, before the meeting of the class, to have a suitable number of plants collected, so that all may have specimens. In examining the pupils as they proceed in their study, each one, besides reciting a lesson, should be required to give an analysis of one or more plants, sometimes the whole class having similar flowers; sometimes giving to each pupil permission to bring any plant she chooses. This idea, at public examinations, is a satisfactory method of testing their knowledge of the subject. With respect to those portions of the work to which their attention should most particularly be paid, it must be left to the judgment of the teacher. Whatever relates to modes of classification, and makes part of a system, should be noted: many remarks, illustrations, and quotations, are designed merely for reading, without being considered as important matter for recitation.

The name of the Natural Order is connected with the name of each genus under the head of Descriptions of Species. Indeed, the subject of the natural effluvia of plants is kept in view through the whole work, although the artificial system is considered as the groundwork of botanical knowledge. The origin of the generic name is also given, as far as this could be ascertained with any degree of certainty.

The analysis at the bottom of each page is designed rather to suggest the leading subjects, than as a form of questions; for every experienced teacher must perceive the importance of varying his mode of questioning.
METHOD OF ANALYSIS

The orders of the 14th class, Tetradyneum, are two, both distinguished by the form of the fruit.

1. Sphenosem. Fruit, a silique, or roundish pod.
2. Sphenosem. Fruit, a siliqua, or long pod.

The orders of the 15th class, Monodelpha, and of the 16th class, Dodecaphan, are founded on the number of stamens, that is, on the characters of the first twelve classes, and they have the same names as Monadelpha, etc.

The 17th class, Symendeha, has five orders distinguished by different circumstances of the florets, as:
1. Equal. Stamens and pistils equal, or in proportion; that is, each floret has a stamen, a pistil, and one seed. Such florets are called perfect.
2. Symendeha. Florets of the disk perfect, of the ray containing only pistils, which without stamens are superfluous.
3. Kumandeha. Florets of the disk perfect, of the ray neutral, or without the stamens or pistils; therefore frustrated, or useless.
4. Kuhendeha. Florets of the disk staminate, of the ray pistillate; the latter being necessary to the perfection of the fruit.
5. Kuhendeha. Florets separated from each other by partial calyces, or each floret having a perianth.

The orders of the 18th class, Gymnandia, Monadelpha, and the 19th class, Dodeca, like those of the 15th and 16th classes, depend on the number of stamens.

The orders of the 21st class, Cryptogamia, constitute six natural families.

1. Funus—includes all Funus, having the fruit on the leaves.
2. Medus.—Mosses.
3. Hexamena—Leverworts, or aquatic mosses.
5. Lychnes.—Lichens, found growing on the bark of old trees, old wood, &c.
6. Funus.—Mushrooms, mould, blight, etc.

Note.—No confusion is produced in taking the character of some classes, for orders in other classes; for example: If you have a flower with ten stamens, unisexual, their filaments into one set, you know by the definition of the class that it belongs to the class Monadelpha; you can then, because it has ten stamens, place it in the order Decandria.

LECTURE V.

METHOD OF ANALYZING PLANTS BY A SERIES OF COMPARISONS—GENERAL REMARKS UPON PLANTS—METHOD OF PRESERVING PLANTS FOR AN HERBARIUM—PRODUCING PLANTS, AND THOSE WHICH ARE NOT PERISHABLE.

The description of a plant is, properly, an analysis; the meaning of the term being a separation; but when we speak of analyzing plants, we mean something more than examining each part of the flower, this, indeed, is the first step in the process; but by analysis, we learn the class, Order, Genus, and Species of the plant. A person engaged in ascertaining the name of a plant, may be said to be engaged in Botany.

Of Tetradyneum—the classes Monadelpha, and Dodeca—Of the class Syne-

dia—Meaning of the word analysis—How used in botany.
METHOD OF ANALYSIS

1st. The plant being in his Directory; if he can read the botanical characters impressed on it by the hand of Nature, he will, by following system, soon arrive at his journey's end.*

2d. We have before us a plant in blossom, of whose name and properties we are ignorant. The name must be first ascertained, and this can only be done with certainty by the Linnaean system.

In the first place we have two comparisons to make. 1st. Whether the Stamens and Pistils are visible. 2d. Whether they are invisible.

If the Stamens and Pistils are not visible, we have already arrived at the class, which is Cryptogama. If, however, the Stamens and Pistils are visible, we have now two comparisons to make.

1st. Whether the flowers have stamens and pistils on the same corolla. 2d. Whether the Stamens and Pistils are placed on different corollas.

If the Stamens and Pistils are on different flowers, we then shall find our plant either in the class Dicotyl or Monocyl; according as the same flower, proceeding from the same root, or from different roots.

But if our plant has the Stamens and Pistils both enclosed in the same corolla, we must next examine,

1st. Whether the Anthers are separate, or,

2d. Whether the Anthers are united.

If we find the anthers free around the pistil, we have found the class of our plant; it is Synagama. If the Anthers are separate, we must proceed to a fourth stage, and see,

1st. Whether the foliages are separate, or,

2d. Whether the foliages are united with each other, or,

3d. Whether the foliages are united to the pistil.

If the latter circumstance is ascertain'd, our plant is in the class Gymnogama.

If the flower has not the foliages united to the pistil, we must ascertain whether the foliages are united with each other; if they are so,

in two parcels or sets, the flower is in the class Dicatapeta, but,

But if the foliages are separate, we must next examine,

1st. Whether these are similar in length, or,

2d. Whether they are of different lengths.

Of different lengths, those only which have four or six stamens are to be regarded.

We find our flower has six stamens, four long and two short, we need go no farther; this is the class Trishasona.

If the flower has four stamens, two long, and two short, it is the class Depyramida.

If the flower comes under none of the foregoing heads, we must now consider their insertion, as,

* Thanner.
the name of flower to these envelopes, which are often remarkable for the brilliancy of their colours, the elegance of their forms and the fragrance of their perfumes.

Method of preserving Plants, and of preparing an Herbarium.

Plants collected for analysis, may be preserved fresh many days, in a close tin box, by occasionally sowing them with water; they may also be preserved by placing their stems in water, but not as well by the latter, as the former method. While attending to the science of Botany, you should keep specimens of all the plants you can procure. An herbarium neatly arranged is a beautiful, and may be rendered highly useful, by affording an opportunity to compare many species together, and it likewise serves to fix in the mind the characters of plants. It is a good method in collecting plants for an herbarium, to have a portfolio, or a book in which they may be placed before the parts begin to wilt. Specimens should be placed between the leaves of paper, either newspaper or any other kind which is of a loose texture, and will easily absorb the moisture of the plants; a board with a weight upon it should be placed upon the paper containing them; the plants should be taken out frequently at first, as often as once or twice a day, and the paper dried, or the plants placed between other dry sheets of paper. Small plants may be dried between the leaves of a book. Plants differ in the length of time required for drying as they are more or less juicy; some dry in a few days, others not sooner than two or three weeks. When the specimens are dry, and a sufficient number collected to commence an herbarium, a book should be procured, composed of blank paper, (white paper gives the plants a lustrous appearance.) A quarto size is more convenient than a folio. Upon the first page of each leaf should be fastened one or more of the dried specimens, either with cobwebs, or by means of cutting them out, in the nature under which the stems may be placed. By the sides of the plants should be written the class, order, genus, and specific name; also a description of the plants, frequently change in drying; the blue, pale red, often turn yellow, scarlet, violet, and green, are more durable. An herbarium should be carefully guarded against moisture and insects; as they may be attacked after the latter, the plants may be brushed over with corrosive sublimate.

Botanical Excursions.

As a beautiful and agreeable exercise, we would recommend frequent botanical excursions; you will find more pleasure from the sciences, by seeing the flowers in their own homes, a dry ground, penetrate marshes, many strange and interesting plants will present themselves, which you cannot find except in the peculiar situations of these you must be content to obtain specimens, without seeing them in their native wilds. You will, no doubt, easily obtain such species, for there is, usually, among the cultivators of natural science, a generosity in affording assistance, and improving on others the treasures which nature lavishes upon those who have a taste to enjoy them.

Method of preserving plants, and of preparing an herbarium—Botanical excursions.

Generally Remarks.

Poisonous Plants, and those which are not Poisonous.

In collecting flowers, you should be cautious with respect to poisonous plants. Such have five stamens and one pistil, with a corolla of a dull, land colour, and a disagreeable smell, and the Daffodil is poisonous; the Thorn apple (Strapmonod), and the Tobacco are poisonous; the Umbelliferous plants, which grow in wet places, have ample flowers. The Umbelliferous plants which grow in dry places, usually have a nauseous smell; such plants are poisonous. Among plants which grow in dry places, usually have an aromatic smell, and are not poisonous, are Caraway and Fenugreek.

Plants with Labiate corollas, and containing their seeds in capsules, are sometimes poisonous, as the Foxglove; (Digitalis) also, such as contain a milky juice, unless they are compound flowers. Such as contain a milky juice, unless they are compound flowers. Such as contain a milky juice, unless they are compound flowers. Such as contain a milky juice, unless they are compound flowers. Such as contain a milky juice, unless they are compound flowers. Such as contain a milky juice, unless they are compound flowers.

Among plants which are seldom poisonous, are the compound Monocotyledonous flowers; they are seldom or never poisonous, 

Poisonous plants—Compound flowers seldom poisonous—Double flowers not proper for analysis—Fruits of Botanical parents—Of any acquaintance with any of the natural sciences.
GENERAL REMARKS.

parlours of those ladies, who have advantages for intellectual improvement, should more frequently exhibit specimens of their own scientific taste. The fashionable ateliers of scrap books, engravings, and albums, do not reflect upon their possessors any great degree of credit. To paste pictures, or pieces of prose or poetry, others, are not proofs of one's own acquirements; and the possession of a well-stored mind; but herbarias and books of impressions of excertion.

It is unfortunately too much the case, that female ingenuity, (especially in the case of young ladies after leaving school) is in a great degree directed to trivial objects, which have no reference either to utility, or to moral and intellectual improvement. But a taste for engagements, which neither lead to the good of others, nor to make herself wiser or better.

* * *

Methods of taking impressions of leaves. — Hold a sheet of paper over the smoke of a lamp until it becomes darkened; place the leaf being printed, in a position where the light falls on its under surface (which is the one in which the veins are most prominent). Each side or the paper is then partly covered with piece of paper, and then the impression is taken. Then remove the leaf, and place the printed side upon the sheet of paper, and press it gently over it, so that every part of the leaf may come in contact with the paper. The leaves will then be found to have a delicate and perfect outline, together with an accurate exhibition of the vein drawing.

Female ingenuity too often directed to trivial objects.

PART II.

LECTURE VI.

IMPORTANCE OF OBSERVING EXTERNAL OBJECTS.—VEGETABLES COMPOSED OF TWO KITS OF ORGANS.—OF THE ROOT.

The exercises which constitute the principal part of our previous course of lectures, are chiefly designed to assist you in practical botany. It is not expected that you are to be the passive receivers of instruction, but that you are to compare with real objects, the descriptions which are presented; by doing this faithfully, you will find your minds gradually strengthened, and more competent to compare and judge in abstract studies, where the subjects of investigation are in the mind only, and cannot, like the plants, be looked at with the eyes, and handled with the hands.

All our thoughts, by means of the senses, are originally derived from external objects. Suppose an infant to exist, who could neither hear, see, taste, smell, nor feel; all the essays of thought and emotion might exist within it; it might have a soul capable of as high attainments as are within the reach of any created beings; but this soul, while thus imprisoned, could gather no ideas; the beauty of reflected light, constituting all the variety of colouring; the harmony of sounds, the fragrant odours of flowers; the variously-hued, which are derived from our sense of taste, the ideas of soft, smooth, or hard, must for ever remain unknown to the soul confined to a body having no means of communication with the world around it.

Since our first ideas are derived from external nature, is it not a rational conclusion that we should add to this original stock of knowledge, by a continued observation of objects addressed to our senses? After the years of infancy are past, and we begin to study books, should we, neglecting sensible objects, seek only to gain ideas from the learned; or, in other words, should we, in the pursuit of human sciences, overlook the works of God?

Having now enabled you to understand the method of analyzing plants, we shall proceed to consider more fully the different organs of plants, with the uses of each, in the vegetable economy.

In plants, as well as animals, each part or organ is intimately connected with the whole; and the vegetable, as well as the animal being, depends for its existence on certain laws of organization.

We shall consider the vegetable organs under two classes; the first, including such organs as produce the growth of the plant, as the root, leaves, &c.; the second, such as perfect the seed, and thus provide for the reproduction of the species, called organs of fructification.

Study of external objects strengthens the mind. — Abstract studies instituted by neglecting the natural sciences. — Our first ideas gained by the senses. — Analogy between the soul and the embryo plant. — We should not confine our attention exclusively to books. — Vegetable, as well as animal economy, dependent on certain laws of organization. — Two kinds of organs of vegetables.