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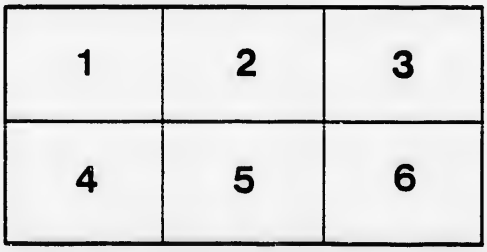

A

BOOK OF BLANKS

—FOR—

BOTANICAL ANALYSIS.

With a Classified List of the principal Descriptive Terms, a List of Exercises for Laboratory Practice, Schedules to begin the Classification of Plants, and a General Index of Plants Described.

BY

D. S. SKINNER, B. A., PH. B.

SCIENCE MASTER, CHATHAM COLLEGIATE INSTITUTE.

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PREFACE.

The Book of Blanks for Botanical Analysis has been prepared to furnish students with an exercise book for recording systematically the characters of plants.

The "classified vocabulary of terms" to which is appended no explanation, is all that is necessary in a book of this kind.

The few easy exercises in "laboratory practice" which can easily be added to by the teacher, will introduce the use of the compound microscope (high and low power.)

The "General Schedule" is intended to be used first, as a preparatory course, before using the more difficult Floral Schedule. As it is especially important that the pupil should be able to describe a plant without the prompting of a schedule, the questions after the names of the different organs have been omitted as far as practicable in the Floral Schedules. The order of thought in recording the proper descriptive terms in these schedules will, of course be, that marked out in the General Schedule. The drawing in outline of the various organs of the plant examined, as well as of the plant as a whole is highly recommended, for which purpose the blanks under "Illustration" are designed.

The meaning of the botanical expressions **"plant characters"** and **"plant affinities"** must be learnt as soon as possible, after beginning the use of the "Floral Schedule." At the outset, assume that those plants have the strongest affinities that resemble each other most in the characters recorded in the **"cohesion"** and **"adhesion"** columns. The first plant examined is to be entered at once as Type No. 1, in the blanks under "Classification," along with its leading characters of **adhesion** and **cohesion**. All plants whose characters agree with Type No. 1, will be placed in the same group; while those that differ will form Type No. 2, Type No. 3 and so on. After a number of plants have been examined and classified in the way indicated, the scientific names of each type or order, as well as genus, may be determined by the use of the authorized Flora, and the names entered in their proper places in the blanks. The object here is to fix upon a method to begin the work of classifying plants, by comparing the groups of characters they present.

The following plants are well suited for this purpose, to the beginner: the buttercup, columbine, larkspur, catnip, mustard, shepherds' purse, radish, mallow, pea, bean, clover, locust, wild rose, apple, geranium, violet, morning-glory, etc.

By pursuing the foregoing plan with the plants of any region, the beginner will be surprised to find how quickly many of those plants which were never thought of as at all alike, fall into company, on account of these deeper resemblances which your studies will have led you to observe.

Chatham, March, 1887.

VOCABULARY OF THE DESCRIPTIVE TERMS.

☞ The first number after the terms, refers to illustrations in the authorized Botany the second to Gray's "How Plants Grow" and Y to exercises in "Youman's Descriptive Botany".

ROOT.

Parts,—Axis, rootlets, spongioles, rootcap.
Class, –Primary, Secondary or adventitious.
Kind,—(a) Tap (93) (71),—*Conical, fusiform,* (-) (57) *napiform,* (-) (70)
(b) Fibrous (1) (48),—*Filiform* (-) (56), *moniliform, fascicled* (65) (48).
Tuberous (95) (58).
Situation,—Terrestrial, aerial, aquatic.

STEM.

Parts, –Nodes (51), internodes (-) (67), axils (-) (57).
Class, (a) Exogenous (168) (239); (b) Endogenous (169) (501) ; (c) Acrogenous.
Kind,—(a) Aerial —*Caulis, Trunk, caudex, culm.*
(b) Underground.—*Bulb* (101) (66), *corm,* (78) (76) *tuber* (99) (59), *rhizome* (100) 63).
(c) Acaulescent.
Structure, Ligneous, herbaceous, fruticose, suffruticose, arboreous.
Duration,—Annual, biennial, perennial.
Surface,—(a) Glabrous.
(b) Glaucous.
(c) Hairy.—*Pilose, hirsute, hispid, pubescent, villous, lanuginous, sericeous, arachnoid, tomentose.*
Shape, –Rounded, half-rounded, triangular, square, compressed, fluted, acute-angled.
Leaf Position,—Radical, cauline.
Leaf Arrangement, or Phyllotaxis.—See (Y 59), alternate (-) (52), opposite (-) (53), whorled (105) (137), fasciculate, decussate.
Attitude,—Erect, drooping, creeping, trailing, prostrate, ascending, climbing, twining, diffuse, decumbent.
Juice, –Milky, acid, watery.
Branches,—(a) (Arrangement).—(See Leaf arrangement). *Dichotomous, scattered.*
(b) Modification.—*Stolon* (-) (74), *runner, offset, sucker, spine, tendril* (-) (72).

BUDS.

Kind,—Leaf-buds, flower-buds, dormant, bulbils or gemmae.
Position,—Terminal (-) (22), axillary (-) (52), adventitious.
Coverings,—Naked. membranous, waxy, gummy, varnished, etc
Vernation,—(a) Folding —*Reclinate, conduplicate, plicate, circinate, convolute, involute, revolute.*
(b) Arrangement —*Valvate, imbricate, conduplicate, obvolute, supervolute, equitant.*

LEAF.

Parts.—(a) Simple leaf (-) (82).—*Lamina, petiole, stipules, sheath, ligule, veins, veinlets, midrib, lobes, sinus.*
(b) Compound leaf.—*Stipules, stipels, petiole, petiolule, rachis, leaflets.*

Stipulation,—(a) Duration.—*Caducous, persistent.*
(b) Structure.—*Foliar, membranous, scarious, spiny.*
(c) Adhesion.—*Adnate, free, ochreate;* (*Stipulate, exstipulate*).

Venation,—(a) Netveined (-) (82).—*Pinnate,* (-) (*82*) *palmate* (-) (*83*).
(b) Straight-veined (-) (85). (c) Fork-veined

Insertion,—Petiolate, sessile.

Petiole,—(see stem-shape).

Apex,—Aristate, acute, (-) (108), obtuse, (-) (107) truncate (-) (108), retuse (-) (109), emarginate (-) (110), obcordate (118) (111), cuspidate (-) (112), mucronate (-) (113).

Base,—Cordate (-) (98), reniform (-) (99), auricular (-) (101) hastate (-) (102), saggitate (120) (100), tapering, oblique, clasping, perfoliate (129), connate (130), sheathing, decurrent, (131) peltate (-) (104).

Margin,—Ciliate, entire (-) (99), crenate (128) (116), repand (-) (117), dentate (-) (115) serrate (-) (114), lobed (-) (120), cleft (-) (122), parted (-) (124), divided ( ) (127).
(a) Lobes.—*Pinnately lobed,* (-) (*129*) *pinnatifid* (-) (*122*) *bipinnatifid, palmately lobed,* (-) (*121*) *palmatifid* (-) (*123*) *pedate* (*125*), *runcinate, lyrate, laciniate, multifid.*
(b) Sinuses. *Open sinus, shut sinus, sharp sinus, etc.*

Shape,—(a) Broadest at the middle.—*Acicular* (*110*) (*137*), *linear* (*111*) (*87*), *oblong* (-) (*89*), *oval* (-) (*90*), *orbicular* (*111*) (*83*).
(b) Broadest at the Apex. *Obcordate* (*118*) (*111*), *obovate* (*116*) (*96*), *oblanceolate* (*115*) (*94*), *spatulate* (*114*) (*95*), *cuneate* (97).
(c) Broadest at the Base.—*Lanceolate* (*113*) (*88*), *subulate* (*112*) (*135*), *ovate* (*113*) (*91*), *cordate* (*117*) (*92*), *reniform* (*121*) (*88*), *deltoid* (*115*).

Surface,—*See stem.*

Kind,—(If comp'd).—(a) Pinnate.—*Abruptly-pinnate* (-) (*130*), *unequa ly-pinnate* (-) (*128*), *interruptedly-pinnate* (*133*) (-), *bipinnate* (*132*) (*132*), *tripinnate, lyrately-pinnate, cirrose.*
(b) Palmate (-) (131).—*Binate, bifoliate or two fingered, ternate, trifoliate or three fingered* ( ) (*136*), *quadrinate, quadrifoliate or four fingered, septenate, multifoliate, twice-three-fingered.*

Duration,—Deciduous, fugacious, persistent.

Vernation,—(See Buds).

INFLORESCENCE.

Parts,—Peduncle (-) (96), bract (-) (140), involucre (-) (144), pedicel (-) (140), bractlet (-) (140), involucel, rachis, receptacle (-) (154), scape (10), spathe (79) (147).

Attitude,—Erect, nodding, pendulous.

Position,—Terminal, (-) (138), axillary (-) (139).

Kind,—(a) Determinate or definite or centrifugal or cymose (3) (150).
(b) Indeterminate or indefinite or centripetal or racemose (26) (139).

Variety,—(a) Solitary (-) (150).
(b) Sessile clusters,—*Spike* (-) (*141*), *ament or catkin* (*63*) (*146*), *spadix* (*79*) (*147*), *head* (-) (*145*), *glomerule.*
(c) Pedicelled-clusters.—*Raceme* (*136*) (*140*), *corymb* (*135*) (*143*) *umbel* (*49*) (*144*), *panicle* (-) (*149*), *thyrse, cyme* (*137*) (*151*) *fascicle.*

FLOWER

Parts, (-) (154).—(a) Receptacle, (-) (154). Stipe, stipitate, gonophore, anthophore (Y 206.)
(b) Floral envelopes.—Calyx, corolla, perianth.
(c) Essential organs.—Stamens, pistil.

Peduncle or pedicel.—Sessile, long, short, straight, recurved, thick, slender.

Formation,—Regular (-) (170), irregular (35) (35).

Symmetry,—Symmetrical (-) (153), unsymmetrical (-) (163). dimerous, trimerous, tetramerous, pentamerous, binary, ternary, quaternary, quinary (3) (162).

Completeness,—(a) Complete (3) (162).
(b) Incomplete (19) (163).—*Apetalous* (23) (163), *achlamydeous* (165) (164), *monochlamydeous* (19) (163), *dichlamydeous* (3) (162).

Perfectness,—(a) Perfect (8) (164).
(b) Imperfect (62) (165).—*Staminate* (62) (165), *pistillate* (61) (168), *sterile* (61) (165), *fertile* (62) (168), *neutral* (-) (169), *monoecious* (61), *dioecious* (63) (167).
(c) Polygamous.

PERIANTH (72).

Cohesion, - Polyphyllous, (72) gamophyllous, monophyllous.
Adhesion,—Inferior (72), superior.
Form, Duration, Shape, See Corolla and Leaves.

CALYX (5)(154

Parts,—Sepals, tube (-) (72), throat, teeth or lobes
Cohesion,—Polysepalous (3) (170), gamosepalous (177) (31),
Adhesion, Inferior, superior.
Duration,—Caducous, deciduous, persistent.
Form,—(See corolla), of sepals (see leaves).
Attitude of Sepals,—Erect, reflexed, connivent, divergent.

COROLLA (-) (154).

Parts,—Petals, limb (138), claw (138), spur (143) (171), corona, scales, nectary, (saccate), tube (40) (72), throat (40), lobes.
Cohesion,—Polypetalous, gamopetalous, (monopetalous).
Adhesion,—Hypogynous (35), epigynous (49), perigynous, (47).
Form, (a) Regular (polypetalous).—*Liliaceous* (75) (509), *cruciferous* (26) (299), *rosaceous* (43) (361), *caryophyllaceous* (-) (129).
(b) Irregular (polypetalous.)—*Papilionaceous* (39) (351), (*vexillum, carnia, alae*), *anomalous.*
(c) Regular (gamopeltalous).—*Tubular* (139) (178), *campanulate* (-) (179), *rotate* (-) (183), *urceolate, salver-shaped* (141) (180), *funnel-shaped* (140) (177).
(d) Irregular (gamopetalous).—*Labiate* (57) (181), *personate* (143), *ringent* (57), *ligulate* (53). (For form petals see Leaf).

Aestivation or Praefloration.—Valvular, induplicate, reduplicate, contorted, imbricate, quincuncial, vexillary, cochlear, supervolute. (Y. 60).

STAMENS (Androecium) (Y. 30).

Parts,—Filament, anther, pollen, connective, anther-lobe, pollen-cell, valves.
Cohesion,—Monadelphous (32) (185), diadelphous (37) (186), triadelphous (-) (297), polyadelphous, monandrous (86), diandrous (65), polyandrous (19), definite, indefinite, tetradynamous (28), didynamous (58), distinct, syngenesious (53((184).
Adhesion,—Hypogynous (26), perigynous (43), epigynous (50), epipetalous (58), gynandrous (86), free.
Filament,—(a) Form (Y. 35),—*Filiform, subulate, capillary, dilated, petaloid, bidentate or bicuspid.*
(b) Length (Y. 38), —*Sessile, exserted, included, connivent*
Anther,—(a) Shape (Y. 31),—*Arrow-shaped, oblong, kidney-shaped, sinuous, emarginate.*
(b) Adhesion (Y. 34),—*Innate* or *basifixed, adnate,* or *dorsifixed, versatile, apsifixed.*
(c) Number of Cells,—*One-celled, two-celled, three-celled.*
(d) Dehiscence (Y. 32),—*Vertical or longitudinal, transverse, porous, valvular.*
(e) Facing (Y. 33),—*Introrse, extrorse.*
Pollen,—(Y. 36)—(a) Parts—*Extine, intine, fovilia.*
(b) Shapes,—*Round, oblong, angular, lobed, pollina.*
Connective, (Y. 37), —Appendicular, widened, abortive, dimidiate.

PISTIL (Gynoecium) (Y. 39 to 56).

Parts —Ovary, (Carpel), cell, parieties, dissepiments, axis, placenta, suture, ovules.
Ovules,—(a) Parts,—*Hilum, rhaphe, chalaza, nucleus, secundine, primine, micropyle, apex, base.*
(b) Kind.—*Arthotropous or straight, campylotropous or curved, amphitropous or half-inverted anatropous.*
(c) Direction. —*Horizontal, ascending, erect, suspended, pendulous.*
Placentation,—Axillary, free, central, parietal, false-dissepiments.
Dehiscence,—Regular or valvular, septicidal, loculicidal, septifragal, circumscissile, irregular, porous.
Style,—(a) Form—(See Filament) *sigmoid.*
(b) Position.—*Lateral, basal, terminal.*
Stigma.—(a) Kind.—*Sessile, bifid, trifid, scrolled, lobed, globose, feathered, linear.*
Kind.—Simple, compound, multiple.
Cohesion.—Apocarpous (9), syncarpous (48).
Adhesion.—Inferior, superior.

FRUIT.

Parts.—Pericarp.—*Epicarp, mesocarp, endocarp, seed, (putamen sarcocarp).*
Kind.—Simple, Multiple, or Confluent, Aggregate or Etaerio (157) Accessory or Anthocarpous (158).
Simple.—(a) Fleshy, indehiscent, —*Berry, hesperidium, pome, pepo,*
(b) Drupe or stone fruit.
(c) Dry indehiscent,—*Achenium,(utricle), cremocarp,cypsela, caryopsis or grain, glans or nut, (cupule) samara or key* (162).
(d) Dry dehiscent,—*Follicle* (25), *legume* (138), *loment*, (138) *silique*, (160), *silicle* (29), *pyxis, capsule.*
Multiple.—*Sorosis, cone or strobilus, syconus, galbulus.*
Dehiscence.—See Pistil.

SEED.

Parts. (a) Nucleus, radicle, cotyledons, plumule.
(b) Albumen, (endosperm perisperm).
Coats.—Testa, tegmen, aril, coma.
Form.—Ovoid, oblong, globular, reniform, cylindrical, topshaped, angular, etc.
Surface.—Smooth, striated, ribbed, netted, tuberculous, furrowed.
Number.—Definite, indefinite, solitary.
Embryo.—(a) Cotyledons,—*Monocotyledonous, dicotyledonous, polycotyledonous, acotyledonous*
(b) Position,—*Eccentric, peripheric, accumbent, incumbent, (conduplicate).*
(c) Direction,—*Ascending, descending, centripetal, centrifugal, vague.*
Albumen.—Albuminous, exalbuminous, mealy, oily, mucilaginous, horny.

STRUCTURAL PARTS.

CELL.

Parts.—Cell-wall, primordial utricle, nucleus, nucleolus, protoplasm, cell-sap.
Contents.—Chlorophyll, chromule, sugar, starch, gum, volatile-oils, resins, caoutchouc, fixed oils, crystals of salts of lime (raphides), tartaric acid, citric acid, tannic acid, malic acid, oxalic acid, gutta percha, inuline, aleurone.
Tissue.—Parenchyma or cellular tissue, prosenchyma or woody tissue, vascular tissue, fibro-vascular-system, bast-tissue, cambium layer, cork tissue, (interceliular spaces).
Epidermis.—Stomata, glands, stinging-hairs, bristles, hairs, prickles.
Exogenous Stem.—During the first year the stem consists of:—
Pith, fibro-vascular bundles, cellular tissue, bark, after the first year it consists of.—
Pith, wood, medullary sheath, medullary rays, bark (inner and outer) epidermis.
cambium.
Endogenous Stem. This stem consists of fibro-vascular tissue in the form of bundles embedded in cellular tissue, all of which is surrounded by a bark which differs from a true bark by not increasing in layers and not being separate from this wood.
Root. The root structure is on the same plan as the stem, there being no marked distinction between exogens and endogens, no pith, no stomata, no buds, a root cap.
Leaf. Fibrovascular tissue, cellular tissue, epidermis, stomata..

LIFE.

Growth. Multiplication of Cells, growth of cells, points of growth, conditions of growth, food,
Food.—Sources, elements, sap, circulation, transmission, Endosmosis, Metastasis.

REPRODUCTION.

From Seeds.—
From Buds.—Naturally by: Stolons, offsets, runners, suckers, tubers, bulbs, corms.
Artificially by: Grafting, layering, slips, budding.

LABORATORY PRACTICE.

Protoplasmic Movements—(1) Examine with the compound microscope, the stinging hairs of the nettle, the stamen hairs of spiderwort, the styles of Indian corn, the hairs and root hairs of the common pumpkin.

(2) Make a thin longitudinal slice of a stigma, and mount and cover in the usual way, *using no water*. When under the microscope, crush carefully, and some of the pollen tubes may be distinctly seen along with their movements.

The Plant-cell.—(1) Mount and examine a drop of common yeast, the pulp of a lemon, etc., a small piece of the epidermis of the petal of a pansy, thin vertical sections of leaves, portions of the epidermis of leaves.

(2) Make a thin transverse section of the young growing stem of Indian corn. (*Note intercellular spaces.*

Formation of New Cells. Examine the budding of the cells in common yeast after their cultivation on a piece of carrot.

CONTENTS OF CELLS.

Chlorophyll.—Grow young plants of Indian corn in the dark. Grow them in solutions containing no iron, then add a little iron in the form of ferric sulphate. Enclose branches of morning glory bearing closed flower buds in a dark room, and let them remain until the flowers open. Note results.

Starch.—Examine with microscope, small and thin portions of a potato, grains of wheat, seeds of the pea and bean, rice, the ripening grains of Indian corn. Treat each with dilute solutions of iodine, and note results.

Raphides.—Examine in garden rhubarb, evening primrose, grape vine, with portions suitable for the microscope.

TISSUES.

Cellular or Parenchyma.—Examine under the microscope the green pulp of leaves, the ends of young roots of Indian corn.

Bast and Wood or Prosenchyma.—Make thin longitudinal sections of the stems of woody plants eg., Maple, apple, etc., and heat for a minute or less in nitric acid and potassic chlorate, The fibres may then be separated under the microscope by tapping lightly on the centre of the cover glass.

Vascular. Make a longitudinal section of the scale of the bulb of an onion or of the stem of the milk-weed, of the young bark of the grape and of the stem of the Garden Balsam (Touch-Me-Not). *Note the laticiferous vessels, sieve tubes and spiral vessels.*

Epidermal.—Strip thin sheets from the leaf of a lily, balsam, fuchsia, lilac, tulip, hyacinth, or a blade of grass, and mount in water or alcohol. Transverse sections may be cut by placing a piece of leaf between pieces of elder pith. *Note the water pores in the fuchsia.*

Hairs and Glands. In most cases hairs may be scraped off, mounted in alcohol or potash, and examined in the usual way. Eg,. Nettle, pumpkin, etc.

STEM.

Scotch Pine.—Cut a transverse section of a year old stem late in the spring or summer and examine and note.

(1) The pith in the centre, its outline, angles, and the loose arrangement of its cells.
(2) The wood, its resin vessels and rings of growth.
(3) The Cambium, a narrow misty zone of tissue surrounding the wood.
(4) The outer and inner bark,
(5) Medullary rays extending from the pith outwards.

LEAF.

The internal structure of the leaf may be easily studied by making transverse sections at right angles to the surface, avoiding those young leaves that are downy or hairy. The leaves of the apple, cherry, lilac are very good. Note the epedermis of upper and lower surface, the palisade tissue, so called, of upper and lower portion, the stoma with guard cells.

ROOT.

The root cap may be easily studied in roots grown in the water eg., duckweed, also roots of indian corn furnish easily made and good sections.

GROWTH.

(1) Suspend a horse chestnut by a piece of twine in the neck of a wide mouthed bottle, and above the surface of some water. Place the bottle in the warm sunlight. Note results.

(2) Plant seeds of different kinds in moist warm saw-dust, and observe the different stages in their growth.

(3) Dig up three plants of the butter cup, carefully, roots and all; leave one on the table, place another with its roots in water, hang the third upside down over water with a few of the leaves in the water, but the root exposed Note and explain what takes place in each case.

(4) Take a bunch of fresh green leaves (water cresses) and place them in a bottle filled with fresh spring water. Invert the bottle in a basin of water, taking care that no bubbles of air are left in the bottle, and place both in the strong sunlight for several hours Repeat the experiment, placing the bottle and basin in the dark.

Devise a method for showing that the gas liberated in the sunlight, is oxygen

(5) Fill a wide mouthed stoppered bottle one third with soaked peas, cork the bottle loosely. After several hours let a lighted taper be lowered into the bottle. Note results and explain.

(6) Plant potatoes and onions and observe the changes in their growth

(7) Study the vernation and aestivation in six different plants, by making transverse sections of their buds, and examining with a small hand lense. Make drawings.

(8) Examine the mode of action of tendrils, and in twining stems of four different plants.

(9) Soak a number of common seeds in water for an hour or two and then dissect and make drawings of the parts exhibited. In the case of albuminous seeds, separate the embryo from the albumen.

(10) Examine under microscope different pollen-grains mounted in water. Press the cover glass gently, and note any change that takes place in each grain that may be instructive.

GENERAL PLANT SCHEDULE.

Date..... *Name*.....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name*.....

Size..... *Habitat*.....

ROOT.—*Parts*..... *Variety*.....

Kind.....

Remarks.....

STEM.—*Parts*..... *Surface*.....

Kind..... *Color*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES.—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE.—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER.—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name* .....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date ..... *Name* .....

Size ..... *Habitat* .....

ROOT.—*Parts* ..... *Variety* .....

Kind .....

Remarks .....

STEM.—*Parts* ..... *Surface* .....

Kind ..... *Color* .....

Shape ..... *Leaf pos'n* ..... *Leaf arrang't* .....

Structure ..... *Duration* ..... *Attitude* .....

Under ground stems .....

Remarks .....

LEAVES.—*Parts* .....

Simple or Comp'd ..... *Stipulation* .....

Venation ..... *Insertion* .....

Petiole ..... *Apex* ..... *Base* .....

Margin ..... *Shape* ..... *Surface* .....

Color ..... *Vernation* ..... *Kind* (if comp'd) .....

Remarks .....

INFLORESCENCE.—*Parts* .....

Attitude ..... *Position* ..... *Kind* .....

Variety ..... *Receptacle* .....

Remarks .....

FLOWER.—*Parts* .....

Peduncle or pedicel ..... *Formation* .....

Symmetry ..... *Completness* ..... *Perfectness* .....

Remarks .....

Illustration page ..... *No.* .....

GENERAL PLANT SCHEDULE.

Date ..... *Name* .....

Size ..... *Habitat* .....

ROOT.—*Parts* .....

Kind ..... *Variety* .....

Remarks .....

STEM.—*Parts* .....

Kind ..... *Color* ..... *Surface* .....

Shape ..... *Leaf pos'n* ..... *Leaf arrang't* .....

Structure ..... *Duration* ..... *Attitude* .....

Under ground stems .....

Remarks .....

LEAVES.—*Parts* .....

Simple or Comp'd ..... *Stipulation* .....

Venation ..... *Insertion* .....

Petiole ..... *Apex* ..... *Base* .....

Margin ..... *Shape* ..... *Surface* .....

Color ..... *Vernation* ..... *Kind* (if comp'd) .....

Remarks .....

INFLORESCENCE.—*Parts* .....

Attitude ..... *Position* ..... *Kind* .....

Variety ..... *Receptacle* .....

Remarks .....

FLOWER.—*Parts* .....

Peduncle or pedicel ..... *Formation* .....

Symmetry ..... *Completness* ..... *Perfectness* .....

Remarks .....

Illustration page ..... *No* .....

GENERAL PLANT SCHEDULE.

Date ..... *Name* .....

Size ..... *Habitat* .....

ROOT.—*Parts* .....

Kind ..... *Variety* .....

Remarks .....

STEM,—*Parts* .....

Kind ..... *Color* ..... *Surface* .....

Shape ..... *Leaf pos'n* ..... *Leaf arrang't* .....

Structure ..... *Duration* ..... *Attitude* .....

Under ground stems .....

Remarks .....

LEAVES,—*Parts* .....

Simple or Comp'd. ..... *Stipulation* .....

Venation ..... *Insertion* .....

Petiole ..... *Apex* ..... *Base* .....

Margin ..... *Shape* ..... *Surface* .....

Color ..... *Vernation* ..... *Kind* (if comp'd) .....

Remarks .....

INFLORESCENCE,—*Parts* .....

Attitude ..... *Position* ..... *Kind* .....

Variety ..... *Receptacle* .....

Remarks .....

FLOWER,—*Parts* .....

Peduncle or pedicel ..... *Formation* .....

Symmetry ..... *Completness* ..... *Perfectness* .....

Remarks .....

Illustration page ..... *No.* .....

GENERAL PLANT SCHEDULE.

Date..... *Name*.....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name* .....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name* .....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... ..... *Name* ... .

Size... .... *Habitat*..... .....

ROOT,—*Parts*..... ....

Kind..... .... *Variety*..... ....

Remarks..... ... .

STEM,—*Parts*..... ....

Kind.....*Color*..... .....*Surface*..... .....

Shape..... *Leaf pos'n*..... ....*Leaf arrang't*.....

Structure..... .....*Duration* ....*Attitude*... .....

Under ground stems..... .....

Remarks..... ....

LEAVES,—*Parts*..... ... .

Simple or Comp'd.....*Stipulation*..... ... .

Venation..... .... *Insertion* ....

Petiole..... ..... . *Apex*... ..... *Base*..... .....

Margin..... .... *Shape*..... .....*Surface* ....

Color.... . .....*Vernation*.....*Kind* (if comp'd) .....

Remarks.... .....

INFLORESCENCE,—*Parts*..... ....

Attitude..... ..... *Position* .... *Kind*..... ...

Variety ....*Receptacle*..... ....

Remarks ....

FLOWER,—*Parts*..... ....

Peduncle or pedicel.....*Formation*..... ....

Symmetry..... .....*Completness*..... ....*Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name*.....

Size..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

GENERAL PLANT SCHEDULE.

Date..... *Name* ... .

Size... ..... *Habitat*.....

ROOT.—*Parts*.....

Kind..... *Variety*.....

Remarks.....

STEM,—*Parts*.....

Kind..... *Color*..... *Surface*.....

Shape..... *Leaf pos'n*..... *Leaf arrang't*.....

Structure..... *Duration*..... *Attitude*.....

Under ground stems.....

Remarks.....

LEAVES,—*Parts*.....

Simple or Comp'd..... *Stipulation*.....

Venation..... *Insertion*.....

Petiole..... *Apex*..... *Base*.....

Margin..... *Shape*..... *Surface*.....

Color..... *Vernation*..... *Kind* (if comp'd).....

Remarks.....

INFLORESCENCE,—*Parts*.....

Attitude..... *Position*..... *Kind*.....

Variety..... *Receptacle*.....

Remarks.....

FLOWER,—*Parts*.....

Peduncle or pedicel..... *Formation*.....

Symmetry..... *Completness*..... *Perfectness*.....

Remarks.....

Illustration page..... *No*.....

ILLUSTRATIONS.

NO. 1

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ILLUSTRATIONS.

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ILLUSTRATIONS.

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ILLUSTRATIONS.

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FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	polysepalous.	superior	
Corolla Petals	5	polypetalous	hypogynous.	
Stamens Filaments Anthers	10 " "	polyandrous.	hypogynous.	
Pistil Carpels Ovary-cells. Styles Stigmas	5 5 1 5	syncarpous.		

ROOT..Fibrous growing from rhizome.....

STEM....erect green herbaceous.....

LEAVES...deeply lobed palmately lobed. reversed...

FRUIT,—*Parts*.....

Kind.....*Dehiscence*.....*Variety*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER..Geraniaceae. **GENUS AND SPECIES**. Geranium Maculatum

COMMON NAME....Wild cranesbill.....

Illustration page..... *No*.....

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	4.	polysepalous.	superior	
Corolla Petals	4	polypetalous	cypsygynous.	
Stamens Filaments Anthers	6 6 6	tetradynamous.	hypodynous.	exserted
Pistil Carpels Ovary-cells. Styles Stigmas	1 1			

ROOT.....

STEM.....

LEAVES.....

FRUIT,—*Parts*.....

Kind..... *Dehiscence*..... *Variety*.....

SEED,—*Parts*.....

Form..... *Surface*.....

Embryo..... *Albumen*.....

ORDER..... **GENUS AND SPECIES**.....

COMMON NAME.....

Illustration page..... *No*.....

FLORAL SCHEDULE.

Date May 25

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	gamosepalous.	inferior superior	The five calyx teeth are divided into parts
Corolla Petals				
Stamens Filaments Anthers	10	polyandrous	perigynous	
Pistil Carpels Ovary-cells. Styles Stigmas	1 2 2	[illegible]	[illegible]	

ROOT fibrous growing from tap root. conical

STEM erect (herbaceous) hairy. erect. 15 in high

LEAVES simple. hairy. alternate. ovate. mucronate. [illegible]

FRUIT,—*Parts* opposite palmately net-veined. stipulate (?)

Kind radical and cauline *Dehiscence* *Variety*

SEED,—*Parts*

Form *Surface*

Embryo *Albumen*

ORDER [illegible] **GENUS AND SPECIES** Mitella diphylla.

COMMON NAME Bishop's cap

Illustration page *No.*

FLORAL SCHEDULE.

Date.....

ORGAN.	No.	COHESION.	ADHESION.	FORM, ETC.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	[illegible]	[illegible]	[illegible]
Corolla Petals	5	[illegible]	[illegible]	[illegible]
Stamens Filaments Anthers	5	[illegible]	[illegible]	[illegible]
Pistil Carpels Ovary-cells. Styles Stigmas	1 1	[illegible]		

ROOT.....

STEM.....

LEAVES.....

FRUIT,—*Parts*.....*Variety*.....

Kind.....*Dehiscence*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER.....**GENUS AND SPECIES**.....

COMMON NAME.....

Illustration page.....*No*.....

FLORAL SCHEDULE.

Date.....

ORGAN.	NO.	COHESION.	ADHESION.	FORM, ETC.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	gamosepalous	inferior	
Corolla Petals	5	[illegible]	epipetalous	salver shaped.
Stamens Filaments Anthers	5	pentandrous	[illegible]	[illegible]
Pistil Carpels Ovary-cells. Styles Stigmas	1 3			

ROOT.....

STEM sub-herbaceous. Long. cylindrical. Juicy

LEAVES Oval-acute-opposite-Leaves cordate-

FRUIT,—*Parts*.....

Kind.....*Dehiscence*.....*Variety*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER [illegible] **GENUS AND SPECIES**..... Pilosa

COMMON NAME.....

Illustration page..... *No*.....

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	8	[illegible]	[illegible]	[illegible]
Corolla Petals		[illegible]	[illegible]	
Stamens Filaments Anthers	8	[illegible]	[illegible]	
Pistil Carpels Ovary-cells. Styles Stigmas	1			

ROOT.....

STEM.....

LEAVES.....

FRUIT,—*Parts*.....*Variety*.....

Kind.....*Dehiscence*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER.....**GENUS AND SPECIES**.....

COMMON NAME.....

Illustration page.....*No*.....

FLORAL SCHEDULE.

Date..................................

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals				
Corolla Petals				
Stamens Filaments Anthers				
Pistil Carpels Ovary-cells. Styles Stigmas				

ROOT..

STEM erect hairy herbaceous

LEAVES net-veined hairy deltoid cordate

FRUIT,—*Parts*..

Kind.................... *Dehiscence*.................... *Variety*....................

SEED,—*Parts*..

Form.................... *Surface*....................

Embryo.................... *Albumen*....................

ORDER.................... **GENUS AND SPECIES**....................

COMMON NAME..

Illustration page.......... *No.*..........

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	[illegible]	inferior	
Corolla Petals	5	[illegible]	hypo[illegible]	
Stamens Filaments Anthers	10	[illegible]	hypo[illegible]	
Pistil Carpels Ovary-cells. Styles Stigmas	1 1 1 3			

ROOT.....

STEM [illegible]

LEAVES [illegible]

FRUIT,—*Parts*.....

Kind.....*Dehiscence*.....*Variety*.....

SEED,—*Parts* many

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER [illegible] **GENUS AND SPECIES** [illegible]

COMMON NAME Mouse ear Chickweed

Illustration page..... *No*.....

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	[illegible]	[illegible]	[illegible]
Corolla Petals	5	[illegible]	[illegible]	
Stamens Filaments Anthers	10	[illegible]	[illegible]	
Pistil Carpels Ovary-cells. Styles Stigmas				

ROOT... [illegible]

STEM ... [illegible]

LEAVES ... [illegible]

FRUIT,—*Parts*... [illegible]

Kind..... *Dehiscence*..... *Variety* .....

SEED,—*Parts*.....

Form..... *Surface*.....

Embryo..... *Albumen*.....

ORDER..... **GENUS AND SPECIES**.....

COMMON NAME.....

Illustration page..... *No*.....

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5-	[illegible]	[illegible]	[illegible]
Corolla Petals	5-	[illegible]	[illegible]	
Stamens Filaments Anthers	∞	[illegible]	[illegible]	
Pistil Carpels Ovary-cells. Styles Stigmas	3- 3- 3-	[illegible]		

ROOT.....

STEM.....

LEAVES.....

FRUIT,—*Parts*.....

Kind.....*Dehiscence*.....*Variety*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER.....**GENUS AND SPECIES**.....

COMMON NAME.....

Illustration page.....*No*.....

FLORAL SCHEDULE.

Date..............................

ORGAN.	No.	COHESION.	ADHESION.	FORM, ETC.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	5	gamosepalous	inferior	
Corolla Petals	5	polysepalous	hypogynous	
Stamens Filaments Anthers	7	hexandrous	perigynous	situated at bottom of calyx lobe
Pistil Carpels Ovary-cells. Styles Stigmas				

ROOT..........

STEM erect – Ligneous glabrous

LEAVES Alt. – [illegible] [illegible] [illegible] – glabrous

FRUIT,—*Parts*..........

Kind.......... *Dehiscence*.......... *Variety*..........

SEED,—*Parts*..........

Form.......... *Surface*..........

Embryo.......... *Albumen*..........

ORDER Sapindaceae .... **GENUS AND SPECIES** Aesculus Hippocastanum

COMMON NAME Common Horse Chestnut –

Illustration page.......... *No*..........

FLORAL SCHEDULE.

Date.....

Organ.	No.	Cohesion.	Adhesion.	Form, Etc.
Perianth Leaves Glumes Palets Lodicules				
Calyx Sepals	4	gamo-petalous	Superior	
Corolla Petals	4	gamo-petalous	perigynous	
Stamens Filaments Anthers	2	didynamous	epipetalous	
Pistil Carpels Ovary-cells. Styles Stigmas				

ROOT... fibrous.....

STEM... short, thick, tuberous, herbaceous.....

LEAVES... opposite, cauline, entire, exstipulate, blue.....

FRUIT,—*Parts*... capsule.....

Kind.....*Dehiscence*.....*Variety*.....

SEED,—*Parts*.....

Form.....*Surface*.....

Embryo.....*Albumen*.....

ORDER... Scrophulariaceæ **GENUS AND SPECIES**... Veronica peregrina.....

COMMON NAME.....

Illustration page..... *No*.....

ILLUSTRATIONS.

NO. 1

NO. 2

NO. 3

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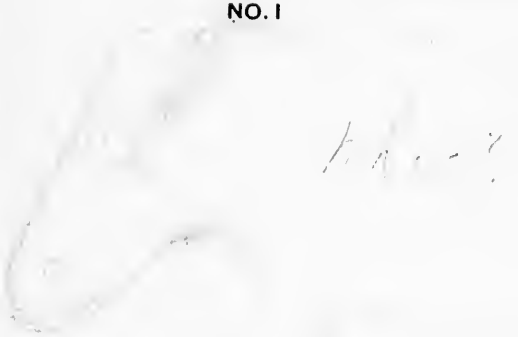
ILLUSTRATIONS.

NO. 1



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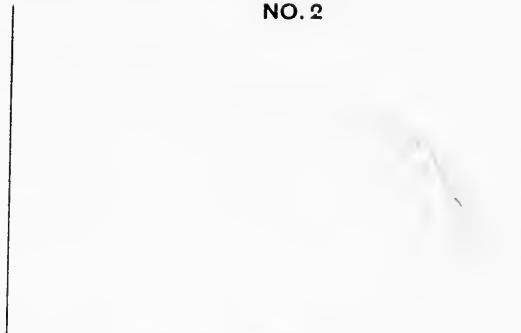

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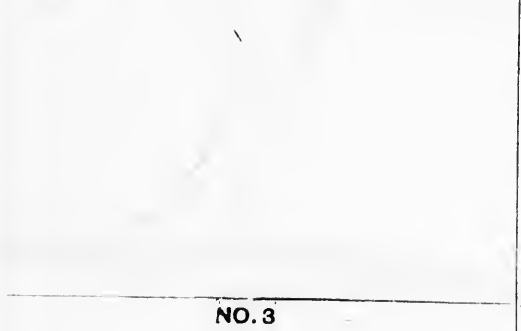

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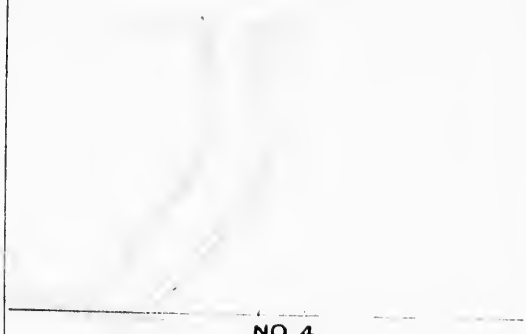

ILLUSTRATIONS.

NO. 1

NO. 2

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ILLUSTRATIONS.

NO. 1

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ILLUSTRATIONS.

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ILLUSTRATIONS.

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ILLUSTRATIONS.

NO. 1

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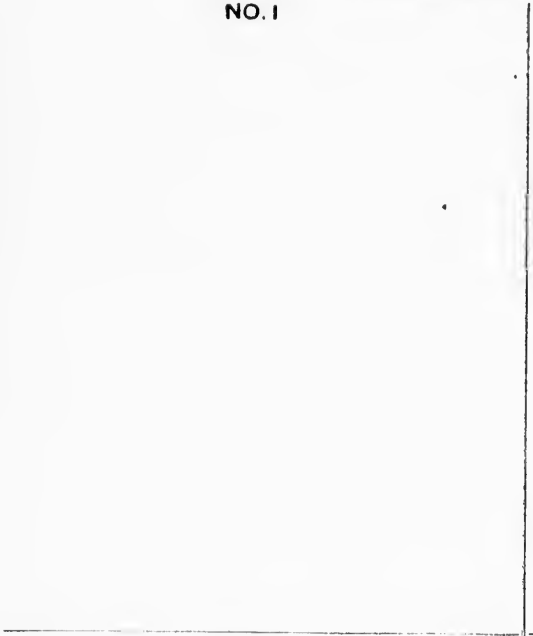
ILLUSTRATIONS.

NO. 1



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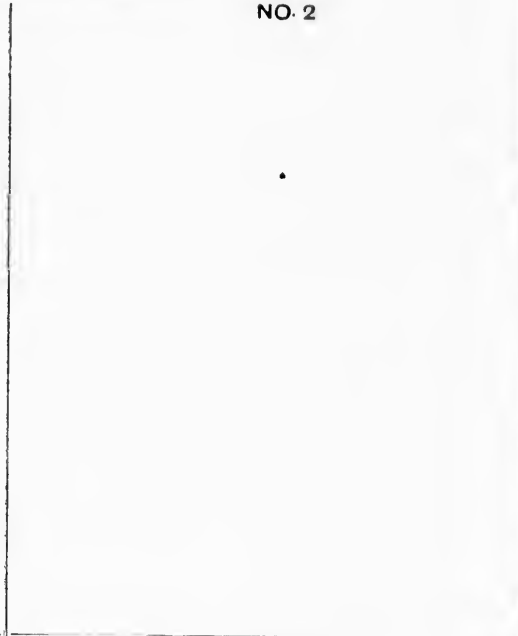

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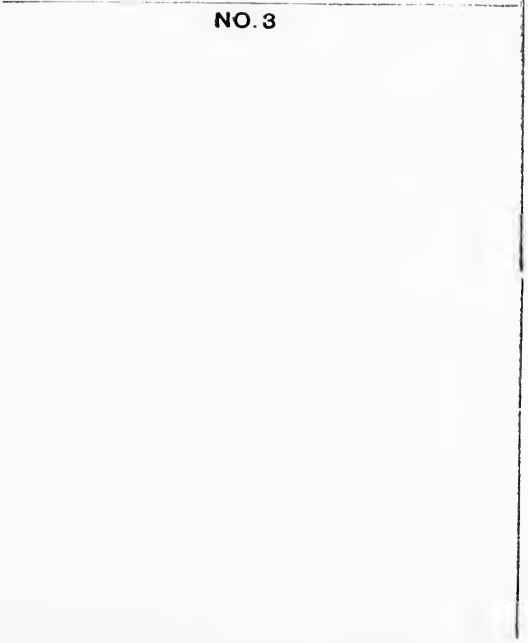

NO. 4

FLORAL SCHEDULE II.

No. .... *Date* June 2

Root .... Taproot

Stem .... 1 ft. hairy [illegible]

Leaves .... hairy, entire, tapering, 4 petiolate, exstipulate, lanceolate

Inflor'ence .... [illegible]

Fruit ....

Seed ....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals	5	gamosepalous	[illegible]	
*Corolla Petals	5	gamopetalous	perigynous	salver-shaped
Stamens Filaments *Anthers	5	pentandrous	epipetalous	
Pistil *Carpels *Ovary-Cells *Styles *Stigmas	4 4 1 1	[illegible]		

COMPOSITAE,—*Involucre* ....

Ray Florets .... *Disk-Florets* ....

Receptacle .... *Pappus* ....

GRAMINEAE,—*Glumes* .... *Palets* ....

Lodicules ....

*Remarks ....

ORDER Boraginaceae Genus and Species Cynoglossum officinale

Common Name Hound-tongue Habitat [illegible]

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals	5	gamosepalous	epipetalous	
***Corolla** Petals	5	polypetalous	perigynous	
Stamens Filaments *Anther	10	diandrous	perigynous	
Pistil *Carpels *Ovary-Cells *Styles *Stigmas	5 3			

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER Rosaceae..... Genus and Species Potentilla canadensis L.

Common Name Dwarf cinquefoil..... Habitat .....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

ORDER..... **Genus and Species**.....

Common Name..... **Habitat**.....

FLORAL SCHEDULE II.

No. ..... *Date* .....

Root ..... **Stem** ..... **Leaves** ..... **Inflor'ence** ..... **Fruit** ..... **Seed** .....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre* .....
Ray Florets ..... *Disk-Florets* .....
Receptacle ..... *Pappus* .....
GRAMINEAE,—*Glumes* ..... *Palets* .....
Lodicules .....
***Remarks** .....

ORDER ..... Genus and Species .....
Common Name ..... Habitat .....

FLORAL SCHEDULE II.

No. ..... *Date* .....

Root .....

Stem .....

Leaves .....

Inflor'ence .....

Fruit .....

Seed .....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre* .....

Ray Florets ..... *Disk-Florets* .....

Receptacle ..... *Pappus* .....

GRAMINEAE,—*Glumes* ..... *Palets* .....

Lodicules .....

***Remarks** .....

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ORDER ..... **Genus and Species** .....

Common Name ..... **Habitat** .....

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals	4	Gamosepalous	Superior	
***Corolla** Petals				
Stamens Filaments *Anther	4	Free		
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER..... Genus and Species.....

Common Name..... Habitat .....

FLORAL SCHEDULE II.

No.................... *Date*....................

Root [illegible]

Stem [illegible]

Leaves Clasping [illegible]

Inflor'ence ....

Fruit ....

Seed ....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
*__Corolla__ Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*....................

Ray Florets.................... *Disk-Florets*....................

Receptacle.................... *Pappus*....................

GRAMINEAE,—*Glumes*.................... *Palets*....................

Lodicules....................

*Remarks....................

ORDER.................... Genus and Species....................

Common Name.................... Habitat....................

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem Lobelia laurifolia

Leaves simply toothed net-veined green

Inflor'ence.....

Fruit.....

Seed.....

Organ.	No.	Cohesion.	Adhesion.	Drawings.
Perianth Leaves				
Calyx Sepals	5	polysepalous	inferior	
***Corolla** Petals	5	polypetalous	hypogynous	
Stamens Filaments *Anther	∞	indefinite	hypogynous	
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER..... Genus and Species.....

Common Name..... Habitat .....

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
*Corolla Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

Remarks.....

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ORDER..... Genus and Species.....

Common Name..... Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....**Genus and Species**.....

Common Name.....**Habitat**.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER..... Genus and Species.....

Common Name..... Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepal.				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER..... Genus and Species.....

Common Name..... Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

*Remarks.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

Organ.	No.	Cohesion.	Adhesion.	Drawings.
Perianth Leaves				
Caiyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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ORDER..... Genus and Species.....

Common Name..... Habitat.....

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	No.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

***Remarks**.....

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.....

ORDER..... Genus and Species.....

Common Name..... Habitat .....

FLORAL SCHEDULE II.

No..... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anthers				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets.....*Disk-Florets*.....

Receptacle.....*Pappus*.....

GRAMINEAE,—*Glumes*.....*Palets*.....

Lodicules.....

***Remarks**.....

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ORDER.....Genus and Species.....

Common Name.....Habitat.....

FLORAL SCHEDULE II.

No...... *Date*.....

Root.....

Stem.....

Leaves.....

Inflor'ence.....

Fruit.....

Seed.....

ORGAN.	NO.	COHESION.	ADHESION.	DRAWINGS.
Perianth Leaves				
Calyx Sepals				
***Corolla** Petals				
Stamens Filaments *Anther				
Pistil *Carpels *Ovary-Cells *Styles *Stigmas				

COMPOSITAE,—*Involucre*.....

Ray Florets..... *Disk-Florets*.....

Receptacle..... *Pappus*.....

GRAMINEAE,—*Glumes*..... *Palets*.....

Lodicules.....

*Remarks.....

.....

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.....

ORDER..... Genus and Species.....

Common Name..... Habitat .....

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No. 1 **ORDER** Geraniaceae

Genera	SC'H'D No.	
Geranium		**Adhesion** calyx inferior
		Cohesion [illegible]
		Remarks

TYPE No. 2 **ORDER** Saxifragaceae

Genera	SC'H'D No.	
Mitella diphylla		**Adhesion** calyx superior stamens perigynous
		Cohesion calyx and pistil
		Remarks Calyx teeth divided into 10 [illegible] parts

TYPE No. 3 **ORDER** Violaceae

Genera	SC'H'D No.	
Viola cucullata		**Adhesion** none
		Cohesion anthers slightly connected
		Remarks

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER..... ....

Genera	Sc'H'D No.	
....	.....	Adhesion.....
....	.....	....
....	.....	Cohesion..... ... .
....	.....	.....
....	.....	Remarks..... ....
....	.... .	....
.....	.....	....

TYPE No..... ORDER.... ....

....	.....	Adhesion ....
....	.....	....
.....	.....	Cohesion.....
....	.....	....
....	.....	Remarks..... ....
.....	.....	....
....	.....	....

TYPE No..... ORDER..... ....

....	.....	Adhesion..... .....
....	.....	....
....	.....	Cohesion..... ....
....	.....	....
....	.....	Remarks..... ... .
....	.....	.....
.....	.....	....

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER.....

Genera	Sc'H'D No.	
		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER..... .....

Genera	Sc'll'd No.	
....	.....	Adhesion.....
....	.....	....
....	.....	Cohesion..... ... .
....	.....	.....
....	.....	Remarks..... ....
....	.... .	....
.....	.....	....

TYPE No..... ORDER.... ....

....	.....	Adhesion ....
....	.....	....
.....	.....	Cohesion.....
....	.. ...	....
....	.....	Remarks..... ....
.....	.....	....
....	.....	....

TYPE No..... ORDER..... ....

....	.....	Adhesion..... .....
....	.....	....
....	.....	Cohesion..... ....
....	.....	....
....	....	Remarks ....
....	.....	....
.....	.....	....

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER.....

Genera	Sc'H'D No.	
		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ..... ORDER..... ....

Genera	Sc'H'D No.	
....	.....	Adhesion .....
....	.....	....
....	.....	Cohesion..... ... .
....	.....	....
....	.....	Remarks..... ....
....	....	....
.....	.....	....

TYPE No..... ORDER.... ....

....	.....	Adhesion ....
....	.....	....
.....	.....	Cohesion.....
....	. ...	....
....	.....	Remarks..... .....
.....	.....	....
....	.....	....

TYPE No..... ORDER..... ....

....	.....	Adhesion..... .....
....	.....	....
....	.....	Cohesion..... ....
... .	.....	....
....	.....	Remarks ....
....	.....	....
.....	.....	....

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No. ..... ORDER. .....

Genera	Sc'H'D No.	
		Adhesion
		Cohesion
		Remarks

TYPE No. ..... ORDER. .....

		Adhesion
		Cohesion
		Remarks

TYPE No. ..... ORDER. .....

		Adhesion
		Cohesion
		Remarks

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ..... ORDER..... ....

Genera	Sc'H'D No.	
....	.....	Adhesion... .....
....	.....	....
....	.....	Cohesion..... ... .
....	.....	.....
....	.....	Remarks..... ....
....	....	....
.....	.....	....

TYPE No..... ORDER.... ....

....	.....	Adhesion ....
....	.....	....
.....	.....	Cohesion.....
....	.....	....
....	.....	Remarks..... ....
.....	.....	....
....	.....	....

TYPE No..... ORDER..... ....

....	.....	Adhesion..... .....
....	.....	....
....	.....	Cohesion..... ....
....	.....	....
....	.....	Remarks..... ... .
....	.....	....
.....	.....	....

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER.....

Genera	Sc'h'd No.	
		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

CLASSIFICATION.

CHARACTERS OF THE ORDERS.

TYPE No..... ORDER.....

Genera	Sc'H'D No.	
		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

TYPE No..... ORDER.....

		Adhesion
		Cohesion
		Remarks

scum that has collected on water
that meat

I. Scum found on water where meat has been allowed to stand for some time.

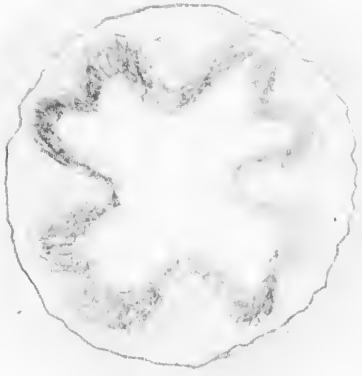
(a) Protophyta (b) Class. Myxomycetes

II. Same as I. only [illegible] meat

(a) Protophyta (b) Class Schizomycetes Order Bacteriaceae

III. Cross section through lower of two

IV Cross section of Intestine of Leech



V

yeast-cell
Fig I

yeast cell with Bud
Fig II

Wall

Protoplasm

Vacuole

cell with old and young Bud
Fig III

Fig IV

Formation of ascospores

Protoplasm

Cell wall of Ascospore

Fig V

Fig VI

Fig VII

Fig VIII

Fig IX

Fig X

Fig XI

d Young Rind

icrospores

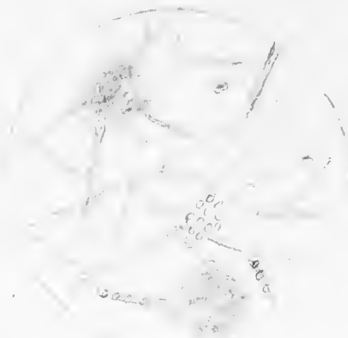
Protoplasm

l wall
uscospore

t-cell

Produce

VI. Algae



Moss

Calyptra

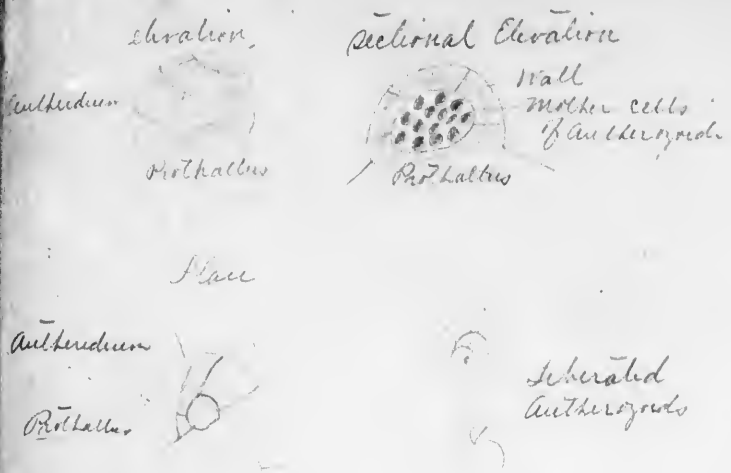
Rosettes in Moss

– Seta

Capsule urn
sporangium

Fig I

Antheridium & Antherozoids of Royal fern



Antherozoids much enlarged