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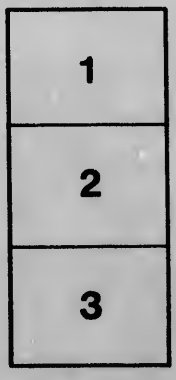

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NATURAL HISTORY SOCIETY OF NEW BRUNSWICK.

$120 in Prizes for Insects and Plants.

A gentleman interested in Natural science and its relation to farming and fruit growing has given to the Natural History Society of New Brunswick the sum of $150, to be distributed in prizes, after deducting $30 for expenses, for collections of insects, fungi and weeds. His chief stipulation is that the schools shall be interested in this work, so that the advantages shall be educational as far as possible; and that the young people, and through them their elders, shall be led to take an interest in those forms of insect and plant life both injurious and beneficial, that effect so largely our agricultural and horticultural interests.

The Society is fully alive to the importance of the work everywhere being undertaken by governments, societies and individuals to grapple with the pests that annually entail such loss to farmers and fruit growers, and it hopes that this, the first systematic attempt in this province to create a general and practical interest in this direction, will call forth the active interest and co-operation of farmers, teachers and students throughout New Brunswick, so that the fullest advantage may reaped from this generous offer.

The Society takes this early opportunity to issue the following plan governing the conditions and distribution of the prizes, with directions to students intending to compete for them:

CONDITIONS.

1. The competition is open to the province.
2. All specimens are to be collected in New Brunswick and exhibited by the collector.
3. The collections are to be handed in not later than the 15th of September, and are to be exhibited at the Exhibition to opened in St. John about that time.

4. The given amount—$150—is to be apportioned as follows: $60 for insect collections; $60 for plants (fungi and weeds), and $30 for expenses.

(a) Insects.—The collection of insects is to be divided into three groups representing (1) injurious, (2) beneficial and (3) other insects, with labels showing the name, locality and date of capture.

Note.—The naming of the more difficult species will be a matter of some concern to younger students especially, but that need not deter them from making and handing in collections, but the prizes will be awarded to those best fulfilling the conditions set forth above.

A first prize of $25 will be awarded for the best and most complete collection of insects; $10 for the second, and five additional prizes ($7, $6, $5, $4, $3) for other collections in order of merit.

(b) Fungi.—Collections of fungi must be made on full sized botanical mounting paper—if large. Smaller specimens may be mounted on sheets one-half or one-fourth the size of above according to size of specimen. As in the case of insects, the fungi are to be divided into three groups—injurious, beneficial, and others not included in these two classes.

A first prize of $20 will be awarded to the best and most complete collection; $10 for the second, and two prizes ($6 and $4) for the next collections in order of merit.

(c) *Weeds.*— The collections of weeds dried, and mounted on standard sized paper, are to be properly labelled with name, habitat, place and date of collection.

A prize of $10 will be given for the best and most complete collection of weeds, and two prizes ($6 and $4) for the second and third.

Notes.—Additional value will be given to any of the above collections if they are accompanied by short notes, descriptive of the habitat, ravages, habits, etc., of each species, such as a student would make for his own

information, as well as to cultivate habits of observation and make the collections of more service to himself and others.

If in the opinion of the judges any collection be considered lacking in merit, it shall not receive a prize.

Directions for Collecting and Preserving Insects.

For collecting insects the following articles are required for practical work :

The Butterfly Net.—This is used for capturing flying insects. A cheap and useful home-made net may be constructed as follows : Take forty inches of strong iron or brass wire ; at each end bend about four inches at right angles ; bring these ends together, thus forming a circle ; this may be strongly bound to a light bamboo stick about four feet long. The bag or net may be made of silk gauze or leno, and should taper to the bottom. The length should be twice the diameter of the hoop. A more convenient net may be made by having the ring soldered to a tin or brass ferule, which may be made to fit the end of the bamboo rod, and thus can be detached when not in use.

The Sweeping Net may be constructed on the same principle as the butterfly net, but with a shorter handle, and is used by holding the handle of the net firmly in one hand and quickly sweeping the tops of grass and other low-growing plants, first from right to left, and then, after quickly turning the net again, sweeping from left to right. The sweeping net should be made of stronger material than the butterfly net.

The Water Net is used for capturing insects or insect larvæ which live in the water. It may be made in the same way as the other nets, with this exception : that the bag may be shorter and of coarser material, such as "grass cloth," or coarse millinet.

The Umbrella is one of the most useful instruments of the collector. It is used as follows: The open and inverted

umbrella is held with the left hand under the branches of trees or shrubs which the collector intends to relieve of its insect inhabitants, while the right hand, armed with a heavy stick, is free to properly shake the branch.

The Chisel is used for securing the insects living or hiding under the bark of dead or decaying trees.

The Trowel is used in digging for the burrowing beetles, ants, crickets, and the many insects which construct subterranean nests.

The Collecting Tweezers are for picking up specimens and transferring them into the various bottles, vials or boxes which the collector carries for the reception of material collected.

The Killing Bottle.—Perhaps the best method of killing is by the use of cyanide of potassium. Large specimens are killed by simply putting them in what is known as the "cyanide bottle." This may be constructed as follows: Take a short, wide-mouthed bottle; break up a quantity of cyanide of potassium into pieces of convenient size; place a layer of these in the bottom of the bottle; then mix a quantity of plaster of Paris with water—just sufficient to make the mixture semi-fluid—and pour it over the cyanide so as to cover it. The bottle is then left open for an hour or two until the plaster is thoroughly dry.

Mounting Insects.—In mounting insects for the cabinet, entomological pins, made expressly for the purpose, should be used. Nos. 1, 2, 3 and 4 are the sizes most commonly required. After returning from a collecting excursion the specimens should be prepared as soon as possible. Take the specimens from the collecting bottles and spread out on a sheet of white blotting paper, and with a soft, dry brush cleanse from any adhering impurities. Specimens with hard covering may be washed with benzine. Insects should be pinned through the centre of the thorax, when, as is more generally the case, this portion is largely developed. Beetles (*Coleoptera*)

and bugs (*Hemiptera*) should, however, be pinned — the former through the right elytron, or wing cover, and the latter through the scutel, or triangular piece behind the thorax. The specimens look pretty with all the legs spread out, but for practical purposes it is better to let them dry in a natural, partly bent position. The pin should project about three-eighths of one inch above the the insect, to make handling easy, and uniformity in this particular will have much to do with the neat appearance of the collection.

Mounting on Points.—Most insects which are too small to be pinned may be fastened to cardboard points by liquid glue. Only the very best cardboard should be used for this purpose. These points can easily be cut by hand to a convenient size—say one-fourth of an inch long by one-sixteenth wide at the largest end, and tapering to a more or less acute point, according to the size of insect to be mounted. A No. 2 or 3 pin is then thrust through the wide end of the triangle, and the cardboard point, or triangle, directed to the left. The insect is then glued to the point, lying evenly balanced on the end of the little slip of cardboard, with the head pointed forward.

Setting of Insects.—For the proper setting of insects with broad wings, such as butterflies and moths, a spreading-board is necessary, and may be made as follows: Take two pieces of thin pine board, fourteen inches long and one and a half inches wide, nail these upon end pieces three inches long and one and a half inches deep at each end, narrowing to one inch and one-eighth in the middle. When the top pieces are nailed on these ends, an opening is left in the centre wide enough to admit the bodies of insects to be spread. Strips of cork or pith in which to fasten the pins may then be tacked or glued below so as to cover the intervening space. These spreading-boards are made of different sizes to accommodate different sizes of insects.

In spreading insects on these boards, first pin the insect, then shove the pin through the cork, allowing the body to fit into the groove in the setting-board. The wings can then be pinned and kept in position by strips of paper. To obtain uniformity in the position of the wings, have the inner margins of the front wings as nearly as possible on a straight line. When the specimens are thoroughly dry they may be removed from the boards.

Preserving in Alcohol.— This means of preserving caterpillars and the many soft bodied insects and insect larvae is too well known to require any extended mention here. Specimens which are to be preserved in this way should be kept for a day or two in alcohol diluted with seventy per cent. of water and afterwards removed to alcohol containing forty per cent. of water.

Labelling Specimens.—Specimens will be of very little value, no matter how much care and pains have been taken in preparing them, if not properly labelled giving information as to locality, date of capture, and collector's name with a number referring to a note-book where any observations made should be carefully recorded. This habit cannot be too strongly emphasized. The collector should never be without his note-book. More profitless work can scarcely be imagined than collecting natural history specimens without some specific object, for a properly kept record forms an indispensable part of every well made collection. A good method is to use two labels for every insect. The upper label should indicate on the first line the sex-mark and locality, as St. J. (St. John). The second line, date of capture, and third line number referring to note-book, and initials of collector. The lower label bears the name of the insect. These labels are fastened to the pin on which the specimen is mounted.

Insect Cases.—A convenient size for these cases is eighteen inches by twelve, outside measurement. They

should be perfectly tight and not over two and a half inches deep on the inside. The top may be of glass and the bottom lined with cork or some material which will hold the pins. The whole inside should be lined with white paper.

Arrangement of Insects in Cases.—The almost universal custom of collectors is to arrange insects in parallel columns in the cases. In regard to the smaller forms, as coleoptera, hymenoptera, diptera, two and a half to three inches in width is allowed for the columns, and for the larger insects as lepidoptera, and orthoptera, four to five inches will be found necessary. With alcoholic material, a similar arrangement may be followed. It is advisable to have at least four specimens of a species, which, entomologically speaking, constitute a set. As far as the conditions of the competition will allow, the collections should be arranged in a systematic manner, the order, family, sub-family and genus being indicated as far as known. The species should be arranged serially in accordance with the latest catalogue obtainable.

For the prevention of injury by insect pests the collection should be kept in tight boxes, and naphthaline cones pinned in convenient corners in the cases.

Of necessity the foregoing remarks on entomotaxy have been very brief, and consequently incomplete.

There is much that the young student will have to learn—from books, from experience and by putting himself in communication with experienced entomologists. Of books the following are recommended: Packard's Entomology for Beginners, price $1.40; Comstock's Manual for the Study of Insects, $3.40.

Pins, labels and other supplies may be obtained from J. Abbott Fraser, 93 Sudbury street, Boston.

Directions for Collecting and Preserving Fungi.

It would be impossible within the limits of this article to give more than a few general directions for the col-

lection and preservation of some of the commoner forms of fungi. No time of the year, except when the ground is covered with snow, is barren of fungi, but it is in mid-summer, and from that time till frosts set in, that their ravages are most apparent and destructive, when as *rusts, smuts, mildews, blights*, etc., they are such a source of injury to cultivated plants.

The collector may be provided with an ordinary collecting box, such as is used for flowering plants, but for Agarics (mushrooms, etc.,) an open shallow basket is preferable. A great number of woody kinds may be carried in the coat pocket, and the ordinary kinds that have their habitat on leaves, may be placed between the leaves of a pocket book, from which they may be transferred to driers on the return home, and dried and mounted in the same way as flowering plants.

The Fleshy Fungi.—In order to preserve the fleshy fungi for the herbarium the following method is usually adopted: The agaric, or other similar fungus, is cut perpendicularly from the pileus (cap) downward through the stem. A second cut in the same direction removes a thin slice which represents a section of the fungus; this may be laid on blotting or other plant-drying paper and put under a slight pressure to dry. From one half the fungus the pileus is removed, and with a sharp knife the gills and fleshy portion of the pileus are cut away. In the same manner the inner flesh of the half stem are also cleared. When dried, the half of the pileus is placed in its natural position on the top of the half stem, and thus a portrait of the growing fungus is secured, whilst the section shows the arrangement of the hymenium (spore-bearing surface) and the character of the stem. The other half of the hymenium may be placed, gills downward, on a piece of black paper, and allowed to rest there during the night. In the morning the spores will have been thrown down upon the paper, which should be placed with the other portions of the specimens.

When dry, the section, profile and spore paper may be mounted together on a piece of stiff paper (botanical mounting paper is the best) and the name, locality and date written on the label below with other particulars. When dried, either before or after mounting, the specimens should be poisoned to preserve them from the attacks of insects. The best application for this purpose is perhaps carbolic acid laid on with a small hog-hair brush. If there is an objection to the use of such a dangerous poison — and there always is — spirits of camphor is sufficient, but as it is volatile, it is not to be trusted as a permanent preservative.

Leaf Parasites, so common on strawberry, blackberry, grass, and other leaves, may be dried between leaves of books as indicated above or in the usual way for drying plants—between the folds of bibulous paper; ordinary newspaper will do. It may sometimes be necessary with dead leaves to throw them in water, in order that they may be flattened without breaking, and then dry them in the same manner as green leaves. All species found growing on wood bark, etc., should have as much as possible of the hard host substance pared away so that the specimens may lie flat in the herbarium.

The Puff-balls are troublesome to preserve, and if mounted on paper are soon spoiled. It is a good plan to provide small cardboard boxes, of not more than a quarter of an inch in depth. Glue the specimen when collected to the bottom, allowing it to dry in that position before replacing the cover.

Moulds.—These are difficult to preserve. A good plan is to go out provided with small wooden boxes, corked at top and bottom, such as entomologists use, and some common pins. When a delicate mould is collected from a decayed fruit or other substance cut away all unnecessary portions of the host or matrix, and pin down the specimen to the cork in one of the boxes. Another method is to wrap the delicate moulds in tissue

paper and place the specimens loosely in pill boxes. (This will be found to be a very good plan with many other delicate species of fungi, which at best cannot be preserved permanently, unless portions of them are mounted on microscopic slides.)

Microscopic Fungi.—Those who attempt to use the microscope and make collections of the smaller fungi, are referred to Cooke's Microscopic Fungi, and other works, for directions in detail.

Value of Drawings.— For fleshy fungi, faithfully colored drawings side by side with the dried specimens, will make up for loss or change of color which most species undergo in the process of drying. A series of photographic groups of such fungi, taken with a kodak, would also add much interest to a collection.

Books.—One of the best books in studying the fungi, is "Fungi: their Nature and Uses," by M. C. Cooke, edited by Rev. M. J. Berkeley. Published by D. Appleton & Co., New York (International Scientific Series). The price is about $1.50.

Weeds — How to Distinguish and Preserve Them.

It may be difficult for the young student to answer the question What is a weed? In general it may be said that a weed is any plant that interferes with the operations of agriculture or gardening. Some plants are weeds because by their rapid growth they thrive and drive out other less aggressive or more useful plants. Others, from their unsightly appearance and uselessness may be termed weeds. Some by their beautiful flowers may win our regard and be less offensive though they are none the less weeds, as the dandelion, cotton thistle, coneflower, and several varieties of daisy. Again, a weed which is troublesome in one place need not be so in another where the conditions for its exuberant growth are not fulfilled. Bluets, Eyebright and other plants, not usually considered weeds, sometimes occupy fields to

the exclusion of almost every other plant. Of course in such situations they are weeds.

Most of our worst weeds belong to the Composite Family of plants, which needs a brief explanation here. What is popularly taken for the flower in this family is really a cluster of flowers. Take the Ox-eye Daisy which is so abundant in this province. Each of the white rays round the margin represents an entire flower and each has a pistil and produces one seed. The yellow central portion consists of many tube-shaped flowers, each of which has its stamens and pistil and produces one seed. So that there are many hundreds of flowers, producing hundreds of seeds, in one flower head; and the same is true of the thistle and other weeds that belong to this family. Hence their power of reproducing themselves is manifold.

As weeds are collected and mounted like other flowering plants, the following directions may serve as a guide:

To *collect* plants one should have a note-book and a tin box (that in the form of a cylinder is the most convenient), eighteen inches long and six inches deep, with a strap fastened to each end, for carrying over the shoulder. To *examine and identify* plants a pocket magnifying glass is needed (one costing from twenty-five to fifty cents is sufficient), and a Gray's Manual and Lessons, which costs from two to three dollars. A trowel for digging up plants, a sharp pocket-knife, a needle fitted in a wooden handle for separating the parts of plants are necessary. To *dry* plants a press and abundance of paper to absorb moisture are required. For the former, two smooth boards that will not warp, 20x14 inches, with a flat stone or other weight of twenty-five or thirty pounds will serve all purposes. Old newspapers, uncut, and folded in quarto form will do for dryers. That completes the outfit.

Collect only good specimens, and be sure to have root, stem, leaves, flowers, and, if possible, the fruit. If the

plant is over fifteen or sixteen inches long, bend it before putting in the tin box or press so that the length shall be about fifteen inches. Returning from a collecting trip put the plants in press. On one of the boards place two newspapers (eight thicknesses). On this place a plant, or several if the size will permit, arranging as naturally as possible, and showing both under and upper surfaces of leaves and flowers. Cover with a newspaper (four thicknesses, or eight if the plant is thick and juicy).

Put a label with each species and proceed thus until all the day's collection is enclosed. Then place on top the second board with the weight and put it in a spot where it will receive plenty of sun and air. Change the drying papers every twelve hours for a day or two, every twenty-four hours for a few following days, and every forty-eight hours after, until the plants are completely dried, which process will take from ten to twelve days.

Plants may be mounted at leisure on botanical mounting paper, 17x11½ inches. This is called the herbarium size, and is used by botanists everywhere. It may be obtained from the Cambridge (Mass.) Supply Company for about $4.50 a ream. But perhaps nearly as good an article may be obtained from local dealers at a much less price. These sheets should be enclosed in manilla covers to protect them.

The Committee of the Natural History Society of New Brunswick to whom has been entrusted the making out of this scheme, has taken pains to be as full and explicit in the directions above given as possible in the short time allotted for preparation. It hopes that there will be a great interest aroused in all parts of the province, and that there will be many competitors for the prizes offered.

G. U. Hay,
G. F. Matthew,
W. McIntosh,
S. W. Kain,
} *Committee.*

St. John, N. B., March 10th, 1898.