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# THE OTTAWA NATURALIST.

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VOL. XIX. OTTAWA, NOVEMBER, 1905.

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No. 8

## ON THE FORMATION OF LOCAL COLLECTIONS.\*

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In reference to local collections and the study of local natural history, one of our older Essex County botanists said, at a field meeting of the Essex Institute many years ago, that "the careful study of the flora of a very limited area may well occupy a lifetime while the results would probably be of more value to science than any general work undertaken by the same student."

There is no better presentation of the need of local collections accessible to the public than the article by Prof. Edward S. Morse † entitled "If Public Libraries, why not Public Museums?" In this paper the author points out how many more public libraries there are in this country than museums and how much more difficult it is to install and maintain a library. And yet there is no doubt whatever regarding the great and in some cases even the greater educational value of the museum. Referring to museums open to the public he says:—"For New England, the fingers of one hand could almost count them, and for the rest of this great republic, the fingers of the other hand would be sufficient to keep tally." And this in contrast to European countries where nearly every large town has its public museum.

Nor have these conditions materially changed since the paper was written in 1893, although new museums have been

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\* A paper read at the Field Meeting of the Andover Natural History Society at "Alderbrook Farm," in Andover, Massachusetts, July the twentieth, nineteen hundred and four, by John Robinson, of the Peabody Museum in Salem.

† Atlantic Monthly, July, 1893, pp. 112-119.

founded in several of the larger American cities and in some of the smaller ones and in many towns local historical societies have begun museums. Libraries, however, have increased more rapidly than ever before, until it is our boast, here in Massachusetts, that there is not a single inhabitant who has not free access to a public library. It is very desirable, therefore, that attention should be called to the formation of museums.

As art museums and certain specialized museums are usually established by endowment and are placed in the hands of boards of trustees, the museums most likely to be formed or which require consideration at this time are the educational museum of natural history (taken in its widest sense to include mineralogy, geology, archæology and ethnology, as well as the usual branches of zoology and botany), which is generally connected with some school or college, and the local museum illustrating the fauna, flora, etc., of some definite area, usually with political rather than natural boundaries, and nearly always the offspring of a local society or club.

It is hardly necessary here to suggest that the educational museum should contain well balanced collections, covering all of the departments of science within its scope in due proportions, that it should practically be a condensed encyclopædia illustrated by type specimens. Such a collection should be attractively arranged and well labelled, with copious references to books and papers treating of the specimens it contains on the groups to which they belong. Large special collections should not be merged in a museum of this sort, they should be kept in separate rooms or, better still, in separate buildings. The educational museum may be made equally perfect in its way whether it fills a single small room or occupies a series of large halls, so long as the relative proportions of its departments are rigidly adhered to.

But the museum most likely to be established at the present time is the local museum. The formation of the many local historical societies, taken in connection with the increasing interest in the study of plants and birds, and the great demand and consequently the great supply of the so called "nature books," in-



icates an interest in these subjects which it is hoped will be permanent and lead to the establishment of local museums in every centre of population in the country, the smaller as well as the greater. In many cases the local museum must cover both natural and civil history,—minerals, plants, animals, pre-historic remains and historical relics. The grouping in one museum of these widely different objects seems at first to be inappropriate, but it is perfectly proper and quite possible to carry out.

In forming a local museum, it should be decided at the outset exactly what is to be done,—what ground is to be covered,—and when decided, every temptation to go beyond these limits should be firmly resisted. Local and general collections should never be mixed and the objects in each department should be arranged in different cases or otherwise distinctly separated.

But specimens are nearly always given before the cases to hold them are obtained, in fact, it is usually the gift of a collection, or the offer of one, which suggests the museum and even the formation of the society itself. The president of a well known county society was in the habit of saying that every person who gives a book to a library ought to give a dollar with it to shelve it and keep it in order, a rule which may be applied with equal propriety to the museum specimen as to the book, but a rule impossible to carry out in either case, for the donor usually thinks that he has done enough in giving the object and would feel insulted at the suggestion of a contribution of money to provide for its keeping.

Museum cases are much more expensive than is generally supposed and temporary ones may be hired or borrowed which will answer the purpose until funds can be raised to obtain permanent cases. Rather than expose delicate objects to dust and injury upon open shelves it is far better to pack them away in drawers and boxes until suitable glass cases can be provided. It is imperative that the cases should have more glass than wood in their construction. A collection comes to mind, housed in heavy, over ornamented, black walnut cases, which were given to an institution by a generous friend,—his own selection. They were so dark and exposed so little surface of glass that the specimens

inside could hardly be seen, and yet for the same cost cases might have been built with five times the glass exposure had they been made of painted pine and placed against the wall as fronts simply, the shelves being attached independently to the wall itself. Such cases may be constructed quite economically and are perfectly satisfactory. It is well to have the cases nearly white in color and the room itself as light as possible so long as the blazing sun light is avoided.

The labelling of the specimens is a most important matter, for a collection without labels is of no use whatever. The labels should be amply descriptive, concisely expressed and distinctly written on one sort of paper or card, except for class or general labels, and, if possible, in one sort of hand writing or one style of printing.

With the exception of such bulky specimens as wood, cones and other fruits, the botanical collection is best kept on shelves in tightly closed cupboards. All the dried plants should, of course, be poisoned and mounted on paper of the standard size, in order that one collection may be united with another if required in the future. The birds, to save expense, may, if numerous, be kept as skins in shallow drawers, only one set being stuffed and mounted for public exhibition. Eggs and nests should be placed with the species of birds to which they belong. The mammals must be stuffed and the fishes and reptiles likewise, if possible, for specimens preserved in alcohol and other liquid preparations are troublesome and quite expensive to maintain and only of service to students. They are almost useless for public exhibition because, aside from the distorting effect of the liquid, nearly all lose their original color and change to a dirty white in a few years. The minerals and rocks on exhibition should be reasonably large, characteristic specimens and there should not be so many of one sort as to be confusing.

One of the most difficult collections to care for is the insect collection. Insects are the most numerous of all animals. The best results for the local museum are gained by collecting only the larger and more interesting insects, enlarging the scope of the collection from time to time. In this way the butterflies and

the larger moths, the dragon flies, conspicuous beetles and some other groups may be collected and arranged in tight glass-topped boxes of the same size. The various stages in the development of the insect should always be shown if possible by carefully prepared specimens. A very attractive way of exhibiting the butterflies and larger moths has recently been adopted in some museums and in many private collections where each specimen is mounted separately on a white tablet covered with glass, but this is a very expensive method when applied to large collections. The insect collection may easily occupy the entire time and attention of one person and the local society is fortunate if it counts an amateur entomologist among its members.

The museum should always be opened at regular hours on designated days. Nothing is more exasperating to the visitor than to find the doors closed against him after taking much trouble to go, perhaps a long distance, to see the collections, or to be told by a sign, or some person near by, to call at Mr. So-and-so's, half a mile off, to get the key.

It is hardly necessary here to go farther into details of the arrangement of the museum, except to say that the local collection should contain, so far as possible, a specimen of every native species of rock, plant, animal, etc., together with a typical collection illustrating the pre-historic remains of the aboriginal race of the region. Photographic and other illustrations interspersed among the specimens add greatly to the interest and educational value of the collection.

From the minerals and rocks, which may be considered the foundation of the collection, it is an easy advance through the plants, and animals, to the handi-work of aboriginal man and thence to our own early historic period and the present time; so that, one finds a perfectly natural sequence of objects from the native rock to the musket our great grandfather carried at the battle of Bunker Hill, and the difficulty of combining natural history collections with those of the local historical society vanishes. With care this combination may be made in an absolutely scientific manner.

One of the greatest difficulties in conducting a museum is

in dealing with unsuitable gifts offered by well meaning friends. The lack of appreciation of the fitness of things sometimes displayed by well educated persons is most surprising. Such a person examines the collection, speaks well of what has been done and then announces his intention of adding to the museum a most valuable contribution, an object which until then the donor would never think of parting with, and of much greater interest than anything in the collection. The donor may be a person of influence in the community and one who has given money generously to furnish the rooms. The gift arrives; it may a fragment of rock from the hill where the witchcraft victims were hanged; a bottle of water from the river Jordan; a bit of polished agate from Arizona with something like the outline of an Indian face in its concentric folds, which you are assured was caught there by the sun's rays as an Indian chief passed by. Although it may be an interesting souvenir of travel to the collector himself, such an object is of no value in a museum, nor can it be classified as scientific or historical and the custodian is at a loss to know what to do with it. He can not afford and does not wish to offend the kindly intentioned donor. What can be done? There is one museum in which a special case is provided for "Recent Accessions" and in this case are placed all gifts as they are received. There all undesirable objects remain until they are forgotten or can be disposed of, while, from time to time, as it may be convenient to rearrange the collections, the desirable ones find their appropriate places in the museum among the groups to which they belong. The establishment of a case for "Recent Accessions" should be among the first things done. There is another advantage in having such a case. A donor is quite sure to visit the museum within a week or two after sending a gift to see if it has been placed on exhibition, and while it may not have been possible to arrange the collection to give it a suitable place, the "Recent Accession" case can take it in immediately.

There is one class of donors who should receive the greatest consideration,—the children. They come with butterflies, beetles, sea-urchins, shells and flowers and want to know what they are and something about them. About the best work which can be

done at the local museum is to encourage children to intelligently observe natural objects. A few reference books may be kept at hand or the children may be taken to the public library and shown a good picture or analytical drawing of the animal or plant and given a short account of it to read, or they may be taken to the shore or fields and assisted to learn the habits of the animal or something about the growth and nature of the plant. All specimens brought to the museum by them should be marked with the donor's name on the card and immediately given a place in the "Recent Accession" case.

Gifts to the collection should always be promptly acknowledged by letters or by filled out blanks which are more convenient. It is surprising what pleasure these acknowledgments give even to older persons, while children show them to their friends with evident pride. In fact everyone appreciates a prompt response and even the most trivial gift should not be overlooked for it frequently happens, after a few worthless objects have been dutifully acknowledged, that a really valuable addition comes from a person thus encouraged.

An important duty of the local society, through its museum, is to aid in the effort now being made to protect our native birds and preserve our rarer wild flowers. Much may be accomplished in this direction, not only by personal appeal to thoughtless and selfish collectors and by the combined influence of the membership of the society upon them, but the museum collections, if reasonably complete and freely accessible to the public, will in a great measure obviate the necessity and curb the desire for making trivial private collections. Collectors should be encouraged to add new specimens to the museum and the duplication of those already there should be discouraged. Efforts should be made to interest the community in the museum and make everyone feel a personal pride and proprietorship in it. The children, having been interested in the life histories of plants and animals, may be taught to be of great assistance in obtaining desirable objects for the museum and at the same time discouraged from collecting indiscriminately and merely for the purpose of accumulating specimens. The thorough knowledge of a few ani-



mals and plants is of far greater benefit to them than the collecting of masses of specimens of which they know but little.

It may be treading upon dangerous ground and, perhaps, outside the limits of this paper, but in a great majority of instances it seems evident that the inclusion of the making of herbaria in the regular work of our schools, where prizes are frequently given for the largest and best arranged collections of dried plants, is of very questionable desirability.

As a matter of convenience, the botanical instruction is too often assigned to teachers, perhaps excellent in other branches, who have no knowledge of botany and who can not interest the scholars in the subject or aid them in their work. Valuable study hours are wasted, usually just at the close of the school year, and other work neglected. It may be that one hundred small collections of dried plants are made. Individually they are valueless but collectively they represent the up rooting of a great number of native plants, often rare ones, without any gain to the scholar or the school. This work as conducted in most of our schools can not be defended as a necessary part of any educational system, nor does it in any way bring the students into touch with nature or lead to a knowledge of her ways.

A single new species of plant added to the local museum collection would be of more value than the entire mass of school herbaria and a greater honor than to win a prize for the best school collection.

The school garden is a far better way of interesting children in botany. The children may be taught to raise their own specimens and, meanwhile, study the germination, leaf and flower morphology, the methods of fertilization and the insect aids, and the development of the fruit.

The work should, of course, be done under the guidance of a competent instructor who could outline the course for the regular teachers and supervise the instruction in all of the schools of a city or in two or more contiguous towns, as is often done now by special teachers of music and drawing, a method already shown to be successful and economical when applied to the care of the roads in adjoining communities. If a near approach to

systematic instruction is impossible, it would be far better to omit botany altogether from the school courses. In some cases botanical and horticultural societies are doing excellent work in this direction and the local natural history society, if it is not possible or desirable to directly conduct classes, may, by its influence, lead the city or town school board into the paths which should be followed. What one horticultural society has done may be learned by reading the reports of the successful work of the children's garden committee of the Massachusetts Horticultural Society in Boston.

Merely pressing and naming plants is not of itself studying botany, it is, literally, the driest part of plant study and, often, if forced to do this work, the boy or girl becomes disgusted with the whole subject.

A very good way of interesting children in botany, available to city children as well as to those living in the country, is to encourage them to become familiar with the trees growing in the streets, to know their names, their nature, to observe them and to write accounts of them and their varied conditions throughout the year, in winter as well as summer. The herbarium, if one is to be made, might take the form of the life history of a single species. Assign to each boy and girl a different tree, or let groups of children study one together. At the end of the season each little collection should contain the seedling plant with the roots, a branch of leaves, a sheet or more of different forms of leaves, the flower,—of both sorts if there are more than one,—the fruit in its different stages. A specimen of the wood of each tree should accompany the sheets of pressed leaves and flowers showing the grain in section, lengthways and across, together with the bark. Such a collection, if carefully prepared and neatly mounted, would be a valuable accession to any local museum, while the written reports would serve admirably as exercises in English composition. Other groups of children could collect the insects found upon the trees, those which come to fertilize the flowers and those which are the enemies of the trees.

A grave mistake is often made in neglecting to interest young persons in local societies and museums by giving them places of

responsibility. As we grow older we are too apt to feel that we alone know best how to conduct the affairs of the society or institution and are loth to give up our hold to others. But even if occasional mistakes are made it is better to let new hands and fresh minds come to the front and before it is too late to engraft the spirit of the founders on the rising generation of workers.—Through the neglect of this important duty many excellent beginnings have later languished and promising local collections have gone to decay or been dispersed.

#### A NEW ANTENNARIA FROM EASTERN QUEBEC.

M. L. FERNALD.

The common *Antennaria* of open calcareous soils in the counties of Bonaventure and Gaspé in eastern Quebec is a plant with the silvery-white foliage forming close mats which are extremely dense—much denser than in any of the described species of eastern Canada and New England. The spatulate leaves are very tiny for an *Antennaria*, when fully developed ranging in length from 8 to 18 mm. and in breadth from 2.5 to 4.5 mm.

In size, outline and color as well as in the dense matting of the foliage, and in the very short stolons, the plant immediately suggests *Antennaria microphylla* Rydberg, and its allies of the Rocky Mountains. Its involucre and pappus, however, are like those of *A. neodioica* Greene. In fact, although the plant as it occurs on the red calcareous-conglomerate rocks about Percé would not suggest to the botanist from farther west the common *A. neodioica* with leaves ranging from 1 to 4.5 cm. in length and from 5 to 18 mm. in breadth, material from the head of the Baie des Chaleurs and from Bic on the St. Lawrence shows it to pass gradually to the ordinary *A. neodioica* with larger more broadly spatulate-obovate less whitened leaves. On this account the Gaspé plant seems best treated as a variety, and it is here proposed as

ANTENNARIA NEODIOICA Greene, var. GASPENSIS, var. nov. Sarmentis dense caespitosis brevibus valde foliosis; foliis inferioribus supra albicantibus vel argenteis spatulatis 8-18 mm. longis 2.5-4.5 mm. laeis apice rotundatis vel subacutis apiculatis, foliis cau-

linis linearilanceolatis remotis arachnoideis; caulibus floriferis tenuibus 1-2.5 dm. altis; corymbis densis, capitulis fœmineis 2-6.

Densely cæspitose, the stolons very short and leafy: basal leaves whitish or silvery, spatulate, 8-18 mm. long, 2.5-4.5 mm. broad, rounded or subacute at tip, apiculate; cauline linear-lanceolate, scattered, arachnoid: flowering stems slender, 1-2.5 dm. high: corymb rather dense, of 2 to 6 short-pedicelled heads: involucre and pappus of the pistillate heads as in the species: staminate plant unknown.—QUEBEC, shingle and dry gravel of calcareous-conglomerate, open slopes and summit of Mt. Ste. Anne, Percé, TYPE coll. July 24, 1905 (*Collins and Fernald*, no 142, *E. F. Williams*) also August 18, 1904 (*Collins, Fernald and Pease*); dry gravelly woods, banks of Grand River, June 30-July 3, 1904 (*Fernald*); dry gravelly beach, Tracadigash Point, Carleton, July 20, 1905 (*E. F. Williams*). Various specimens from Carleton, Nouvelle, River Ste. Anne des Monts, Bic, etc. show transitions in the foliage to typical *A. neodioica*.

Gray Herbarium, Harvard University.

#### SUB-EXCURSION TO ROCKCLIFFE.

The exquisite weather on October 7th, induced nearly 100 lovers of out-of-doors to participate in the Club's sub-excursion to Rockcliffe. The President and several of the leaders were on hand and punctually at the time appointed the party started off, keenly alert to make the most of this favorable opportunity. A welcome guest at this excursion was Mr. T. D. Jarvis, of the Wellington Field Naturalists' Club, an active Society founded on the same lines as our own Club, and one which is doing good work. The botanists, as usual, were largely in the majority, but Mr. Gibson and Mr. Halkett had several interesting followers, who found many insects to study. After a most enjoyable tramp through the woods the party re-assembled at the north end of Mackay's Lake, and several very interesting addresses were delivered by the Leaders. The President first called on Mr. Halkett, who from his different pockets brought forth a motley collection of insects, snails, frogs and snakes, all of which he handled lovingly while he pointed out their beauties. Mr. Halkett's enthusiaam makes him always a favourite among those who attend the excursions.

Mr. W. T. Macoun said that the study of trees was one of the most important lines of work that the students, especially, could be engaged in. The value of Canadian forests was being more and more recognized every year and, as Forestry was bound to interest an increasing number of persons every year, it was important that the students who would some day be teachers should

know as much about the native trees as possible. Specimens were named by Mr. Macoun and the difference between the various species pointed out. Mr. Jarvis, of Guelph, followed and compared the trees of the Ottawa district with those of Western Ontario, he also conducted an impromptu class for a few minutes and by questions and answers brought out much useful information about the trees observed during the afternoon. Rev. G. Eitrig said that few birds had been observed. He described the habits and notes of the Chickadee, Nuthatches and Creepers, and told the excursionists some interesting things about the migration of birds. Miss McKay Scott spoke appreciatively of the delights to be found in the woods at this time of the year.

Dr. J. F. Whiteaves was present and gave much information to those wishing to learn about the rocks and the fossils contained in them. The President, Dr. Sinclair, in closing the meeting congratulated all present on the enjoyable outing and hoped that they all might have many more together.

W. T. M.

#### SUB-EXCURSION TO BEAVER MEADOW.

Saturday afternoon, 14th October, proved a most delightful day for a jaunt in the autumn woods, and about 60 members of the Club took advantage of the favourable opportunity for examining the rocky ledges along the Beaver Meadow at Hull. President Sinclair drew attention to some of the more interesting localities, and the party then broke up into bands and sallied out under the various leaders. Mr. W. T. Macoun and Dr. Fletcher had a numerous following of those interested in plants, and several enthusiasts led by Dr. Ami pushed forward up the valley to Fairy Lake, where they had a pleasant afternoon, examining the fossils in the Coral Reef. Mr. Halkett delighted his party by drawing forth many objects of interest—snakes, frogs, spiders and insects—from beneath stones and logs. When the party re-assembled before leaving for home, Mr. Halkett also gave much valuable and entertaining information concerning the habits of the different specimens secured. Dr. Fletcher spoke briefly of some of the more striking plants, showing what a surprising number of objects worth studying could be found even at this late date in the season. The trend of his remarks was that all things in a state of nature were beautiful and exceedingly instructive. If at first we could not see the beauty, we must look further for it, feeling confident that it was there, and we should surely find it and get much health-giving pleasure in the quest. He spoke of some of the trees growing around the meeting place and pointed out their characteristics. President Sinclair was congratulated on his thoughtful management, by which this and all other excursions of the year had been made so successful.

J. F.



## NATURE STUDY No. XXIX.

## WOOLLY-BEAR CATERpillARS.

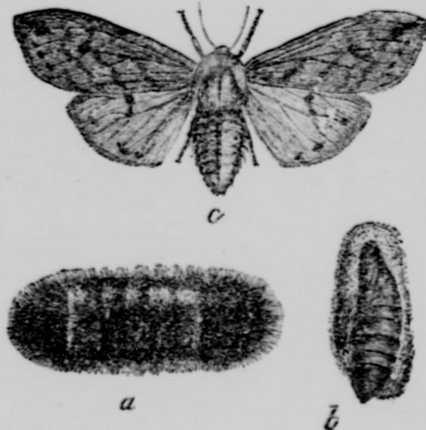
By ARTHUR GIBSON, Central Experimental Farm, Ottawa.

Teachers engaged in Nature Study are often at a loss to decide what forms of life around them will serve best to attract and hold the attention of their pupils.

On account of their abundance, and the ease with which they can be collected, insects are every day being more and more used as Nature Study object lessons. This article is presented simply to draw the attention of teachers engaged in Nature Study work to a certain group of insects, the Woolly-bears, three kinds of which are to be found commonly almost everywhere in Canada. When specimens have been collected, the teacher should present them to the class in such a way as to arouse the interest of the pupils, and thus develop independent thought and investigation. The little that the child sees and thinks out for itself, is of far more educative value than the great deal that the teacher gives out in the course of one or even many lessons.

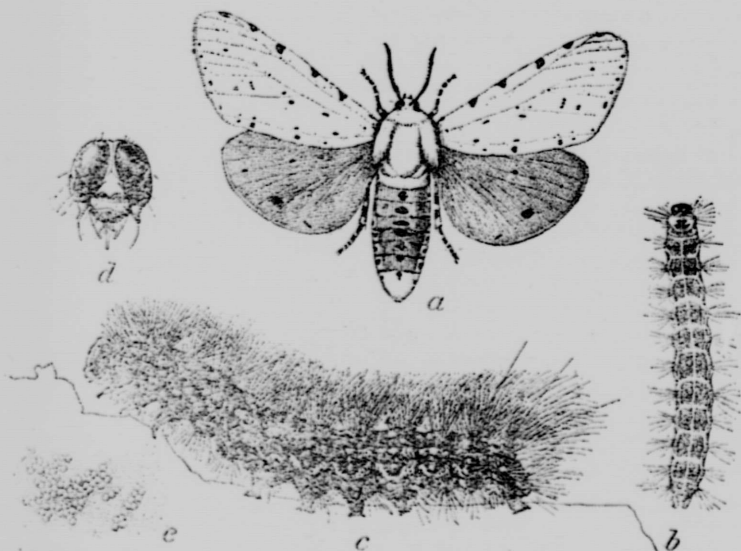
"Woolly-bears" is the popular name given to the hairy caterpillars of the moths known as Arctians. All of these caterpillars are clothed with dense clusters of hairs, which as a rule are conspicuously coloured. In some kinds these hairs are stiff and even, while in others they are slender and of varying lengths. Most arctian caterpillars are general feeders, living upon the foliage of almost any herbaceous plant; but a few kinds occasionally feed on the leaves of shrubs and trees. The moths are fairly large and, on account of their beauty, are favourites with collectors.

**THE HEDGEHOG CATERPILLAR.**—In the fall of the year, or in early spring, everyone must have seen the caterpillars of the Isabella Tiger moth, *Isia isabella*, S. & A. This Woolly-bear which is called the Hedgehog Caterpillar is particularly noticeable in autumn, hurrying along road-side paths, sidewalks, railroad tracks, etc., as if on a most pressing errand. If we watch them for a little while, we shall soon see that there is a set purpose in their actions. Evidently they are not simply wandering around in search of food, because we see them pass by



Hedgehog caterpillar, pupa in cocoon, and moth.

tempting food plants, time after time. They have something more important to do now, viz: to find a suitable place where they can lay up for the winter. At this time the Hedgehog Caterpillar is full grown, and the winter is spent snugly rolled up under a piece of plank, a flat stone, or an old log. The caterpillar, or larva, is shown in the accompanying figure. The tufts of hair at either end are jet black, those in the middle of the body bright rust red. On the arrival of spring the caterpillar comes out of hibernation and after again wandering around, it finally selects a somewhat similar place to that where it passed the winter, and spins an oblong-oval cocoon composed of coarse silk and the hairs of its own body interwoven. The moth which comes from this cocoon, is a rather sober coloured and heavy-bodied insect of a dull grayish tawny-yellow (Isabella yellow)\*, the fore wings being marked with dusky stripes and spotted with black, the hind wings spotted with black, and sometimes flushed with salmon red. There are three rows of black spots on the body, one down the centre, and one on either side.



Salt-marsh Caterpillar and moth. (Chittenden, Bull. 43 D v. of Ent., U.S. Dept. Agr.)

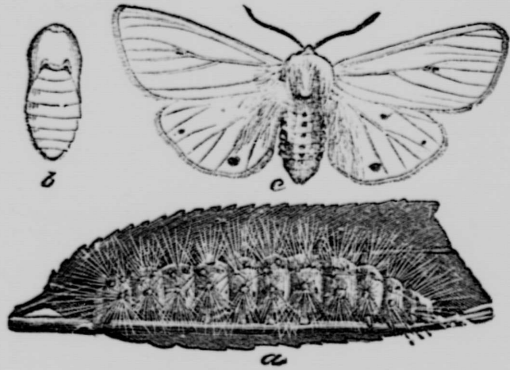
THE SALT-MARSH CATERPILLAR, *Estigmene acrea*, Dru.—Early in the past century a large hairy caterpillar appeared in destructive

\*The origin of the term "Isabella yellow" will I think interest any one who looks it up.

numbers in the salt-marshes about Boston, and was then given the above popular name. It is not, however, we now know, restricted to salt marshes, and the name is therefore misleading. This Woolly-bear, which is widely distributed throughout the United States and Canada, is noticed particularly in flower and vegetable gardens. It is a general feeder and seems to be satisfied with almost any low growing plant. When mature it measures about  $2\frac{1}{4}$  inches in length, and has a dark body with yellow markings along the sides. The hairs on the body are slender and mostly reddish or reddish-brown.

This caterpillar becomes full grown in autumn, and the winter is passed in a different state from the preceding species, viz., as a pupa, inside a cocoon. This cocoon is much the same as that of the Hedgehog Caterpillar, only a little larger; it is formed in any convenient place where shelter can be obtained. Towards the end of May, and during June, the perfect moths appear and often come to lights at night. The female moth is a beautiful insect. The wings are pure white, spotted with black, as is also the body, excepting the central abdominal segments above, which are orange. The male differs from the female in being slightly smaller and in having the two hind wings bright buff yellow. The under-side of the wings are also buff yellow. The male moth is shown in the figure.

THE YELLOW WOOLLY-BEAR, *Diacrisia virginica*, Fab.—Occurring also in gardens, feeding on many low plants, and even sometimes eating the foliage of trees, is another hairy caterpillar, called the Yellow Woolly-bear. This kind resembles very much immature specimens of the Salt-marsh Caterpillar, but differs in not being so large when full grown, the hairs being shorter, and the body not so dark. It also lacks the distinct yellow markings on the sides. Although called the Yellow Woolly-bear from the colour of the hairs of the majority of the caterpillars which were first studied,



Yellow Woolly-bear, pupa and moth.

so dark. It also lacks the distinct yellow markings on the sides. Although called the Yellow Woolly-bear from the colour of the hairs of the majority of the caterpillars which were first studied,

these hairs are not always of a yellowish tinge, as in many specimens they are of a dark rusty or reddish-brown colour, or even nearly white. The body colour also varies, and in the paler specimens a more or less broken lateral blackish stripe, as well as bands of the same colour across the back between each of the segments, may be seen. When full grown, in autumn, this Woolly-bear spins a cocoon similar to that of the Salt-marsh Caterpillar, and passes the winter as a chrysalis inside this coarse silken cover. In May and June, of the following year, the moths appear. These do not differ very much, the wings of both sexes being snowy white, marked with a few black dots. There is a row of black spots down the centre of the abdomen, and another on either side; between these there is a longitudinal orange stripe.

To rear these insects in confinement, an old tin box, if this is clean, will answer as a breeding cage; and it is no trouble at all to get food plants, as dandelion, plantain, and other weeds are common everywhere. If specimens of the Salt-marsh Caterpillar or of the Yellow Woolly-bear are collected in autumn, they should be given fresh food every day or two, and, when this is done, all the old food and any dirt which may be present, should be removed from the cage. As both of these Woolly-bears make their cocoons in the fall, some dry leaves should also be put in the cage, among which they will spin up. Two or three specimens only should be placed in each cage. In early spring the Hedghog Caterpillar may be found commonly under boards, etc., in fields or along roadsides. These do not require much attention, and soon after collection they will make their cocoons.

The three kinds of Woolly-bears, as stated above, are all exceedingly common; but, yet, how few of us know much about them? It is very often the commonest objects about which least is known.

In Nature Study work, it is well known that the presentation of some object in which life is noticeably apparent is bound to induce thoughtful consideration; therefore, some living animal, no matter how small, will prove of special value in the development of an active mind in those pupils before whom such objects are placed.

During all such observations as are above suggested the alert teacher will find many points of value in connection with the work of teaching Nature Study.

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