THE HIGH SCHOOL MUSEUM.

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Comparatively few high schools in this country have their own school museums. It is true that high schools, especially in the larger cities, have their "collections," but too often they are so poorly arranged and maintained that their purposes are defeated and they fall short of being as important factors in the school work as they can be.

In many cases the lack of a school museum is due to a belief on the part of school authorities that they involve too great an expenditure of money. They are considered to be a luxury, something of no particular use, but very nice to have. The word "museum" is often associated with the thought of expensive cases filled with rare "curiosities" from distant parts of the world. It is true such a museum would be expensive, but it is also true that it would be as worthless as expensive. If there is anything for which a museum has no use it is a mere "curiosity." The high school museum need not be expensive either as to starting or maintaining. It should contain usable and instructive specimens which are chiefly representative of things of interest in the locality and which are collected and prepared, in almost all instances, by the students themselves. A museum of this kind will prove to be a valuable adjunct to the school work.

The following diagrams show the plans for a cheap and attractive case which has been tried and found satisfactory for museum purposes. It can be constructed of hard pine at a cost of about \$35. The staining and finishing can be made to match the woodwork of the building. The doors and ends of the case are of glass. The shelves are adjustable, three or four conveniently going into one case. The upper shelf should slant downward so as to admit of better display. If the cases stand in a well lighted place, the shelves may be stained the same color as the outside of the case, but if the light is poor, the shelves and especially the back of the case should be painted white. The base of the case may be furnished with drawers or shelves, the latter being much cheaper. All the doors should be provided with locks. This case has an advantage over the show-case style in that it has no horizontal glass surfaces which are liable to be broken by leaning upon them.

Museum cases should be placed in the school halls, where the specimens are constantly seen by the students as they pass back and forth. In the halls the specimens will be examined much more often than if they are placed off in some basement or garret or room that is used for class work part of the time. It is highly important that the cases be in as conspicuous and accessible place as possible.

As previously mentioned, the material composing a high school museum can be and preferably should be from the locality in which the school is situated. The specimens should illustrate the geology, botany and zoölogy of the region. Science teachers will find more interest taken in field trips, as well as more profit derived therefrom, if collecting for the school museum is a part of that work.

Many high schools have a number of museum specimens, but they are often stored in boxes or closed, wooden-front cases where they are seldom seen, in many instances even by the teacher. Valuable specimens are often scattered about the rooms, piled in

the corners, in windows, on and under tables. Students should not be expected to look at such material. Museum specimens of this kind would have their value to the students increased ten-fold if they were arranged in glass cases, labeled, and placed in a conspicuous place. The formality in itself would command attention and stimulate an interest.

An equipment of museum cases and specimens is of course prerequisite to a good museum, but the value of a museum to a school depends, for the most part, upon the manner in which the specimens are displayed and the use made of them for instruction. The proper grouping of specimens is very essential. A Pleistocene skull should not be exhibited alongside of a blue-bird's nest. A museum is not a miscellaneous lot of objects brought together with no purpose; it should consist of carefully chosen specimens which are arranged for some purpose. Museum specimens should not be merely to look at but should be illustrations of facts or exponents of ideas. Each case or portion of case should be confined to the illustration of some one fact or one group of related facts.

Labels should be attached to everything. They should be clear and distinct, and should convey as much information as possible in an accurate, concise, and readable form. They should be written with typewriter (record ribbon) or with waterproof India ink.

The writer has found the "Riker Specimen Mounts" exceedingly valuable for the preparation and display of specimens in an attractive and instructive form. These mounts may be obtained from the American Entomological Co., 1040 DeKalb Ave., Brooklyn, N. Y., from Kny-Scheerer Co., Nos. 225-233 Fourth Ave., New York City, and probably from other laboratory supply houses. The mounts are provided with a glass cover; the specimens are arranged on a cotton background and held in place by pressure of the glass front. They are made in various sizes, but those of the dimensions $6\frac{1}{2} \times 8\frac{1}{2}$ inches, 8×12 inches, and 12×16 inches are found to be the most useful. Their cost is reasonable. Although primarily intended for entomological collections, they are adaptable to a great variety of things, such as plants and plant parts, shells, bird's eggs, and geological specimens. They are particularly useful in that they admit of the grouping, under glass cover in one frame, of specimens that are to be related in the mind of the student. It is a decided advantage from an edu-

cational standpoint to have the student see things in relation and comparison to each other.

In order to illustrate specifically some of the uses that can be made of the Riker mounts and at the same time give some idea of what can be done to start a museum with material from the immediate neighborhood to draw upon, an example will be discussed somewhat in detail. Suppose the subject to be "Leaf Venation." The student could be asked to collect, as a part of his botany work, a set of leaves showing various types of venation and to arrange them tastefully in a Riker mount. At the top of the mount would be the subject "Leaf Venation"; each leaf would be neatly labeled, telling the kind of venation and the name of the tree from which it came. The name of the student who made the collection, arranged and labeled it, should be attached to the mount. Such work by the students does not fail to arouse interest and lead them to a better understanding of their subject. In addition to their museum purposes, the mounts can be used year after year in the class work. They are in a convenient and instructive form and can be handed around a class without danger of destroying the specimens.

There is almost an unlimited number of things that can be arranged in the above manner, and by assigning to each student a different subject, a respectable and valuable museum will soon be had. The following is a list of only a few suggestive possibilities, suitable for display in Riker mounts: various leaf shapes, plant organs, compound leaves, types of leaf surfaces, twigs and bud arrangement, seedlings, parasitic plants, fruits showing adaptation to dispersal, characteristic Alpine plants, shade plants, plants from rocky soil, types of flowers, autumn coloration in leaves, snails, insects showing mimicry, butterflies, life histories, fossils from certain horizons. Other things will be placed side by side in one mount for purposes of comparison. A few suggestions in this line are: leaves from same plant showing variation, sun and shade leaves of the same species, air and water leaves from same plant, simple and compound leaves, staminate and pistillate catkins. Immediately there occur to the reader many more subjects which would admit of the same treatment. Individual and smaller mounts will hold shells, fossils, birds' eggs, etc.

All of the above mentioned specimens can be exhibited in ways other than in Riker mounts, but not so attractively and in such a

permanent form, admitting of such admirable grouping and arranging of objects.

The local geology offers a rich supply of valuable museum material. Different kinds of wood, cut in longitudinal, tangential and radial sections, could be shown; to these might be added commercial specimens from the lumber yard. It would cost very little to arrange exhibits of cereals, nuts, spices and condiments, quarry products, different kinds of bark, commercial starches, weed seeds, oil seeds, varieties of petroleum, by-products of petroleum, varieties of fibers, different kinds of leather, and some of the more common medicinal plants. There can be collections of birds' nests, of reptiles and fishes, to be preserved in museum jars. Some students will take an interest in mounting the skeletons of the common small animals. It is not unusual to find some high school student who is able to do the simpler kinds of taxidermic work. The museum will afford an incentive to the students to take up such work. Recently acquired pieces of physical apparatus, either from the dealer or made by the students, and the more interesting chemicals can be placed in the cases for a short time. Labels should accompany them, indicating their uses.

It is a good plan to change the specimens in the cases quite often. Students tire of seeing the same objects day after day, and hence soon become disinterested in the museum work as a whole. But if new specimens are placed on exhibition at frequent intervals the students' interests in the work are kept alive. Furthermore, the enthusiasm for and success of the work will largely depend upon the part the students themselves play in the building up of the museum. There is no end to the number of valuable things of interest the students will bring in, when they know there is a proper and definite place for them, and when they realize that the specimens go to the upbuilding of a school interest and are really made use of by the school. When the museum has become well established due to the work of teachers and students, the patrons and townspeople will be found to take an interest and make worthy donations.

The museum has been discussed with the high school particularly in mind, but the suggestions, with some modifications, are applicable to the grade schools as well. Every grade school, as well as high school, should have its museum, a few cases where the collections made by the students may be kept in a permanent and instructive form.