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THE HERBARIUM INTRODUCED

EVEN *Arnoldia* readers must realize that many people have never heard the word "herbarium," that fewer still know its meaning, and that even fewer have ever been inside a herbarium building. In fact, an astonishing number of well-meaning but misguided garden lovers harken back to high school Latin and imagine "herbarium" to be another word for a place to pick rosemary, mint leaves or medicinal herbs. A quick look at Webster's dictionary must give them embarrassing second thoughts, and set them to wondering about "a collection of dried plants, usually mounted and classified." Beyond this, of course, is the important fact that the herbarium is a key reference tool of the botanist and plant grower.

Since the beginning of recorded time, and probably long before that, men have been preoccupied with arranging their knowledge of natural phenomena in a systematic order. This constant effort for order goes beyond men's innate appreciation of things rational; more pragmatic is the realization that nature is rendered more useful through scientific study, comprehension and classification. More known quantities can be made more readily available to more people for more purposes. Any discussion of flora—be it professional or amateur—necessarily involves the scientifically given names of plants; and it follows logically that the herbarium is thus essential to all aspects of plant study, whether it is care, growing, propagation, ecology, geographical distribution, or whatever. For, after all, one must know what the plant is!

The herbarium of the Arnold Arboretum is divided into two sections: the cultivated material, numbering more than 100,000 specimens, is located in Jamaica Plain for immediate accessibility to the collections of living material in the Arboretum itself. This horticultural division contains voucher specimens not only of the plants cultivated in the Arboretum but also of plants grown in arboreta, botanical gardens, city parks and back yards in the United States and throughout the world. The non-cultivated, or wild material, numbering 700,000 specimens

or more, is housed in the Harvard University Herbarium Building in Cambridge, combined with the herbaceous collections of the Gray Herbarium, in easy reach of Harvard's botany students and botanically interested faculty members whose studies are more apt to deal with wild plants than with cultivated. Although this separation is made for the sake of convenience, the two sections are frequently used together, as when comparing a cultivated species with its wild progenitors, or in gathering complete information about a plant.

When it is collected, the plant specimen is dried in a press. This ensures that it is flattened and so occupies less space in subsequent storage, and that the leaves, in particular, neither curl up nor wrinkle but retain their original outline and almost their natural size. When dried, these specimens are mounted by fastening them with a special plastic glue on heavy stock herbarium paper; an accompanying label is also attached on the sheet. This label should give all the pertinent data observed by the collector: date of collection, location, habit, appearance of the inflorescence and/or fruit if present, fragrance, etc., and, in the case of cultivated material, the source of the plant. The amount and value of this information depends, of course, on the plant itself as well as on the experience and abilities of the collector, and the number of observations he has been able to make of the plant. The identity of the specimen is then checked and, if it came from the Arboretum, this also constitutes a check on the identity of the living plant on the grounds, a matter which is particularly important in the case of new accessions. Where necessary the mounted specimen is annotated with its identity and then filed in its proper nook in the herbarium cases—determined at the Arnold Arboretum by its family, genus, species, and finally geographic origin. Once in the case, this named specimen is available to other experts who may be able to add data to that already given, or to interested people who may want to identify or inform themselves about a particular plant or group of plants. Furthermore, as long as the specimen is kept dry and free from injurious insects (the kind that eat stored food and other products), it will last for centuries, as have thousands of specimens already in the older herbaria.

If, while visiting a garden, you were to admire an unfamiliar plant and consider adding it to your own garden, you would, naturally, want to know something more about it. Since gardening books, even at their best, are, needfully, selected lists with selected information, it would be well worth the trouble to gather a small specimen of leaves, flowers and/or fruit, and have the identification checked in a herbarium, for the scientific name of the plant is most important. A rose by any other name is likely to smell quite different! but proper scientific identification gives confidence of acquiring an identical plant from a nursery.

A horticulturally or botanically informed person is usually able to place a plant in its proper family almost immediately; he may also know the generic identity offhand, but unless the plant is commonly well known or belongs to a genus of which he has made thorough study, further refinement of the name must usually

be completed through a check of herbarium specimens, for no matter how completely a plant is described or illustrated there is no substitute for an actual specimen.

Where garden plants are involved, it may be difficult to supply precise nomenclature due to the large number of hybrids and cultivars that are developed by amateur or professional breeders who sometimes fail to register new cultivar names—or who are ignorant of those already registered, and duplicate them—thus ensuring a certain amount of confusion. The lilac collection of the Arnold Arboretum is elaborate testimony to the range of variation which can be developed from a single species (in this case, *Syringa vulgaris*, from which over 300 different cultivars have been derived), and were these names not registered, voucher specimens of many conserved in the herbarium, for example, and Kodachrome slides available to show color, lilac lovers would have far more difficulty than they do now in obtaining desired lilac plants for their gardens.

If the expert is able to match your specimen against one in the herbarium, which is already accurately named, he can then refer to the library where a monographer may already have saved him the effort of shuffling through more sheets and making detailed, time-consuming observations; and, with luck, one of the horticultural books will list your plant and offer experienced advice on raising it. Besides the pleasure of learning about the plant, you will be able to ask a nurseryman for it by its proper name instead of trying the 'well-it-had-pretty-little-yellow-flowers' technique.

At the Arboretum, herbarium specimens are made from the plantings on the grounds both at Jamaica Plain and Weston. It is the aim that the new accessions be gathered as soon as they are ample enough to yield adequate specimens, and the staff makes collections at all significant stages of development; especially foliage, flowers and fruit; notes and photographs are also taken to record color and form. In the case of hybrids or cultivars raised at the Arboretum, specimens of the original parents are made, if possible, with a view to providing complete records to aid propagators, nurserymen and taxonomists. In addition, duplicate material is gathered and sent on an exchange basis to other institutions for their herbaria.

This exchange is important too, for by its means material which has passed through the hands of experts in particular groups and who may be working at an arboretum or botanic garden in another country, are added to the herbarium with the experts' opinions and annotations attached. Or sets of material of a particular genus may be received from a garden which grows an especially complete, authoritative and specialized collection of those plants. Occasionally, too, a difference in usage of a botanical name from one country to another comes to light. This difference can then be investigated and corrected, for, after all, Latin is used for scientific names so that they can be truly international in character. To this same end, the naming of plants is carefully governed by the International Code of

Botanical Nomenclature and its counterpart for cultivated plants which are fully international, even in these days of international hostility and competition.

The use of the herbarium in ascertaining the identity of a plant for horticultural purposes, or to satisfy curiosity, is familiar to many home gardeners (although, judging from some of the leaf fragments we occasionally find enclosed in letters, there are numerous people who expect the botanist or horticulturist to name a plant off the top of his head even when given unsubstantial material). Behind the scenes, however, the taxonomists are working with anatomists, cytologists, ecologists, paleobotanists, nurserymen, propagators, as well as with scientists in other fields. Drug companies extracting chemicals from plants want to know the name of a certain specimen and where it grows; hospitals and mothers call describing a berry eaten by a small child, and asking if it is toxic; the Federal Government's Atomic Energy Commission is conducting experiments testing the reaction of different plants to radiation; Dr. Richard A. Howard, Director of the Arboretum, has developed and cooperated in "survival" programs aimed at keeping soldiers alive in uncivilized areas by teaching them to live off the local vegetation—and not eat the poisonous plants in error; city planners need street trees that will thrive within specified limits; entomologists seek the identification of plants visited by particular insect species. For these problems, and many more, the internationally accepted nomenclature of a plant is a necessary ingredient of the study.

The herbarium, obscured by the showy display of the ground plantings, the greenhouse area, and the bonsai, plays an important, if undercover, role in scientific and horticultural routine of the Arnold Arboretum although it is usually the least appreciated unit. But if botanical and horticultural study is to progress, it must do so with the aid of a well-organized herbarium. To this end, the Arboretum is making a concentrated effort to increase the scope and number of its collections, soliciting cultivated material from all parts of the world, and adding material from its own new accessions.

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See also: Kobuski, Clarence E., "The Horticultural Herbarium," *Arnoldia*, 18: 25-18, June, 1958.