NOTES FROM THE BEBB HERBARIUM[1]

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In the spring of 1942 one of our students, Edward E. Dale, Jr., reported that flowering dogwood (*Cornus florida* L.) occurs in an interesting locality about five miles east of Ardmore in Carter County, known as Sand Canyon. He brought several beautiful specimens as proof, and these were immediately inserted in the Bebb Herbarium. Although it was thought at the time that this was the westernmost station for the plant and probably represented a slight range extension not previously known, it was found when checking the complete range of the plant, that Stevens (1916) had collected specimens as early as 1913 from "Woods, near Ardmore, Carter County." Shirley (1937) also recorded the species from that county. Van Dersal (1938) cited it too, although his range for the plant was given only by map and no printed statement regarding distribution was included; but there seems to be no question that the area on his map included Carter County. Phillips, Gibbs, and Mattoon (1939) merely reported its occurrence "in the eastern half of the state", and made no more exact statement regarding it.

The matter was further checked with one of our graduate students, Miss Mildred Griffith, who teaches in the Ardmore High School. Miss Griffith, an able student of the local flora, is probably more familiar with the plants of Carter County than anyone else. She has told the writer that the plant is abundant in Sand Canyon, and that she is unable to remember when she has not known of its growing there in profusion. She has also reported that there are several other localities in the county where the dogwood occurs. The station was personally visited in the fall of 1942 and Miss Griffith's statement was found to be perfectly accurate. The

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trees were numerous and all of good size, being fifteen or more feet in height. At the time, they were fruiting heavily. A large number of specimens, both in flower and fruit, have been deposited in the Herbarium.

But the story is not complete. The next spring (1943), another student, Leonard McLennan, brought in a beautiful specimen in full flower from Murray County. This is, to the best of the writer's knowledge, the first collection there and definitely extends the known range of the plant into the Arbuckle Mountains. He said he found several trees in a rocky thicket but was unable to say whether the environment was limestone, granite, or sandstone. The writer has never personally been fortunate enough to find the plant in the Arbuckles nor to his knowledge has any other botanist collected it there, but this, of course, does not mean that it does not occur there. In the other parts of the state where it has been found, it grows in soils derived from granite, limestone, and sandstone. Apparently it is tolerant to many types of soil.

There are specimens in the Bebb Herbarium and in the Herbarium of Oklahoma A. & M. College from all of the counties east of the 96th meridian except Nowata, Craig, and Rogers, but west of it representatives are known only from Carter, Murray, and Pottawatomie Counties. However, Stemen and Myers (1937) recorded it in Creek, Hughes, and Johnson Counties, but no record of its occurrence in Coal, Pontotoc, Seminole, or Okfuskee Counties seems extant. It is to be expected from these three and from all of the counties in the extreme northeast region of the State. Cory (1937) included it in the Timber Belt, Coastal Prairies, and Blackland Prairies of Texas.

As Sand Canyon is not in the Arbuckles proper, the Stevens specimen, although unquestionably representing the plant at the westernmost limit of its range, can hardly be used as proof of its presence in the mountains. The McLennan specimen definitely can be so used and thus adds a new plant to the constantly increasing list of interesting and unusual plants found there.

Now that *Cornus florida* has been definitely placed in the Arbuckles, with a continuous distribution from the extreme eastern part of the State as far west as Murray County, the question arises whether the occurrence of several other characteristic Appalachian plants such as *Rhamnus carolinianus, Arisaema triphyllum, Arabis missouriensis* and others which also occur in the Arbuckles can be accounted for by the same methods of migration as the dogwood. Both *Cornus* and *Rhamnus* are unquestionably dispersed by birds; their fruits are thoroughly edible and attractive. *Arisaema* also has brilliantly colored fruits and is indubitably dispersed by the same agent. *Arabis*, with its dry seeds securely held in the siliques, is probably not dispersed by any animal, but rather by wind.

The more often significant facts are found regarding plant distribution, the more essential it is that explanations for these distributions be made. But a great deal of study centering on plant migration is still necessary, particularly in regard to our local Oklahoma plants.

Too often phytogeographers map ranges of distribution and then worry about explaining these distributions after the maps are made. Many of them fail to comprehend the difference between geographical distribution and ecological distribution. The phytogeographer will tell one that dogwood may be found anywhere east of the 96th meridian, but the ecologist knows only too well the fallacy of this statement. It is quite true that dogwood will grow in any region east of the 96th meridian but only if the environmental factors are suitable. There is a distinct difference between these two types of distribution.

The old method of going through herbarium specimens and placing a dot on a map in each county where one species is found actually gives

only part of the story regarding its complete distribution, and leads to many unfortunate and fallacious conclusions.

This brings up the question of proper labelling of specimens. In most instances data found on herbarium labels are grossly inadequate. Merely giving the township or county, as did McLennan for the dogwood, is not sufficient; nor is a habitat like the one to which Stevens referred above—"Woods"—adequate. Actually this decription tells practically nothing. What kind of woods—virgin or secondary, coniferous or deciduous, scrub or tall forest?—*exact* data are essential. To the writer it seems imperative that accuracy and completeness, to say nothing of comprehensiveness, are vitally important in describing habitats. He knows of many systematists who give no more details than merely "woods", or "prairies", or "flood plains."

The following suggestions are by no means either new or highly original. They are well known to many phytogeographers, but are offered here as aids to young collectors whose part in increasing our knowledge of the flora of Oklahoma will become much more significant in the future years.

An adequate label should include as much information regarding the environment as can be given. Some of the more outstanding data which appear to be essential are listed as follows:

1) Adequate description of the soil when it is possible to obtain this. Soil maps should be consulted where these are available, but care is often necessary in interpreting them for, though they may be as accurate as scientific work can make them, they are not always infallible. Individual soil samples taken from the station and analyzed in the laboratory are also helpful. For example, the term "halophyte" is often incorrectly used to indicate soil relationships. Johnston (1941) says that it is frequently used to refer to plants growing on gypsum soils, with unfortunate deductions on the part of investigators studying the specimens years after they have been inserted in the herbarium. He goes on to state: "If the conventional definition of halophyte, 'a plant growing on soils impregnated with salt or alkali', can be stretched to include gypsophiles (plants of calcium sulphate), I do not see why the term cannot be made entirely meaningless by including the plants of calcium carbonate, the calciophiles, as well." The point is that only by having *labels which describe the soil type in adequate terms*, can the necessary information which both the ecologist and phytogeographer seek, be obtained.

2) If a geological map is obtainable it should also be consulted and the name of the particular formation at which the collection was made should appear on the label. This is highly significant inasmuch as plant distribution is often closely related to rock types, especially in areas like the Arbuckle Mountains, which exhibit many different and complex geological formations.

3) Moisture relations should be adequately mentioned. This is very important and unfortunately nearly *always* omitted even by otherwise competent collectors. In Oklahoma, seasonal change is rapid and a habitat which in spring might be described as a "wet, swaley sedge-meadow" could easily become a "dry open pasture" by fall. Erroneous conclusions would obviously be drawn by a taxonomist who read the latter description, especially if the specimen were deposited in a distant herbarium where the staff was unfamiliar with climatic changes in Oklahoma.

4) A brief but complete summary of the community is also valuable. At least a list of the dominants, co-dominants, or subdominants should be included. Such information is invaluable to the ecologist.

5) Where the specimen is too large to be mounted on a standard 11½ x 16½ mounting sheet, its total size should be listed. This is especially important in the case of trees and shrubs. In many instances specimens are totally without value because these details are lacking. In this connection it is often helpful to photograph the specimen from which the collection was made and to mount a print on the sheet with the specimen. Many of our leading herbaria have already adopted this procedure, thereby enhancing the utility of their collections.

Of course it is obvious that the inclusion of these facts will in most instances involve the use of a much larger label than is normally available. But in order to obtain a habitat picture which gives a complete summary of the ecological conditions under which the plant occurs, it is well worth the small additional cost and effort to procure labels of adequate size to list these conditions.

Even with those additional facts, many of the historical specimens so valuable in herbaria and too often without even meagre information on their labels, will be found to be inadequate. But if new collections from approximately the same historical localities are made (and it is hoped profoundly that they will be made) these new specimens will give increased value to the herbarium as a whole. And in the final analysis, is not an herbarium valuable, not only for its type-specimens or historically interesting collections, but even more for the factual information it contains regarding the environment in which its treasured specimens grew?

Experimental taxonomy requires an abundance of herbarium material necessary for the study of mass collections. One label for each complete mass collection would suffice, but it is essential that such a label be detailed and specific. It should be prepared as outlined above. That mass collections have no place in the average herbarium is a grave fallacy in the opinion of the writer. And as he sees the situation, not until herbarium curators realize the value of complete data, mass collections, and really good specimens (not mere fragments), will their institutions again play a part in the progressive development of taxonomy as an important adjunct to botanical science.

Until more accurate field observations are made regarding the methods of plant distribution and migration and until more complete field data are recorded, taxonomy in general and phytogeography in particular will never achieve the dynamic optimism which they should rightfully possess.

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