

BIODIVERSITY IN INDIA, 1993

F. R. FOSBERG

Botany Department, Smithsonian Institution, Washington

The role of herbaria, provides an opportunity to print out and emphasize in accumulating, preserving and storing of primary information on the botanical aspects of biodiversity.

An enormous amount has been and is currently being written on diversity and its global importance, with which one can only agree and approve. This emphasis is what we have been working toward through many years of conservation efforts.

However, it might be realized that this information is practically all what must be called "secondary information" in other words, what people have said about biodiversity. This information filtered through many people's minds. Of course this may often add to, rather than lessen its value. The whole edifice of Western Civilization is preserved by the written word. Knowledge is passed on in written form from one generation to another and even across gaps in continuity.

We must, however, keep in mind that this enormous accumulation of written information, all of the books, manuscripts, microfilms, and the explosion of magnetically recorded and stored data that is now flooding the world, is still secondary. It is removed from the actual phenomena described, by having passed through usually not just one censorship, but normally a great series of such, dating back to the earliest cuneiform inscriptions on stone or clay tablets.

Here is not only faithful recording of fact, but of error, not to mention deliberate misrepresentation, but also the whole realm of fiction. The borders between fiction, error and reliable fact are frequently obscure or vague. Errors and misinformation are often innocently repeated as

fact, even concerning natural phenomena such as biodiversity.

Primary information, directly involving the actual phenomena, is much more rare, as it is harder to acquire store and transmit.

Of course, by far the best source of primary information is direct observation of nature itself. The field naturalist, if he has cultivated habits of careful and accurate observation, is potentially a superior interpreter of nature. However, two aspects of personal observation keep it from being the complete approach to such understanding of our natural world. These are the shortness of human life, limiting all appreciation of the time-dimension of nature, and the vastness of the phenomena itself.

At least a partial way around these problems is provided by the permanent, or at least long-term, preservation of documented museum specimens of samples of nature from known points in time and space. The botanical aspect of such sampling is the herbarium or collection of dried preserved samples of plants. The zoological equivalent is, of course, the museum of zoology.

The properly prepared and preserved herbarium is an ideal tool for studying the temporal and spatial distribution, as well as the morphology, of most species of plants. This method is not new. There are plant collections in Italy dating back to the mid-fifteenth century, the specimens still in condition to be studied, many of their features as clear as when the specimens are first collected and dried. Of course methods and adequacy of preservation and handling have changed and greatly advanced, and documentation, especially, is now much more effective. But

the basic nature of such collections, individuals of small plants, representative fragments of larger ones attached to standard sized sheet of heavy, preferably, permanent rag paper, with written or printed labels, has not changed substantially in almost 500 years.

Ease in handling, sorting, comparing as well as study under magnifiers and special microscopes, dissection of floral organs, association of photos and drawings, are all facilitated by the nature of such specimens. Even their chemical nature can, with proper care, be determined, recorded, and stored with such material.

This sounds simple, but does present problems. Dried plant material is susceptible to insect and fungal attack and eventual complete destruction, unless preventive measures are taken. This especially so in warm climates. Many herbaria in the tropics have disappeared because of insect damage. Protective methods such as chemical poisoning, periodic fumigation, sealed or insect-proof cabinets, heating, freezing, or quarantining are in use.

The tropical herbarium is difficult and expensive for an institution to maintain (see Fosberg

and Sachet, 1965, *Manual for Tropical Herbaria. Regnum Vegetabile* Vol. 39). Hence, there are far fewer such institution in the tropics, where most species of plants are found, than in cooler climates, where there are fewer plant species.

Outstanding among the herbaria in the tropics is the Central National Herbarium of India in the Calcutta Botanical Garden, Howrah, W. Bengal. It dates back to colonial times, contains a vast number of important historical collection, is one of the bases of the many British botanical works on Indian botany. It is a vital legacy, inherited from the British period and, fortunately, treasured and well-cared-for. No sound work on the sub-continent can afford not to use it. Others papers in the present volume will provide the statistics of size, number of specimens and the housing, as well as listing the collections represented.

Suffice it here to emphasize the role of herbaria, particularly this one, in the development of botany in all areas, and particularly in the tropics. The Botanical Survey of India is to be congratulated on its possession of this great asset, and to be encouraged to continue its growth, development and use.