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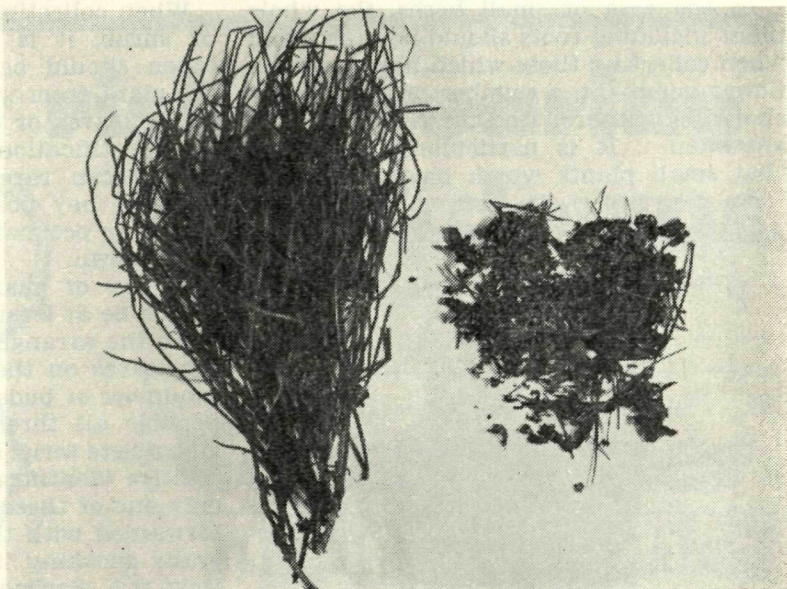
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Fig. 1.—This specimen was forwarded in a box in an unpressed condition. Drying out and rough handling resulted in the leaves and flowers becoming detached and broken



PLANT SPECIMENS FOR IDENTIFICATION

By R. D. ROYCE, B.Sc. (Agric.), Senior Botanist, and N. G. MARCHANT, Herbarium Assistant

PLANT names and the naming of plant specimens are of fundamental importance in the science of botany. In applied botany as well, proper identification is of the utmost importance. In agriculture for instance, accuracy in naming poisonous plants and weeds, as well as fodder and pasture species, can save farmers considerable sums of money, and may be responsible for avoiding heavy stock losses.

The most important requirement for the successful naming of a plant is a good specimen to work with. Too often, damaged or insufficient material is submitted to the State Herbarium and Botanical Branch of this Department, and while some of these specimens can be named with a fair degree of certainty, and others named with some doubt, the majority cannot be classified at all, until better material is made available.

Perhaps the most common cause of unidentifiable material is the practice of crushing a number of pieces of scrub into a shoe-box or paper bag and posting the package to the Department of Agriculture. The specimen invariably arrives at its destination as a collection of bare dry sticks with a mass of detached and withered leaves, flowers or fruits at the bottom of the container. (See Fig. 1.)

Other parcels are lined with damp newspaper or greaseproof paper, while stems

are frequently pushed into a piece of potato to keep them fresh. Or again a piece of scrub is crammed into a plastic bag, with or without damp cottonwool or newspaper. When such specimens are in the mail for only a short time, these methods may keep them fairly fresh, but if there is any delay in transit the plants are liable to a heavy mould development which renders them unrecognisable. (See Fig. 2). In any case, dried and pressed material is just as convenient to work with as fresh material. The collection and preparation of good specimens is neither difficult nor tedious, and may be carried out successfully by almost any member of the family.

THE SPECIMEN

When selecting material for the preparation of a botanical specimen, many factors have to be considered.

In the case of small herbs, the whole plant including roots should be taken, and when collecting those which have only one flower per plant, a number of such plants should be gathered and treated as the one specimen. It is particularly important that small plants which have the leaves

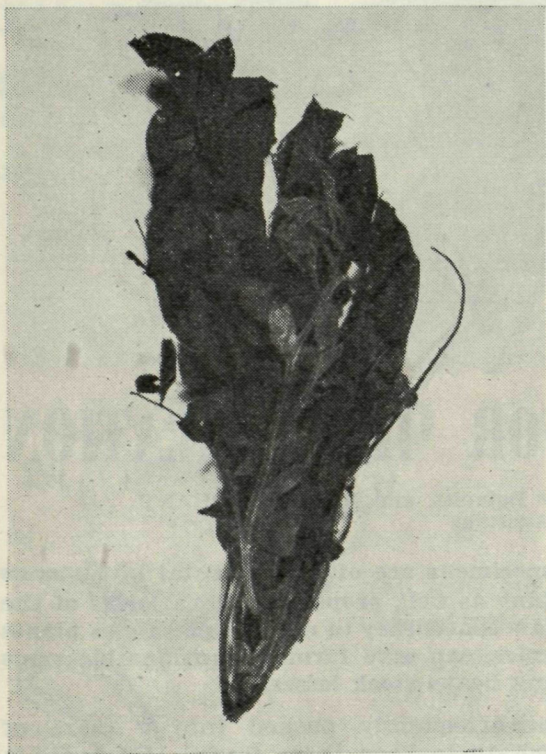


Fig. 2.—A specimen forwarded in a plastic bag. A heavy growth of mould destroyed the important structures

concentrated in basal rosettes at ground level, and with erect leafless flowering stems, should be gathered with leaves and stems intact.

Grass specimens should be collected in this manner, so that they show the base of the plant, the roots and the barren stems as well as the flowering stem. Those grasses which produce a wide spreading seed-head need to be carefully selected. Usually a young developing head can be found which is much smaller than a fully-matured one, but where no young one is available, a larger specimen can be pared down by removing a proportion of the branches in the seed head, or by taking only the top section.

When collecting a specimen from a tree or shrub, it is essential that the piece taken should be truly representative of the plant from which it came. Frequently single leaves or even leaflets are sent in for identification, but specimens of this nature can rarely be named, and then only if they possess some characteristic aroma or peculiarity of structure which is well known.

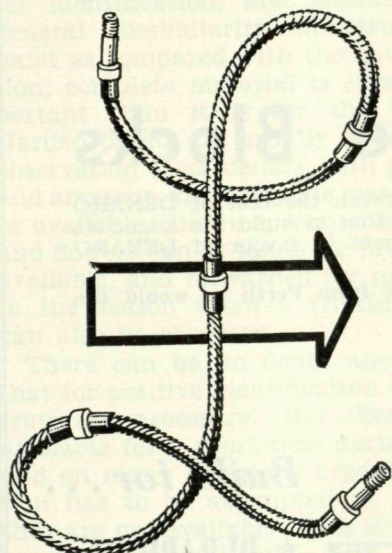
To be of maximum use a specimen should be at least 9 to 10 in. in length and show the arrangement and attachment of the leaves on the stem, and should carry a number of buds, flowers or fruits. Where possible all three should be included, as a complete series of these structures makes positive identification much easier, but if only one of these is available, it should be forwarded with the attached leaves. Generally speaking it is advisable to take at least two specimens to allow for accidents and to provide a duplicate set when forwarding for identification.

Special care is required when selecting material from species of *Eucalyptus*, the so-called gum-trees of Australia. These species cannot usually be distinguished from leaf material alone, and buds, flowers and fruit are generally essential for a completely satisfactory identification. Many groups of *Eucalyptus* have buds which are similar both in size and shape as well as in ribbing and markings, but differ completely as to fruit. Others have similar fruit, but differ in the buds. Under these circumstances complete material is very important, but is not always available on the tree.

However, much can still be done under some circumstances to provide better material. If all the buds have burst and the tree is in full flower, bud-caps (opercula) can usually be found on the ground below the tree. These, together with the flower, will give the full picture of the original bud. Similarly, if no fruit can be found on the tree, these can frequently be obtained from the ground. Where material is obtained by this method, care should be taken to ensure that no other species are growing close by. As far as possible these specimens should be gathered from isolated trees or from among a clump of trees of the one species. A specimen of bark is also useful in providing additional characters to assist in identification.

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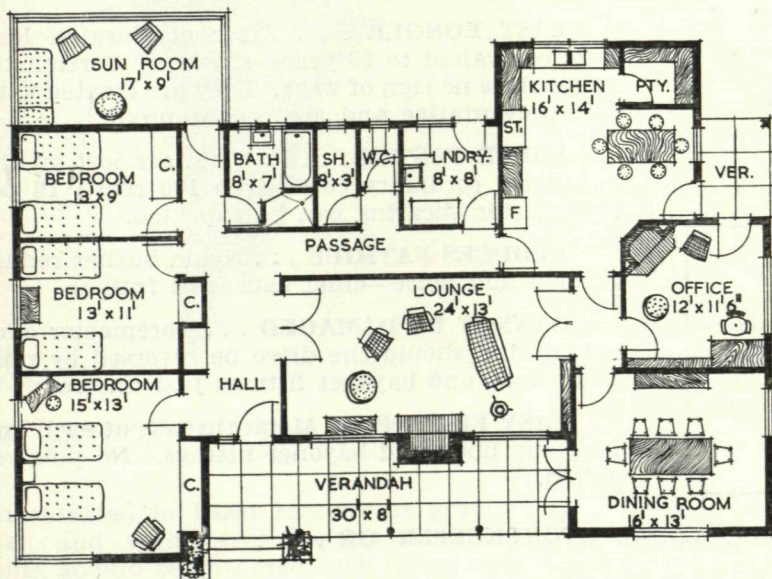
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A large number of trees and shrubs have been introduced into Western Australia from other countries and are being grown in gardens throughout the State. Specimens from these are frequently submitted for identification, and because of their general dissimilarity in structure and habit as compared with the native vegetation, complete material is even more important than it is for the local flora. Garden plants are usually under the close observation of gardeners, both professional and amateur, and complete material should be available, since a specimen bearing buds and flowers can be taken for pressing when available, and forwarded for naming later in the season when a fruiting specimen can also be obtained.

There can be no doubt about the fact that for positive identification, flowers and fruit are necessary. But these are only available for a short time during the year, and on many occasions urgent identification has to be attempted at times when they are not available. This is particularly important in connection with stock losses from poisonous plants, as these losses frequently occur in the summer and autumn when the plants are completely devoid of all traces of flowers and fruit.

Fortunately a very large proportion of the native poisonous plants can be readily recognised, even in the absence of flowers. Each has its characteristic habit, leaf shape and arrangement, as well as soil requirement, and the naming of these plants as they occur in their native habitat is comparatively simple. Insofar as a flowerless specimen reflects the character of these plants and is well prepared, it too can be readily named. Where no attempt has been made to prepare the specimen, it is quite possible that it will not be recognised when submitted for naming. When the original plant material is not complete, the specimen should be prepared with the utmost care, in order to compensate for the lack of flowers.

THE PRESS

In preparing a botanical specimen from a branchlet of a plant some means of flattening and drying it is necessary. Many elaborate and costly gadgets have been devised for pressing specimens, and each has some particular advantage under the

right circumstances. But these are not really essential.

When only one or two specimens are being prepared, no elaborate precautions are necessary. Individual plants, particu-



Fig. 3.—A well-prepared specimen of Matilija Poppy (*Romneya Coulteri*) showing opened flower, flower bud and leaf arrangement

larly herbs and other slender species, can be laid out between pages of a book, or into the fold of the daily paper. Pressure can then be applied by placing two or three books or newspapers on top. Except under exceptional circumstances this procedure would be adequate for producing a completely satisfactory specimen, as there would be a sufficient thickness of paper to absorb all the moisture and dry the plant before fungus developed.

When preparing a number of specimens at the same time, it is necessary to use a plant press, and a cheap and effective one can be made by using a pile of folded newspapers, two boards of appropriate size and a leather strap or length of rope

by means of which pressure can be applied to the bundle. (See Fig. 4.)

The most useful size of paper for the average specimen is approximately 10 inches by 12 inches, and this is obtained by folding sheets of the daily paper in halves. For small herbs, grasses and other plants without much woody tissue, only a single folded sheet is necessary. This would give four thicknesses of paper between each plant, but when the plant is woody, or has rigid leaves, or when it is succulent and contains excessive water (e.g., samphire) two or three times as many thicknesses as this are necessary. The function of the paper is not only to absorb moisture from the plant, but to transmit firm pressure so as to flatten it, and for this reason it is better to err on the side of too many thicknesses, rather than to cut them to a minimum.

PREPARATION

The actual preparation involves some patience but little real skill.

The press is set up by taking one of the boards and placing a few thicknesses of paper on it. The first specimen is then laid on the paper so that when pressed all the structures will be visible. If it is excessively leafy, some should be removed so that the flowers and fruits will not be obscured. The specimen is then covered by further thicknesses of paper and pressed flat by applying pressure with the hands. A further specimen is placed on top, arranged, and pressed flat, the amount of paper used each time being determined by the nature of the specimen. It is important that they should be placed on top of each folded paper and then covered by another folded paper, and not placed inside the fold of each sheet. If arranged in the latter manner, they could be overlooked during subsequent changes of paper, and lost.

This procedure, alternating specimens and sheets of paper, is continued until all the specimens have been placed in the pile. The second board is then placed on top of the last papers, and the leather strap or rope is passed round the whole and drawn tight. When first put in the press, the specimens should be subjected to maximum pressure by the tightening of the rope or strap as much as possible. This

is particularly important as during the first 24 hours under pressure a great deal of moisture is removed and a considerable degree of flattening is achieved.

After the plants have been in the press for one day the strap is released, the layers of wet papers are removed and the press built up again as before, using fresh papers. This time the pressure should be less than on the previous day, and should then be eased off successively with each change of paper, until when the last change is made practically no pressure need be applied. This allows a freer circulation of air to assist in the final drying out. The number of changes that will be necessary will depend on the air temperature and general weather conditions, as well as the type of specimen, but four or five changes should usually be sufficient.

By this time the plants should be quite flat and sufficiently dry to be left in the last change of paper until packed for the post. If for any reason specimens are kept for any length of time before posting, a little naphthalene or other insect repellent should be sprinkled over them. For posting, it is only necessary to have one sheet of newspaper between each specimen, though it is essential to have stiff cardboard on the top and bottom, or to have the bundle packed in a cardboard box to prevent damage in transit.

HERBARIUM PRACTICE

It is partly by means of specimens forwarded by farmers, naturalists, foresters and others interested in botany that the collection of plant material in the State Herbarium is built up. For this reason a well-prepared specimen showing all the structures necessary for identification, and being large enough to show the habit of the plant, is of special importance. It is the practice of Herbaria throughout the world to regard all plant specimens submitted for naming as being the property of the institution concerned, and plants are not returned to the collector except under exceptional circumstances.

For this reason all specimens submitted for naming should be clearly numbered for easy recognition. The easiest method of doing this is to attach a numbered piece of paper to the stem of the specimen by means of cellotape, cotton or by some

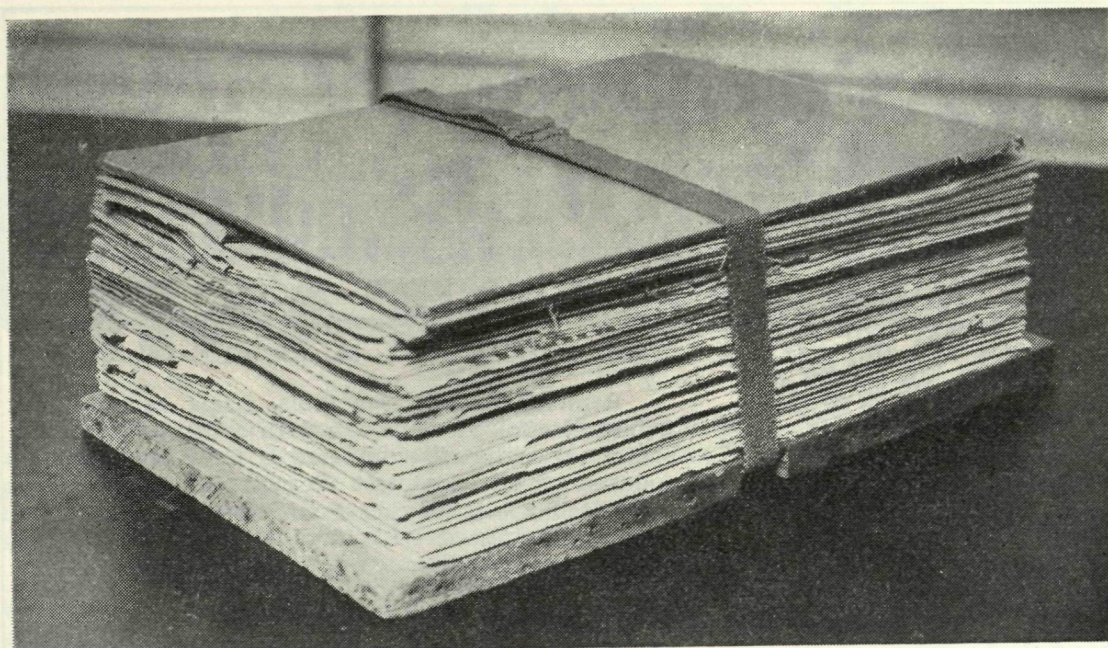


Fig. 4.—A useful type of plant press. The bottom board has a slot to take the strap. The top board is of cloth-covered plywood

similar means. Merchandise price tags can also be used, but whatever means is employed, the number should be firmly fixed onto the plant material. Two pieces of each plant should be tagged with the same number. One is then forwarded to the State Herbarium and the other is retained for reference and comparison with the list of identification when it is received.

The value of these specimens can be greatly increased if a few notes concerning each plant are forwarded with the pressed material. These notes should give details which are not readily obtained from the specimen itself. Such things as size of the plant, soil type in which it grows, associated vegetation, colour of flower, locality and date of collection are of importance, and could assist materially with the identification. Even of greater importance when submitting specimens of exotic plants for naming, are details of the country of origin, or the history of the plant, where the seed originated, and any peculiarity of the plant concerned. Under some circumstances a relatively poor specimen can be named with certainty, if full and detailed notes about the plant are available.

Lastly it is most important that the name and address of the sender should be placed inside the parcel. If these essential details are only recorded on the outer wrapping of the parcel, as it so frequently is, it is comparatively easy to lose the identity of specimens when several are delivered at the Herbarium at the one time. Perhaps the ideal arrangement is to include a covering letter in the parcel with the specimens.

SUMMARY

When submitting plant specimens for identification the following points cannot be emphasised too strongly:—

- (1) Select representative specimens.
- (2) As far as possible obtain flowers or fruits.
- (3) Press and dry the material between newspaper.
- (4) Prepare notes concerning each plant.
- (5) Number duplicate sets of specimens.
- (6) Pack tightly for protection in the post.
- (7) Forward to Government Botanist, Department of Agriculture, Jarrah Road, South Perth.

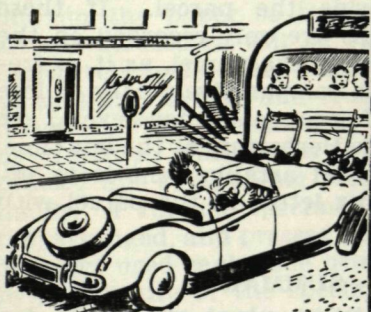
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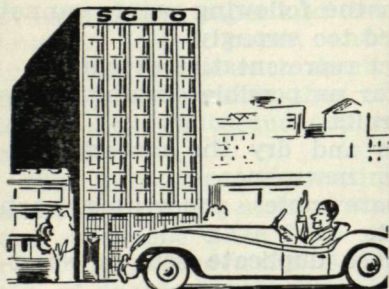
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