

Activities of a Taxonomist

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Ladies and Gentlemen:

I have been asked to write an article for this magazine, about my activities as Plant Taxonomist at the Los Angeles State and County Arboretum. In doing so, I also appreciate the opportunity to incorporate some of the problems related to my work.

The responsibilities of this office fall mainly into five categories: 1) Identification of plants growing at the Arboretum; 2) Research; 3) Identification of submitted plants and plant material; 4) Consultation; and 5) Teaching.

IDENTIFICATION OF PLANTS GROWING AT THE ARBORETUM

One of the main objectives of the Los Angeles State and County Arboretum is to introduce from all possible sources, especially from regions with similar climates, new or rare woody plants likely to succeed in the southern California area and to be of horticultural value.

There may be 250,000 species of vascular plants, not including the countless thousands of sub-species, varieties, sub-varieties, forms, sub-forms and cultivars. No botanist is capable of recognizing all 250,000. A well trained and experienced taxonomist will recognize a few thousands, probably not more than 5,000. For the rest, he depends on libraries and herbaria. He needs comparative studies to key out plants under question, comprehensive descriptions to confirm his determinations, references to the current botanical names of these plants and other names under which they may have been known.

The single work where he can find all that information does not exist and probably never will. All that information is scattered not in many, not in hundreds, but through thousands of books, magazines, and journals published in many languages over a period of many years, and not available in most institutional libraries, which also applies to our library. What makes the situation even more frustrating is that most of them are already long out of print or not reliable any more.

In dealing with limited floras or limited taxonomic groups, it is possible to become a specialist. Dealing with the plant population of the world, or should I say earth, it is completely impossible.

We are introducing plants practically from all parts of the world. Many of these are relatively well known and offer no problems. Others come from areas botanically less known and here is where the problems arise. According to my experience 5% if not 10% of the plants introduced, come to us misidentified or under names no longer valid. It is my responsibility to "discover" such misidentified plants and to correct their identification. Sometimes the results are completely surprising. Who ever suspected that the plant long known in California and sold in nurseries as *Viburnum japonicum* is not that species at all, but *Viburnum odoratissimum*, a completely different species. In many cases I still am not sure if the identifications of certain species are correct. For example, I am questioning even the identity of the name *Gardenia jasminoides*, which is applied to gardenias grown in the United States, but final determination must await more information. The material we sent to Kew, last year, for comparison with the authentic material in their herbarium has not come back yet.

We are sometimes criticized for not using the common names on our display labels, or for using only Latin names, or for changing the names of already well known plants.

The first complaint is not exactly correct. We use common names, even though it is

contrary to my personal belief, when they are known to exist in local usage. It is as meaningless, if not ridiculous, to use such names as Mgundaguluwe, Muparamhoswa, Nsiwi, or Umdhlonza on our labels as it is to use local California names such as Mickey Mouse plant, or Bird's-eye bush in Rhodesia. For your information they all apply to *Ochna serrulata*, previously known and still known in nursery trade as *Ochna multiflora*.

Latin is the only language which allows botanists and gardeners in all parts of the world to refer to specific plants without a chance of misunderstanding or ambiguity. Furthermore, there is only one valid name in Latin, while in English there may be numerous valid names. May I quote here a sentence from Alastair Simpson's article in the *Gardeners Chronicle*, 1959. Mr. Simpson visited Sochi, a Russian health resort and spa on the eastern shores of the Black Sea, and reported; "The Botanical Garden was the only place in Sochi where I did not feel at a loss, due to common language, i.e., Latin." . . . This is a perfect example of the value of Latin in plant nomenclature.

As for changing names, the international ruling is that the first-recorded name of a plant should, at all times, take precedence. This makes some changes inevitable. One of the recent name changes for example, was that of *Cydonia japonica* to *Chaenomeles speciosa*. In addition, for many years, American botanists were using two sets of rules — some followed the International Rules, while others followed the so-called American rules. This resulted and added even more confusion to the already existing problem of name standardization. The alterations in plant names by this office are made in accordance with the *International Code of Botanical Nomenclature* and the *International Code of Nomenclature for Cultivated Plants*.

RESEARCH

The existence and completeness of its living collections, library, and herbarium, general policy of the institution and available time, are all factors which determine the scope of taxonomic research at any arboretum or botanical garden.

Because of its limited budget, our library is far from being satisfactory even for routine work, and our herbarium, although rapidly growing thanks to the efforts of our curator, is still in its third year of infancy.

How time consuming is botanical research? I would like to mention here the experience of Australian botanists preparing their new Flora of Australia. They estimate that each taxonomist, working full time with adequate facilities, can deal with, on the average, not more than 80 species per year. If the flora is to be produced within about 20 years, 15 taxonomists will be the minimum number required for the vascular plants.

Considering all factors involved the only reasonable approach seems to be applied research, making a limited amount of taxonomic data available to the general public. Following this line, I prepared a manuscript, *Ornamental Shrubs of California*, which was published by the Ward Richie Press in association with the California Arboretum Foundation, Inc., in February, 1962.

The aim of this book is two-fold. First, to provide means of identification of ornamental shrubs grown in gardens, parks and nurseries of California, and second, to draw attention and stimulate research on the many taxonomic problems still outstanding. It is intended primarily for students, teachers, nurserymen, gardeners, landscape architects, home owners and amateur botanists who often find the standard manuals of plant identification too technical for easy use.

The key in this book is based on the more obvious features of shrubs, such as color of flowers, number of sepals, petals, stamens and pistils, and form and arrangement of leaves. To illustrate the use of the key, let us take the Mexican orange, *Choisya ternata* H.B.K., a rather well known shrub from Mexico with compound trifololate leaves and white flowers (if you already do not know the meaning of botanical terms, there is a glossary of botanical terms with illustrations in the book).

The key begins on page 27, where we, first time, must make one choice of two statements.

1A Leaves (or leaf-like organs) apparently absent.....	2
1B Leaves (or leaf-like organs) present.....	11
We choose 1B and go on to 11	
11A Leaves simple	12
11B Leaves compound	437
We chose 11B and go on to 437	
437A Leaves alternate	438
437B Leaves opposite or whorled.....	472
We choose 437B and go on to 472	
472A Flowers yellow	
Primrose jasmín, <i>Jasminum mesnyi</i> , p. 157	
472B Flowers not yellow.....	473
We choose 472B and go on to 473	
473A Flowers white	474
473B Flowers lilac, lavender or violet.....	477
We choose 473A and go on to 474	
474A Stamens 2	
Poet's jasmine, <i>Jasminum officinale</i> , p. 167	
474B Stamens more than 2.....	475
We choose 474B and go on to 475	
475A Stamens 4	477
465B Stamens more than 4.....	476
We choose 475B and go on to 476	
467A Stamens 5	
Blue elder, <i>Sambucus caerulea</i> , p. 182	
476B Stamens 10	
Mexican orange, <i>Choisya ternata</i> , p. 113	

Here, at 476B, we recognize our plant. On page 113 we find a description of the Mexican Orange.

The botanical descriptions in the second part of the book have been prepared from living material growing in the Los Angeles State and County Arboretum and in other localities in California, after comparison with published descriptions in monographs, special papers, technical journals and floras. They are uniform, and in my opinion easy to compare. The entry for Chinese hibiscus will serve here as an example:

Chinese hibiscus. *Hibiscus rosa-sinensis* L.

An evergreen shrub or tree up to 15 (25) ft. Leaves simple, ovate, coarsely toothed, 3 to 5 in. long, alternate, petioled, glabrous or with few scattered hairs beneath, with stipules (Fig. 131). Flowers bright rose-red (in the type), 4 to 6 in. across, regular, bisexual, pediceled, in 1's, axillary. Calyx of 5 united sepals, 5-cleft, with an involucre (epicalyx) of 6 or 7 linear bracts below. Corolla of 5 distinct petals. Stamens numerous, cohering into a tube about the pistil with the anthers at the apex, much longer than the corolla. Pistils (ovaries) 1. Fruit dry, a capsule. Native probably to China.

Runs into many forms with pale yellow, amber, white, pink, rose or red single, semi-double or double flowers.

The Chinese are said to make a black dye from the petals of this species for their shoes, hair and eyebrows.

After finishing the manuscript and turning it over to the publisher any author understandably is very much interested in the "finished product" and its degree of acceptance. The reviews of this book have been favorable, and the criticism when offered, suggestive

and constructive. Even more, the book has been adopted already by several colleges and universities as a textbook.

The following are the excerpts from some of the reviews:

"Perhaps one of the most formidable undertakings of plant taxonomists is that of providing the gardening public comprising as it does all types of interests from the rankest amateur to the professional botanist, with a work equally usable by all. The amateur frets over complexities and the professional condemns omissions, but both are grateful for a work such as this to help them identify an unfamiliar plant.

"One of the advantages of having a plant taxonomist as the author of a work of this scope is in the matter of nomenclature, which in this book is strictly up-to-date and reliable, including the cultivar names.

"This book by Dr. Enari is a welcome effort in this time of the expanding field of gardening when people are more and more becoming aware of plants and are trying to learn their names." *Baileya*

"Gardeners and homeowners, nurserymen and landscape architects, students, teachers and amateur botanists will welcome this new guide to the shrubs of California.

"Equipped with this book even a beginner can successfully identify 277 shrubs grown in California." *Golden Gardens*

"The key requires flowers and leaves but is a comparatively simple one.

"The bulk of the book is given over to clear descriptions of each of the species, in technical, but relatively simple terms.

"Interesting and useful notes are appended to a number of the descriptions, particularly for those which are known to be dangerously poisonous." —*Missouri Botanical Garden Bulletin*

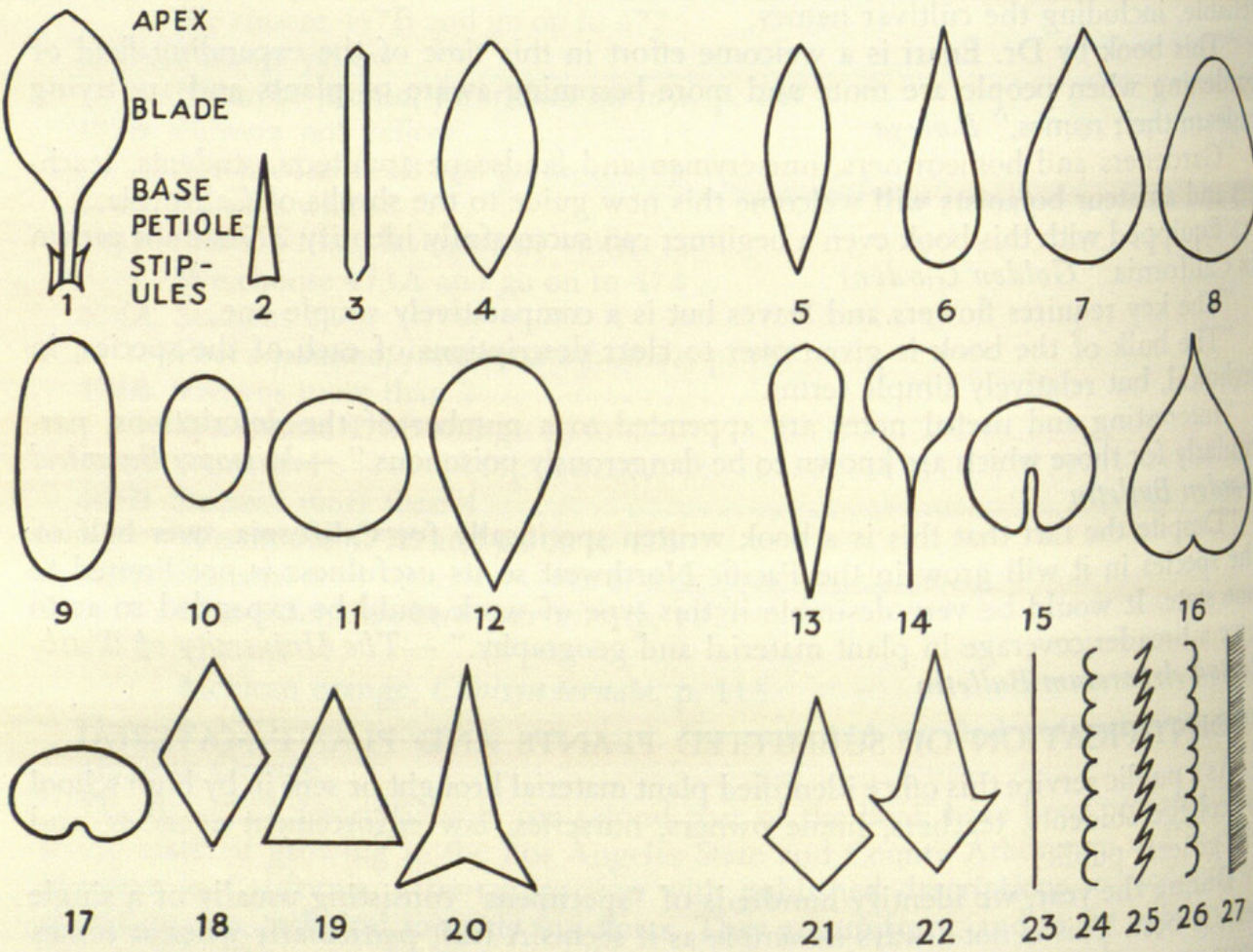
"Despite the fact that this is a book written specifically for California, over half of the species in it will grow in the Pacific Northwest so its usefulness is not limited to one state. It would be very desirable if this type of work could be expanded so as to give a broader coverage in plant material and geography." —*The University of Washington Arboretum Bulletin*

IDENTIFICATION OF SUBMITTED PLANTS AND PLANT MATERIAL

As a public service this office identified plant material brought or sent in by high school or college students, teachers, home owners, nurseries, law enforcement agencies, and the general public.

During the year, we identify hundreds of "specimens" consisting usually of a single leaf, at best. This is not always as simple as it seems. A leaf, particularly when it comes from an eucalyptus tree, a leaflet of a compound leaf, a dried flower, a seed or seed pod, a drawing of a deciduous tree, seen in wintertime in Nebraska, an artists' creation (particularly when the artist happens to be one of the admirer's of Picasso's expressionism), an artificial flower with the label "Made in Japan," a few leaves collected from the Venezuelan jungle (they still are on my desk) are not sufficient for positive identification. So, next time you send something to us to be identified, please send a specimen large enough to reveal what the plant is like and with leaves, flowers, and even with fruits, if possible. For doing this, please accept our gratitude in advance.

Only rarely can a plant be identified by a non-botanical description over the phone or in correspondence. I still remember one of the phone calls in my first year here I was asked to identify a weed with white flowers and green leaves, which was all I could get out of Miss or Mrs. X. But right she was, I know it, because next day she was in my office with her white-flowered, green-leaved weed. It was Sweet alyssum, *Alyssum maritimum*.

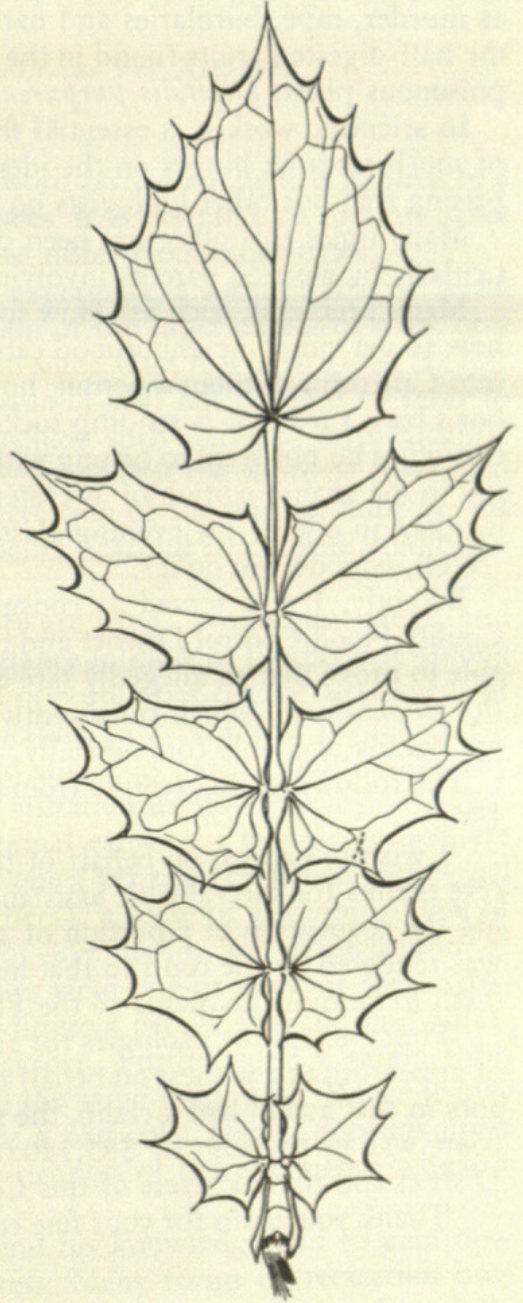


See opposite page for explanation.

Sample of illustration from
Ornamental Shrubs of California

LEAF SHAPES:

1. Leaf with apex, blade, base, petiole and stipules
2. Awl-shaped
3. Linear
4. Elliptic
5. Narrowly elliptic
6. Lanceolate
7. Ovate
8. Ovate
9. Oblong
10. Oval
11. Orbicular
12. Obovate
13. Oblanceolate
14. Spatulate
15. Orbicular; cordate base
16. Cordiform
17. Reniform
18. Rhomboidal
19. Triangular
20. Sagittate
21. Hastate
22. Hastate



75. Leaf of Chinese mahonia,
Mahonia bealii.

LEAF MARGINS:

23. Entire
24. Dentate
25. Serrate
26. Crenate
27. Ciliate

CONSULTATION

This office is also available for consultation by other departments of the County, and the general public, on problems involved in the field of taxonomy. During the last year I have been consulted many times by the Los Angeles Sheriff's Department, Santa Monica Police Department and others involving plant material in criminal cases such as murder, rape, burglaries and narcotics. In the murder case I was able to prove that the half-digested fruits found in the stomach of a dead woman belonged to an extremely poisonous plant, *Digitalis purpurea*, commonly known as Foxglove.

In scientific work it is essential that we apply names with precisions, for the validity of much research hinges on the identification of the material involved. So it is not surprising that our other biologists on the staff occasionally consult with this office.

Many times this office has been consulted by the local physicians, hospitals and particularly by worried parents involving a poisonous plant eaten by children.

Many problems, such as: How to make poison oak not toxic, how to feed parakeets, how to get rid of neighborhood cats by using poisonous plants, how to smuggle plants into California without a permit, how to get rid of an old Rice paper plant in the neighbor's back yard that is sending suckers into your yard, and numerous others referred to this office do not seem to belong within the scope of plant taxonomy, at least not according to the second edition of Webster's Dictionary. In talking about the Rice paper plant incident in one of my evening classes I am teaching, the reaction was rather amusing: "Well, *how* do you do it?"

Recently, I also served as consultant and botanical authority for the Los Angeles County Flood Control District and the County Counsel. During court proceedings I was able to prove that an allegedly rare eucalyptus was really a typical and common *Eucalyptus pulverulenta*, which consistently flowers and fruits in this area and of which seeds are readily available commercially.

The following are excerpts from the letter of the County Counsel dated September 5, 1962:

"I wish to express on behalf of this office and of the Flood Control District our sincere thanks for the valuable assistance that you rendered to us in the recent trial involving the acquisition of a portion of a grove of *Eucalyptus pulverulenta* trees. Judgement was rendered by the court in that matter on August 29, 1962, and I consider the judgement to be most favorable to the Flood Control District."

"Please accept my apologies for any personal inconvenience suffered by you as a result of appearing as a witness on behalf of the District, as I believe you are aware the defendants in that action had a claim, the sum exceeding \$500,000.00. Final judgement by the court was in the sum of \$85,740.00 which represented a considerable savings to the District and the taxpayers of this County."

"Thank you again for your fine cooperation and valuable assistance."

TEACHING

Under the sponsorship of the Arcadia Unified School District's Adult Education Program, I am teaching Plant Identification. The students in this 14-week evening course learn how to identify plants, both native and exotic, through use of a botanical vocabulary and plant "keys." It is expected that after finishing the course they should be familiar with 150 to 200 plants and able to recognize them regardless of where they grow.

If the popularity of a course can be judged from its attendance and letters expressing appreciation, I would say this course has proved to be popular. This year the course has been extended another 14 weeks at a more advanced level.

In addition to the course mentioned above I am teaching an evening course in Plant Chemistry and a day time class in Plant Identification in our Professional Gardener's School.



Enari, Leonid. 1963. "Activities of a taxonomist." *Lasca leaves* 13(Winter 1963), 12–18.

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