Special Book Review

Cheers, Gordon. 1992. **A guide to the carnivorous plants of the world.** Angus & Robertson, Pymble, NSW 2073, Australia. 174 p.+ix

Reviewed by Don Schnell

At the outset, my conclusion—This is an excellent book. It stands on its own quality, but additionally in light of the poor quality of other recent efforts in presenting a global summary of carnivorous plants, I would recommend that if you could only afford one book, this should be your first choice.

This is really a second, considerably expanded edition of the author's 1983 book. There are 231 mostly excellent crisply printed and well-selected color photos inside, and the dust jacket (followers of my book reviews know my attachment to dust jackets vs imprinted hard covers) also has color photos. There are abundant range maps and scattered line drawings where indicated. After the preface and acknowledgements, the author has a mapped climate key and a helpful pronunciation guide for beginners. The introduction, history and folklore and evolutionary paths sections are good reading and well illustrated.

I was pleased to see those old Scientific American fanciful illustrations from early in the century again—They are not often seen. And it was nice seeing actual pages of the legendary Veitch catalogs reproduced. The evolutionary chart provides food for thought, although one might question the leaps back and forth from monocot to dicot so easily, and latest plastid DNA studies indicate at least seven separate origins of carnivory in plants.

The next set of chapters on morphology, classification and trapping mechanisms are nicely done with actual photos of trap types in a chart instead of the usual line drawings. Cultivation and propagation will be of great interest to all readers and these two chapters are rather uniquely presented via examples or "type plants" for each of several recommended classes or modes of cultivation and propping. Specific details for each genus or species is given in later sections on those plants. There then follow the several chapters, one per genus, illustrating the CP of the world through selected species examples. Each chapter has an introductory page to the genus including a line drawing of an example and a range map of the genus, then the following pages example species with color photos and a well-conceived outline method of describing the species, habitat, native land, etc. Australia is rather heavily represented in the Droseras chapter, but they do have the most species and space is always limited in books. There is a rather unique chapter called "Field Trips" with color photos in which the author briefly describes field trips through several example areas of the world. There follows a so-so glossary, a monthly calendar of what to do with each genus each month of the year (with allowance for northern vs. southern hemisphere) in chart form, and a chart of cultivation guidelines. The world list is presented clearly and mostly accurately, and the usually dull nature of such lists is broken by occasional additional color photos sprinkled throughout. There is a list of organizations, and a bibliography and separate list of recommended reading which is reasonably representative.

There are very few typos and geographic errors or misplaced mountains. The *Catopsis* range map erroneously does not include southern Florida in the USA where plants are abundant. *Heliamphora* species are of course also found in swampy areas below the tepui as well as upon them. The author misses a few tricks such as informing the neophyte straight away on how to tell flowers of *Genlisea* spp. readily from similar utricularias without digging the plant up—Genliseas have five sepals.

But these errors in such a complex work are few and almost of the inevitable variety given the overwhelming positive nature of the book, and certainly errors of a 180° lesser degree than the disaster of another book of similar attempted scope by another author that I had the discomfort of recently reviewing.

The book is $45.00 Australian, and I do not know about outlets elsewhere such as in Europe and North America—Perhaps we will find out after the book has been out awhile. [Ed note: See Book List for updated information]. It is sturdily bound and the production is excellent on semi-glaze paper of good quality. While I have praised it as a best bet for one book for the beginner, we old timers can also get a lot out of it and I thoroughly enjoyed reading it.

Book Review

Temple, Paul. 1988. **Carnivorous Plants.** (A Wisley handbook). Royal Horticultural Society, London. 64 p. $5.95US.

Even though this booklet has been out for two years, it may not have come to your attention yet. In case readers are wondering what a "Wisley handbook" is, it is a series of booklets published on a wide variety of plant subjects by the Royal Horticultural Society in Great Britain. They have their gardens at Wisley, hence the name of the series.

This particular book is soft cover but quite sturdy. All photo illustrations (including cover and frontispiece) are in color and there are 40 of them and these are of excellent quality from original sharpness, color and composition to final printing. The photos cover a wide range of plants with multiple representatives of all major kinds of CP.

The several pages of introduction describe the nature of carnivory and list examples of CP. There follows 18 pages of instruction and comment on growing and propagation techniques, along with problems. The British have a great deal of difficulty with fungus diseases that we in the United States are mostly spared. The growing section includes methods of making outdoor bogs and beds, and lists of plants that can survive outdoors at various temperature limits. The author, therefore, makes a case for minimum cost for the beginning grower in particular in the use of windowsill and outdoor plantings.

There is then 28 pages of descriptions of various genera and/or species, along with more specific horticultural hints that are "fine tuning" over the general section.

The book is remarkably free of errors in spelling and nomenclature, except for misspelling *Utricularia sandersonii* (only one 'i' in the book, and a very fine photo labeled *Utricularia intermedia* is clearly *U. ochroleuca* instead. The photo shows vegetative material, but the foliar structure and presence of scattered traps along the foliar branch clearly indicates the correct identification.

The book is sufficiently inexpensive that I can recommend it to all CP enthusiasts. The experienced grower may have doubts about a 64 page book, but the photos and commentary on growing plants in Britain is worth it. Beginning or intermediate growers will find good solid information in addition to the above qualities. The list of sources is of course British and will probably become outdated, but that is no problem for CPN subscribers.

The book is available in Great Britain from various bookstores and of course from RHS outlets. In the USA, it may be purchased from Sterling Publishing Co., 387 Park Ave. S., New York 10016- 8810. I have also seen it for sale in the gift shops of several botanical gardens with other publications in the Wisley series.

Literature Review

Bender, Steve. 1990. "Beauty in the bog." Southern Living Magazine 25:42-44.

This popular article in a southern magazine describes how some people discovered a savanna bog on their property near Fairhope, Alabama. They had moved there with the intent to raise cattle. After clearing and burning off a wooded area one autumn with the intent of extending their pasture, the following spring they observed a heavy growth of beautiful bog plants, including *Sarracenia leucophylla.* They decided to preserve the area and have been burning it off every year since. They have now built a boardwalk for visitors to observe the very fine mix of plants. Three color photos show a very nice display over several acres. To visit the site if you are in southern Baldwin County, Alabama between April and September, call 205/947-3044 for an appointment and directions. There is a nominal admission charge of $2.00 to help cover expenses.

Earley, Lawrence S. 1991. "Stew in Brunswick." Wildlife in North. 55:14-21.

This article discusses the downturn in plant and animal species in Brunswick County, North Carolina as development and population growth take an upturn. For those not familiar with this county, it is the location of the legendary Green Swamp and has been called the most ecologically diverse county in North Carolina, and having the most threatened or endangered species. In the last ten years, the population of this previously rural county has doubled, as it did the ten years before that, and as it is expected to at least do in the next ten years. The main problem is exponential growth of retirement homes and golf courses and services to serve the increasing population. There are no zoning laws to protect wild areas, although enactment of these is being contemplated. Several biologists are quoted regarding decreasing plant and animal wild areas, and most of us who have been visiting the area for 25-30 years would readily concur. The article is considered and well written. There are many color photos among which are the following CP: A very nice full cover of *Sarracenia minor*, a savanna in moderate shape showing *S. flava*, and a photo containing both *Drosera filiformis* and *Utricularia cornuta*. There is also a semi-diagrammatic map of the county showing sample ecosystem locations. (DES)

Fagerberg, WR and D. Allain. 1991. A quantitative study of tissue dynamics during closure in the traps of Venus's Flytrap *Dionaea muscipula* Ellis. Am. J. Bot. 78:647-657.

This is a very good paper discussing research work done by the authors in extending what work had already been done on leaf movement in *Dionaea*. The paper opens with a brief but complete review of work done since Darwin to this day. They summarize closure into three phases, the first and third having been recognized before, but the second a new distinct category: Capture—The familiar quick phase, which has been studied most; Appression—An approximately 30 minute phase that is slower and results in trap margin contact; and Sealing—Completed in about 1 hour post-stimulation and characterized by tighter sealing of the trap margins just internal to the edges with the actual edges somewhat everted.

The authors very cleverly divide the trap into three zones (A,B and C) and excise these from several plants during the above mentioned phases. Excision was quick and smooth and fixation immediate so as to arrest any anatomic changes for study by light and electron microscopy. The article should be read for details and completeness, but in summary they found a very complex inter-related sequence of cellular enlargement changes in each of the three regions that collated with what would be expected physically to result in the gross observable three closure phases.

The authors conclude with some paragraphs of theoretical discussion on physiological control of this process which may be related to pH and calcium transport across cell membranes as extrapolated from Japanese research on these ions and their effects

on *Aldrovanda*, and the fact that traps can be successfully anesthetized by pH buffer variations and use of calcium channel blocker compounds. (DES)

Folkerts, G. W. 1990. The white-topped pitcher plant— A case of precarious abundance. Oryx 24:201-207.

This is a well written and conceived popular conservation article with four photos (including one ironic one of buckets of clipped *S. leucophylla* pitchers awaiting packing) and some references.

After a brief introduction on the nature of pitcher plants and their habitats, the article focuses on the Gulf coast where, at the moment, there is still a greater abundance of pitcher plant habitat compared to disastrously rapid destruction of sites on the Atlantic coastal plain. Here, the author also sees the beginning of a precipitous decline.

He describes the main roles of decreasing fire at appropriate times of the year (most natural fires are spring and summer and some research indicates better response than with the traditionally accepted winter fires), land use changes with drainage and destruction of habitat, horticultural collecting (personal and commercial) of taxa or variants whose numbers have become critical, and lately the growing fad of using *S. leucophylla* pitchers in flower arrangements here and abroad. Because CITES has regulated international trade in *Sarracenia* and their parts, we have a number of 500,000 pitchers of *leucophylla* per year in international trade, and an unknown number in unregulated interstate trade. The author discusses the harm of uninformed harvesting of massive numbers of pitchers from a stand at anytime, and effects on longterm plant health and productivity. (DES)

Karlsson, P. S., K. O. Nordell, B. A. Carlsson and B. M. Svensson. 1991. The effect of soil nutrient status on prey utilization in four carnivorous plants. Oecologia (Heidelb) 86(1):1-7

The authors tested the hypothesis that carnivorous plants are less responsive to prey when grown in nutrient-rich soil. Four plant species, *Drosera rotundifolia, Pinguicula alpina, P. villosa* and *P. vulgaris* were tested and seven characteristics were measured. The results were that 75% of the tests showed no significant difference and therefore the hypothesis was not supported by the data. An alternate modification of this idea is that CP can grow in nutrient poor or rich soils provided that competition from other plants is low.

Krafft, C. C. and S.N. Handel. 1991. The role of carnivory in the growth and reproduction of *Drosera filiformis* and *D. rotundifolia*. Bull. Torrey Bot. Club 118:12-19.

The authors collected plants of the above two species, potted them up in nutrient poor media under screening outdoors, and fed varying numbers of fruit flies to half the plants the other half being unfed and acting as controls. Growing the plants over a season disclosed that the fed plants in general had enhanced growth during the feeding period. The "feeds" carried over winter hibernaculum stage with increased flowering and seed production the following spring in those plants that were fed. They conclude that feeding in a nutrient poor environment has immediate as well as long lasting benefits. The discussion was interesting in trying to collate results of conflicting experiments in other papers in the bibliography, particularly with field experiments. One interesting experiment suggested that in the case of sundews growing in moderately rich fields with other competing plants, carnivory gave a competitive edge to the sundews as a source of nutrients other than the soil. (DES)

MacRoberts, B. R. and M. H. MacRoberts. 1990. Vascular flora of two west Louisiana pitcher plant bogs. Phytologia 68:271-275.

The authors reference their previous paper on two similar bogs and mention that little has really been done in studying the pitcher plant bogs west of the Mississippi River. They describe the two present bogs located 0.5 km apart in Kisatchee National Forest. They are seep slope bogs with mucky soil and little sphagnum except for incidental patches. Soil analyses are provided with the expected results. All important flora is listed, including the CP: *Sarracenia alata, Drosera brevifolia, D. capillaris, Pinguicula pumila, Utricularia cornuta, U. juncea* and *U. subulata.* (DES)

Sattler, R. and R. Rutishauser. 1990. Structural and dynamic descriptions of the development of *Utricularia foliosa* and *U. australis*. Can. J. Bot.68:1989-2003.

In traditional taxonomy, morphologic structures are usually described in static terms for purposes of classification and identification. One might say, "A leaf is a leaf is a leaf... ". However, the utricularias offer good models supporting a case for a dynamic approach, at least theoretically, since there is much discussion over what constitutes leaves, stems, roots (if any), shoots, etc., and what the traps are in traditional terms. The authors document development of shoots by means of SEM and make a proposal of how such studies and dynamic intermediate stages may in the future be useful in taxonomy. (DES)

Sieren, D. J., et. al. 1990. Noteworthy additions to the vascular flora of eastern North Carolina. J. Elisha Mit. Sci. Soc. 106:7-9.

The only CP mentioned is a new county record for *Drosera brevifolia* in New Hanover County which is one of the counties immediately adjacent to Wilmington. (DES)

Sorrie, Bruce A. 1992. *Utricularia inflata* Walter (Lentibulariaceae) in Massachusetts. Rhodora 94:391-392.

U. inflata is reported for the first time from New England in an artificial impoundment lying between Carver and Plymouth in Plymouth County, MA. This brings the number of Utricularias in the state to 13. Federal Pond is a reservoir for a cranberry growing operation. After considering several possible mechanisms of introduction, the most likely is via waterfowl. (DES)

Speta, F, and F. Fuchs. 1992. *Pinguicula debbertiana* (Lentibulariaceae), eine weitere neue Art aus Mexiko. Linzer Biol. Beitr. 24:375-380. IN GERMAN.

From the now famous area of San Luis Potosí (famous among Mexican *Pinguicula* fans), this new species is described. It appears to be most closely related to *P. esseriana.* The paper contains two pages of line drawings of key morphologic features including the flower in several views.

Valdés, Cristina P. 1989. Estudios preliminares en el género L.(*Droseraceae* Salisb.) en Cuba. Revista del Jardín Botánico Nacional 10:207-212. IN SPANISH

Herbarium specimens of the genus *Drosera* L. were reviewed from Cuban herbaria. Dot location maps are included in the paper and show what the author concludes are three species of the genus in the country: *D. intermedia, D. capillaris* and *D. brevifolia.* In the past, some of the specimens had been identified as *D. rotundifolia* and *D. tenella* which could have given a total of five species instead of three. However, with the possible exception of one problematic specimen in poor condition and labeled by her as *D. capillaris,* it would appear there are only three species collected so far. The author introduces the paper with a short summary of the family and its carnivorous features. (DES)

Venters, Vic. 1991. Stiffer penalties may deter poaching: Law strengthened to protect rare Venus's flytraps. Wildlife in North Carolina 55:28(Aug).

This is a full page informational article with a black and white photo of *Dionaea.* In spring, 1991, stiffer penalties went into effect for poaching this species. By poaching, the law determines that the term applies if the plants are collected from state lands (including roadsides and ditches to the extent claimed by the state), parks, federal lands, wildlife and nature preserves, and private lands without written permission of the owner. Owners may collect and sell from their own lands at will. Formerly, the penalty for poaching was a paltry $10.00 per arrest—Hardly a deterrent! The new penalty is a minimum of $100 and a maximum of $500 for first offenders. Repeaters may be fined $1000. This could still be little deterrent for the professional poacher collecting by the truckload, if it were not that the thief can actually be fined these amounts per plant!

It is estimated that over 500,000 *Dionaea* are removed from the wild each year. Most of these are sold to Holland, Germany and Japan. Besides plant removal, habitat destruction is also stressed as a very important factor in decreasing the genus in the wild.

(Editorial comment: The article mentions that this spring, someone was apprehended in the Green Swamp sanctuary with 1000 plants in possession, so the process can work. The article also states that clearly disclosed that these were collected and potted up. Recall the entrepreneur written about in the Greensboro, NC newspaper a year or so ago who bragged about dumptruck-loads of CP collected and legally shipped from Wilmington ports to Holland. I clearly recall about two years ago being awakened by a phone call at 4 AM and a gruff foreign voice over long distance demanding—not asking about—250,000 flytraps "right away", and did I know anyone who could do it! The caller identified his location as the Netherlands.) (DES)