

SPECIAL LITERATURE REVIEW

by Donald Schnell

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Juniper, BE, RJ Robins and DM Joel. 1989. *The Carnivorous Plants*. Academic Press. 353 P. \$150.00 US.

This book has been long awaited ever since word went out that the authors were working on a comprehensive book publication covering the anatomy, physiology and syndrome of carnivorous plants. The last such work was by Francis Lloyd in 1942, a book which is held in affection by all of us interested in CP.

As the authors indicate in their preface, the work is not intended to supplant Lloyd, or even Darwin's 1875 book for that matter, but to supplement them. I would concur in this result and recommend that all serious students of CP consult Lloyd, at least, as well as this new volume.

Academic Press has thankfully put aside the gaudily printed boards of their recent books (also used by many other textbook publishers) and we have a real jacket once again. It is colorful, and is the only color in the volume. Readers should understand that this book is not intended to discuss taxonomic treatments, cultivation or to provide color photo pictures of plants. All diagrams, photos and line drawings are in black and white, which is quite satisfactory since most of the photowork is of anatomic microsections and transmission and scanning electron microscopy.

The book is oversize, measuring 22.5 x 28.5 cm, and the text is printed in two 9cm wide columns per page. Typeface is large and quite readable. Binding is of moderate quality (the boards of my copy came warped), and while the paper is not fully glazed, it is moderately heavy and reproduces the photowork well. As noted above, there are 353 pages, but 309 pages are actual text, the rest being references, index, appendices, etc. There are 26.5 pages of references for a total number of approximately 1160 citations listed. References are as current as the late 1980's. More on these in a moment. There are 174 figures, mostly of the description above. These are supplemented by tables where required.

The authors certainly have their credentials in the area that is covered in most detail and best in the book: New concepts of anatomy, physiology and biochemistry related to the carnivorphyte syndrome. While the numbers of references is impressive, there are curious gaps in certain areas where they might as well have completed a particular author's CP bibliography, which would not have been excessive in any case and would have been pertinent. A serious reader will often go to a book of this kind not only to review the author's summaries and ideas, but as a source for references. One should still use other sources as well, particularly Lloyd, CPN Literature Reviews and the standard specialty library indices.

In Chapter 1, there are three of the more interesting tables and figures. One is a radial representation of the carnivorous syndrome among the genera. Another is an update of the expected list of total numbers of species in the accepted genera of CP and their distribution. This has been adapted from the CPN World List of 1986 by Schlauer. The authors state they will use this nomenclature throughout the book, but there are confusing lapses. There is also a chart showing taxonomic and nomenclatural authorities in roughly sequential time, this again acknowledged from Schlauer. Unfortunately, again, the book authors did not use Schlauer's complete bibliography; the missing entries would have found sufficient space in the chart.

The book begins with a preface, and a brief glossary of the origin of the CP generic names. This is followed by a key to abbreviations used in the book. The design of the remainder of the book is entirely different from Lloyd who organized his work into chapters for each genus which was covered as completely as knowledge permitted in 1942. The present authors have divided their book into sections and chapters based on specific features of the carnivorous plant syndrome. In most chapters, there tends to be a laundry list of genera and features that apply to the subject of that chapter. The aim of the authors is somewhat different from Lloyd; that is to present a cohesive discussion of each feature of the CP syndrome referred secondarily to the genera. They have succeeded except for a few annoying side effects of such an organization: If one wishes only to read about a certain genus, the readers must consult nearly all chapters rather than one. Also, valuable space is taken up in most chapters by redescribing the genus again and again. It is as though each chapter was written freestanding of the others, although there is abundant cross-referencing to other chapters and pages to support arguments.

The main text is divided into six parts, each with three (one with four) chapters. Part 1 is an introduction to the CP syndrome and plant habitats. The authors early on establish a six-point criteria for what is truly a carnivorous plant, and pretty much stick with it throughout the book, although occasionally there is some muddiness possibly related to multiple authorship or time lapse in writing such a detailed work. Part 2 covers attraction and trapping, and is probably the second best section in the book. The best—certainly related to the authors' primary interests—is part 3 on nutrition and digestion. This section of four chapters brings one thoroughly up to date after Lloyd. Part 4 covers phytochemicals and their roles in carnivory, and in herbal and medicinal uses. Part 5 is on exploitation and mutualism. The chapters on associated fauna and pollination and reproductive strategies are the most interesting and potentially most useful but suffer from lack of completeness and detail. The chapter on mimicry vs. mutualism is best described as tedious. Finally, part 6 covers some aspects of evolution, both past and with future comments. There is discussion of features of the CP syndrome in non-CP (eg the glandular sticky stems of *Silene* spp), which purpose is to put into perspective how the CP syndrome may have evolved as polyphyletic lines of aggregations of these features.

The two appendices are interesting but I am not certain why they were selected over any other material available. The first is a summary by Frank Morton Jones of letters sent by Rebecca Austin back east and describing her observations of *Darlingtonia* in the field in the 1870's. The second is a 1987 field note by Matthew Jebb concerning some observations of the natural history of *Nepenthes* in Papua.

Overall, the book is written in very clear language and is easy to follow and understand, although the reader will have to be current with some technical aspects of botany, ecology and plant physiology in general to get through some sections. I found very few typographic errors considering the length of the text, most being misspellings and an occasional jumbled sentence (eg one which compares *Drosera* to *Drosera* generically).

Unfortunately there are several errors of substance and omission, particularly in areas where the authors look into field botany, ecology, evolutions and plain "natural history". I will mention a few examples.

Kevan is listed once among the references, but none of his papers of the late 1970's are quoted. In these he seriously questioned—with good evidence—the interpretation of UV light path markings, and how insects perceive color according to our concepts. Yet, the authors of this book show some nice photos through UV filters of various trap leaves and innocently go along the standard UV path without any acknowledgement or discussion of other possible meanings to what we see and photograph.

Dionaea is described as having wider, flatter petiolar blades in the late summer and autumn and narrow blades in spring, when in fact just the opposite is the rule both in field and well-grown green house plants. The authors state as an important prop in several of their evolutionary and ecological proposals that all carnivorous plants are insect pollinated, period. They seem to have overlooked cases of cleistogamous flowers in utricularias where abundant seed is produced, and chasmogamous flowers of the genus for that matter where insect pollination has yet to be clarified. Also, many *droseras* are autogamous if their flowers are not externally pollinated during the day or so most are open.

Again, in the pollination chapter, only two references are quoted repeatedly in the very short section for sarracenias. The authors conclude that the pollination mechanism for these pitcher plants has not been determined, as well they might limiting themselves to the two references. Actually, two very complete studies on pollination syndromes of sarracenias were available in plenty of time for use by the authors of this book. One on *S. purpurea* in New England was completed in 1979, and another on *S. flava* in North Carolina in 1983. Both of these studies contain many additional references that would have stood Juniper et al. in good stead had they sought them out. This is a prime example of reference limitation (see above) causing problems with complete assays of a particular subject before conclusions are drawn.

In another area concerning pitcher plant fauna associates, no mention is made of the leafcutter wasp which is found quite easily and relatively commonly in the larger, more erect *Sarracenia* pitcher species. The wasp is interesting in that it packs a freshly opened pitcher with alternating layers of grass or dried sphagnum and larval chambers. A single egg is laid in each larval chamber and a stung insect such as a cricket is added to each chamber for larval feeding. Jones reported this wasp first in the early 1900's. I have not seen paper wasps as described by Juniper et al.

Finally, in areas in which I am particularly familiar with the literature, I noted that several authors of papers were directly misquoted regarding their own conclusions from their studies. This should alert one to not use this book as a secondary citation source but to check all original references if possible before quoting them.

In summary, I can recommend this book as an addition to the rather scant carnivorous plant book literature, with the caveats mentioned above. The authors do bring forth some new material (even older references missed by Lloyd) and some stimulating discussion and concepts. However, the work is not encyclopedic as many might hope it would be.

Which brings us down to one last point—The price. At \$150.00 US, the book will clearly see a limited market, largely libraries or large academic departments with adequate book allowances. We all have been aware of a steady inflation in book prices over the years, but it has been my impression that in the past three or four years there has been a veritable explosion in pricing of all technical books beyond what we see in their production value in hand. I would suppose that Academic Press realized that even though this book was needed that it would still have a very limited appeal and did not wish to take a loss on it that would have to be made up in sales of other books.

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Rob Maharajh (168 Dalewood Ave. South, Hamilton, Ontario, Canada, L8S 1Z4) "WTB: Fresh seed, plants or gemnae of *Drosera cistiflora* varieties, *Drosera esmeraldae*, *Drosera pauciflora* varieties, *Drosera neocaledonica*, *Drosera ramantacea*, *Drosera sessiliflora*, *Nepenthes pectinata*, *Nepenthes macfarlanea*, *Nepenthes rajah*, *Nepenthes villosa*, *Pinguicula grandiflora* any variety, *Pinguicula longifolia* any variety, *Pinguicula vallisneriifolia*, *Pinguicula pumila*, *Pinguicula lusitanicum*, *Pinguicula agnata*. Any tuberous *Drosera* and Mexican Pings. and/or hybrids beside *Pinguicula caudata*."

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COMING IN SEPTEMBER

- Herbarium samples of CP
- Australia's Diminutive jewels; the Pygmy Sundews

In the December issue:

- New ICPS Directory and 1989 Members



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