CARNIVOROUS PLANT NEWSLETTER

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ERRATA -see captions

Front cover: *D. uniflora* in habitat at Tierra del Fuego, Argentina. Photo by Randy Lamb. Please see article beginning on page 91.

Rear Cover: *Utricularia spp.* on Chiloé Island, Chile. Photo by R. Lamb. Also refer to his article beginning in page 91.(The photos corresponding to these captions was inadvertantly reversed with September's cover.)

The co-editors of CPN would like everyone to pay particular attention to the following policies regarding your dues to the ICPS.

All Correspondence regarding dues, address changes and missing issues should be sent to ICPS c/o Fullerton Arboretum, CSUF, Fullerton, CA 92634. DO NOT SEND TO THE CO-EDITORS. Checks for subscription and reprints should be made payable to ICPS.

All material for publication, comments and general correspondence about your plants, field trips or special noteworthy events relating to CP should be directed to one of the co-editors. We are interested in all news related to carnivorous plants and rely on the membership to supply us with this information so that we can share it with others.

Views expressed in this publication are those of the authors, not necessarily the editorial staff.

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Editor's Corner

The editors thank everyone for their continued support. We certainly try to put out a first class publication, and in spite of occasional snafus, the word gets out. We most humbly apologize for any errors or omissions and will work to correct them. At this time, we wish to acknowledge the continued excellent work of our only paid staff member, Judith Valona (Administrative Assistant) who handles all the administrative and financial matters and we look forward to her continued presence. Joe Mazrimas is now Editor-in-Chief and is the one to whom all manuscripts are to be sent. Don Schnell our third co-editor (along with Joe and Leo), critically reviews papers. Art North continues to maintain the mailing list and is able to generate labels for regional meetings, Gordon Snelling, our Seed Bank manager tries to fill orders as soon as possible, but needs seeds to do so-please send him your excess seed. Marilyn Medlin of the CSUF Public Affairs Office continues her excellent desktop editing. Of course CPN would not be possible without all of you the members. As seen by the wide variety of articles, CP appeal to many people of diverse backgrounds. We hope CPN will continue to be an avenue of information for the novice as well as the professional. To all our sincere thanks for a job well done.

Enclosed with this issue, you will find a renewal envelope, which is inserted in all CPN's we prepare for mailing. If you have already renewed or are paid up for Volume 22, please pass the envelope on to a friend or use it for any communication with the Society. We are pleased that there will not be any increase in rates and that California residents will no longer have to pay sales tax. Judy will be contacting the California members by letter regarding this.

Special Notice

Steve Baker (Rt. 1, Box 540-19AB; Conover NC 28613; USA. Tel. 704/256-7035 after 2000 EST/0100 GMT) Writes:

I would like to offer my services to all CPN readers that want their articles, art, pictures, and drawings computer ready. If you will send your articles either typed or if you have an IBM compatible or Apple II computer, send it on a 3.5 inch diskette. I will make it ready for a Macintosh. I can translate for most word processors and convert it so it can be used with a Macintosh. I can also scan art, pictures drawings, and text. Please always send a hard copy for verifying. I would also like to offer a service to all of you that have price lists or wish to have a price list-I will either redo yours for you or will help you design one. I can add art, pictures, drawings if you have them or I have some line art drawings already. After I finish your price list, the only thing I want if you like the finished product is some plants-no money. I am just beginning in CP and hope to use my computer and skills to increase my collection of CP's. I will also be glad to make changes when you add or delete plants from your list. If I can help with either of the above items, please do not hesitate to call on me at the above address.

Corrections

In the December, 1991 issue (20:114-123), Allen Lowrie's note on his adventures and discoveries in Darwin and Kununurra, Australia contained several typographic errors, some of which we are correcting here. On p. 123, line 7, the average diameter was 12 cm, not 18 cm. In the fourth line from the end of the article, there were 600 photos made, not just sixty. Finally, the back cover is *Drosera petiolaris* aff. "Erect", not Kununurra. We regret these errors.

ICPS Seed Bank

4 January 1993

Byblis liniflora, *Drosophyllum lusitanicum*, *Dionaea muscipula*, *Drosera aliciae*, *D. anglica* "sw BC" (5), *D. binata* "Coromandel Penn", *D. binata* "Hauraki Plain, NZ", *D. binata* "Northland, NZ", *D. brevifolia* (5), *D. burkeana*, *D. burmanni*, *D. capensis* "alba" (5), *D. capensis*, *D. capensis* N.L., *D. capillaris*, *D. capillaris* "alba" (3), *D. capillaris* "pink", *D. coccicaulis* (2), *D. collinsae* (1), *D. filiformis*, *D. filiformis filiformis* (5), *D. intermedia*, *D. intermedia* "tropical", *D. intermedia* "Cuba", *D. montana*? (5), *D. natalensis* (5), *D. rotundifolia*, *D. rotundifolia* "Southern BC", *D. rotundifolia* "New Jersey", *D. spathulata*, *D. spathulata* "kansai" (2), *D. spathulata* "Hong Kong", *D. spathulata* "pink flower", *D. spathulata* rotundate (6), **Pygmy droseras—>** *D. nitidula nitidula* (5), *D. nitidula omissa* (5), D. *pygmaea* (10), **Tuberous droseras—>** *D. auriculata*, *D. auriculata* "NZ", *D. auriculata* "Melbourne", *D. peltata* "NZ". *Pinguicula grandiflora* (3), *P. macroceras* "Yukon" (5), *P. primuliflora* (5). *Utricularia bisquamata* (1), *U. delicatula*, *U. livida* (2), *U. longifolia*, *U. novae zealandeae*. *Nepenthes ventrata* X *ventrata* "WIP". *Sarracenia alata*, *S. alata* "Angelina County, Texas", *S. flava*, *S. flava* "heavy vein" (2), *S. flava* "purple throat" (2), *S. leucophylla*, *S. leucophylla* "red tube" (3), *S. minor* (3), *S. purpurea*, *S. purpurea venosa* (2), *S. rubra wherryi* (2), *S.* X *harperi* (*flava* X *minor*) (3). *Darlingtonia californica*.

As can be seen, the Seed Bank is low on number and kinds of seeds. We need all kind of CP seeds which can only come from **you**. Please send in your spare seeds-help disperse CP around the world and maybe help someone get started. Address is on inside front cover.

Special Notice

By Donald Schnell

The Federal Register (57:21377-21381, 20 May 1992) contains the US Fish and Wildlife Service proposal to list *Pinguicula ionantha* as threatened. Comment is encouraged, but the cutoff date was long past before this appeared.

P. ionantha is restricted to four counties in north Florida, the central portion of the panhandle. Liberty County is the center of most known locations. The proposal, quite detailed, descriptive and generally accurate as are most of these, mentions that habitat destruction is the prime cause for deterioration of populations. There has been no commercial pressure to date, and little personal collecting documented. The Carrabelle locations are specifically mentioned, a place where there were once thousands of plants just a few years ago, suffered near extirpation due to scraping and redigging of roadside ditches, and drainage of shallow water collections in preparation for tree growing and housing. The plants do tend to gravitate to moisture collections, and is the case with many CP, unattended drainage ditches have become prime habitat!

I think the main urging will be for more reserves within the Appalachicola National Forest, under control of the US Forest Service, a theoretically friendly colleague of the US Fish and Wildlife Service. Let us hope they will help this time and preserve some of the Forest for CP and other biodiversity, such as the two Pleea savannahs near Sumatra.

These proposals have had a good record and we can presume passage and placement of *P. ionantha* on the threatened list. Field CP botanists should behave accordingly.

News & Views

Clyde Bramblett (Orgel's Orchids; 18950 SW 136th St.; Miami FL 33196)

A well-known dealer of exotic plants, including CP, suffered severe damage from Hurricane Andrew. He lost all his greenhouses and lathe structures and, of course, most of his plants (see photos). However, Clyde and his wife came through without injury. Their house is standing, although with roof and water damage. They do not expect electric power until Thanksgiving! (Ed.-Note received in September.) Clyde asked us to express his apology to any of his loyal customers who may be inconvenienced by his lapse of sales. He says he will be back and we wish both he and his wife the best in recovering from the damage. (Ed. note: **Marie's Orchids & CP** sustained damage not from the hurricane, but from a tornado! More details as they become available.)

In everybody's life a little rain gotta fall.

Some days are like that.

Manny Herrera (11945 SW 10th Terr., Miami, FL 33184; USA) writes the following:

I am thirteen years old and am very interested in CP. I have just become a member of the ICPS.

I recently returned from a vacation to North Carolina, Alabama and the Florida panhandle. In Wilmington, NC, I met a man who owns a zoo. Behind his zoo he has a bog which he owns. I saw *Sarracenia flava, S. leucophylla, S. minor, S purpurea,* several *Sarracenia* hybrids, *Dionaea muscipula* and *Drosera capillaris.*

I got sick in Alabama so could not go CP hunting. In Florida I saw *D. capillaris, D. filiformis* var. *filiformis, S. psittacina* and two types of *S. flava.* In north Florida I saw *D.capillaris* and S. *minor.*

My vacation was great and I enjoyed it a lot. I have three people to thank: Mr. C. Bramblett who told me where to find plants, and my parents for driving that whole trip. I am interested in any *Heliamphora sp.* Those interested in trading, please write me for my list."

David Parker (523 Cascade Circle; Bennettsville SC 29512; USA. Tel. 803/479-4257) writes:

I would like to tell ICPS members that I feed my *Dionaea* plants live wax worms that I get from my local bait shop. Since I've fed my *Dionaea* plants with the live wax worms, they have been growing vigorous and are healthy. I like to feed my plants wax worms because they are easier to handle than crickets and other insects.

ATTENTION: Carnivorous Plant Hobbyists

The Second Informal Gathering of carnivorous plant hobbyists will be held at the home of Carl and Sherry Taylor in Lakeport (a small community on Oneida Lake just east of Syracuse, New York; write them at 2651 Larkin Ave., Lakeport NY 13032; tel. 315/633-2359) during the weekend of August 6-8,1993. Planned events include:

- SLIDE SHOWS AND LECTURES
- ROUND-TABLE DISCUSSIONS
- PLANT AND SEED EXCHANGE
- SWIMMING IN ONEIDA LAKE
- BACKYARD BARBEQUES AND BUFFETS
- PLANNING MEETING FOR 1994 CONVENTION

More details in the March, 1993 issue of CPN

Carnivorous Plant Tour of South America Part Two: Exploring the Temperate South, and the Journey Back.

By Randy Lamb
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Argentina

After travelling along coastal and inland Uruguay I went on to Argentina to later investigate its cool beckoning south. In Buenos Aires I spent a week enjoying the market places, coffee houses and "Parrilla" beef houses in the older parts of town. A quick visit to the Jardin Botánico did not turn up any PC [plantas carnivoras] but it was still quite an enjoyable afternoon.

Soon enough I was on a flight to the far southern reaches of the continent, to the world's most southerly city, Ushuaia. Located on the Argentinian side of "Tierra del Fuego" and overlooking the Beagle Channel, Ushuaia receives a cool coastal temperate climate. The weather, people's attire, and the local flora all made me a little homesick. My Español had improved immeasurably by this time so I had few problems locating information at the Parque Nacional and Forestry offices along with directions to the local plantas carnívoras. I received several hot tips on turbales [*Sphagnum* bogs] which where known to contain *Drosera uniflora* and *Pinguicula antarctica* .

In "Tierra del Fuego Parque Nacional" I eventually found myself on an elevated boardwalk at Laguna Negra, over its lakeside *Sphagnum* bog. A large information sign there points out extensive colonies of *D. uniflora* . I had just missed their flowering by a few weeks judging by the large single green seed capsule held above each mature plant. The flat thick basal rosettes of *D. uniflora* , along with their singly-borne style of flowering, seemed very unusual and primitive compared to other species of *Drosera*. The large glistening colonies of sundews spread over the *Sphagnum* mats was an impressive sight to behold.

I spent a week in Ushuaia going on long hikes every day to investigate its many glaciers, Beech forests and *Sphagnum* bogs but I found no more PC. At the town's local library I found reference books on the local flora and fauna, including maps covering the areas of Chile and Argentina that I would be travelling into during the next several weeks. I also found detailed descriptions of the PC species I sought along with habitat data, distribution ranges and altitudes of documented sites. On my final day while waiting for my flight north to Patagonia I was treated to a light snowfall which made that particular southern adventure complete.

Once arrived in the Rio Gallegos airport I immediately caught a bus inland to Calafate, located on Lago Argentina near the "Los Glaciares" national park. The boat tour along the park's spectacular Moreno glacier allows you to cruise between icebergs, watch new ones being calved and ride the large waves and swells that result. The local park naturalist knew of no PC in the area but had a few stories about sundews at the Fitzroy area to the immediate north. On my way out of the park office I picked up an information pamphlet to read and practice my Spanish with on the long bus ride back to the coast. In accordance with Murphy's Law, several hundred kilometres and several hours later I discovered information in the brochure describing *P. antarctica* in the park! C'est la vie!

Back along the coast I went north visiting the penguin, sea lion and sea elephant colonies as I went. These areas were of the typical dry patagonian grass and scrublands that exist on the eastern side of the Andes mountains. Later I travelled inland to

Photo #12

Photo #13. *D. uniflora* at Tierra del Fuego, Argentina.

Argentina 12 & 13—*D. uniflora* at Tierra del Fuego, Argentina.

Esquel and then Bariloche. The naturalists at "Los Alerces" National Park knew of local butterworts by the Torre Cillas Glacier above Lago Menendez but they were only boat or horse accessible.

In a Bariloche book store I found a local flora book, Flora de Puerto Blest, and it listed *P. chilensis* as growing in a National Park across Lago Nahuel Huapi. Private boat rentals to go there were very expensive for gringos so I decided to leave my PC searches for the western side of the Andes, in Chile.

Chile

Seeing Chile's south as I travelled through the Lake District was breathtakingly beautiful with endless mountains, rivers, lakes and forests. As you pass over the Andes mountains you can see the difference that the moister climate on the west makes as the vegetation gradually becomes greener and more lush. My bus trip ended in the coastal fishing town of Puerto Montt, on the Pacific Ocean. When I wasn't dining on seafood, I was over at the Forestry office. Señor José Mercado, the "Téchnico Forestal de Javier", kindly took the

P. antarctica, Chiloé Island, Chile.

time to make a list of potential national parks and locations that I should visit to find *Sphagnum* bogs and carnivorous plants.

My first field outing took me on a trip to Chiloé Island to the south. The resident naturalist at the "Chiloé Parque Nacional" headquarters was away on duties when I arrived but there were posters on the wall showing butterworts and sundews growing side by side! Having only several hours before the daily bus left I quickly headed out on the trails through the *Sphagnum* bogs and forests. Sundews were nowhere to be found, but in one bog that bordered a farmer's cow pasture I found waves of tiny yellow red-veined flowers. After slogging barefoot through the deep cow-churned peaty muck, I found that the flowers I had spotted belonged to a species of terrestrial bladderwort that appeared similar in form and habit to a small *U. intermedia*. Once I had finished taking photos and cleaning my feet, the time remaining made it clear that I had to jog back to the village in order to catch the bus before it left. On the way back, disappointed at not finding sundews or butterworts, I spotted a flash of green in the path's ditch. The green colour turned out to belong to a colony of butterworts! While catching my breath I took a couple of photos before

these plants were within the distribution range of *P. chilensis*, the low elevation and coastal occurrence made it clear that the plants were indeed *P. antarctica* !

North of Puerto Montt I travelled to the virgin temperate rain forests at "Agua Caliente" national park where several turberas [*Sphagnum* bogs] were located. The early evening drizzle dampened my spirits little as I soaked in the hot spring pools located on the lower slopes of the Antillanca Volcano; my tent was another matter during the cold wet night though. An hour before sunrise I started the ten kilometres hike up to the bog lake I had been given directions to. My determination to find sundews dwindled as the rains started again while I was at the lake. All that was to be found was an aquatic bladderwort, similar to *U. minor* in size and form, which I took a herbarium sample of and described later to the park rangers.

Central Chile turned up no other carnivorous plants. I must add however, that the vineyards near Santiago are a great place to look for PC, especially in the wine tasting rooms.

Bolivia, Peru, Ecuador and Columbia

Unfortunately, at this point in my journey there was hardly any time left for PC hunts. It was now necessary to concentrate on my return journey.

From Santiago I flew north to Arica where I changed planes to go on to Bolivia. The flight to La Paz was incredible, starting at sea level and crossing the Andes mountains to land on the altiplano at nearly four thousand metres in elevation. I kept a constant look out for PC while exploring the countryside, including the 5,200 metre Chacaltaya Glacier, but most of the areas were too high in elevation.

From Bolivia my travels took me into Peru where I travelled around Lake Titicaca, then continued by train into the Inca Valleys and Cusco. While climbing the peak over Machu Pichu I found *Sphagnum* beds hanging on the steep cliff sides but no PC could be found. There were however many different varieties of orchids in bloom at these Inca ruins in early March.

I saw vast expanses of beautiful countryside and potential PC habitats while bussing across Ecuador but I had little time to check them out properly. Soon I was off on a flight from Quito, Ecuador to Bogotá, Columbia for a short stopover. From there I would later return to Caracas, Venezuela by plane.

Venezuela

Once back in Caracas I set out to track down the PC collections I had heard and read about. A trip to the local University's Botany department found that the professor I wanted to see was in the Gran Sabana doing work. The secretary told me that there were no carnivorous plants at the university but I should try the nearby botanical gardens which had some. The people at the botanical gardens told me that their person was also in the field, that they had no PC either, and I should try the "Parque del Este". As it turned out, and as was expected, the park also had no PC and they suggested trying the university and the botanical gardens. Somehow none of the day's events were of any surprise to me at that point so I shrugged my shoulders and spent the rest of the week playing tourist, shopping, and relaxing. It was time to go home.

Carnivorous Plants in Ireland. III: David Moore and *Sarracenia* x *moorei* at Glasnevin .

By E. Charles Nelson
National Botanic Gardens, Glasnevin
Dublin 9, IRELAND

Sarracenia x *moorei*, the first artificial hybrid pitcher plant, was raised in the early 1870s at the Royal Dublin Society's Botanic Gardens, Glasnevin. This garden situated a few kilometres north of the centre of Dublin still flourishes and today is known as the National Botanic Gardens; for many years - from about 1870 until 1922 when the Irish Free State was established—it bore the name Royal Botanic Gardens, Glasnevin.[1]

Almost as multifarious are the names applied to the hybrid which resulted from the deliberate cross-pollination of *Sarracenia flava* and *S. leucophylla*. All plants arising from that cross, whether naturally occurring or artificially created, and all backcrosses have only one correct name *Sarracenia x moorei* [Anonymous ex] Masters. *S. x mooreana* Veitch is a superfluous synonym which *must* be abandoned; its continued use is contrary to the *International Code of Botanical Nomenclature.*[2]

The hybrid was named for Dr David Moore[3], Director of Glasnevin Botanic Gardens from 1838 to 1879. David was a Scot, a native of Dundee. His father and his grandfather were gardeners and David (and his younger brother Charles) evidently absorbed their love of plants. It must also be said that Scotland's unique system of education in the eighteenth and nineteenth centuries was conducive to the 'production' of gardener-botanists of outstanding calibre with a depth of knowledge equalled by few modern horticulturists or botanists.[4] While still in his 'teens, David moved from Scotland to Dublin, as an assistant gardener in the city's other botanical garden, that attached to the University of Dublin (Trinity College). At the College Botanic Garden, situated in Ballsbridge, one of Dublin's southern suburbs, David's botanical education and horticultural training continued under the guidance of James Townsend Mackay —he was also Scottish and also imbued with that distinctive Scottish passion both for wild plants and cultivated ones.

After four years in the College Botanic Gardens, growing orchids and Cape heaths, among many other things, David Moore became a field botanist working for the Irish Ordnance Survey, collecting indigenous species in the north of Ireland. His contribution to Irish botany was to continue for many years. But in 1838 he returned to gardening, as curator of the Royal Dublin Society's Botanic Gardens at Glasnevin.

David Moore took over a garden of about 30 acres which was in its fifth decade. It had been formed as a patriotic gesture in March, 1795, had risen to be a fine garden and then declined into the doldrums. Ninian Niven—yet another Scot—was appointed to resuscitate it in 1834 and he succeeded wonderfully, and was able to bequeath to David Moore a vigorous and expanding collection. By the late 1830s plants were flooding in from collectors in the Himalayas and the Pampas of the Argentine, from Australia and the Cape of Good Hope. Glasnevin was already leading many of its 'sister' gardens in the challenging work of plant introduction.

David Moore built on Niven's programme of replanting and acquisition. He began to form the orchid collection that was to sparkle brilliantly by the end of the century, and it was at Glasnevin, under David Moore's direction, that for the first time an orchid was raised from seed and brought into flower. He had an equal interest in trees and shrubs, raising and flowering such wonders as *Cardiocrinum giganteum*, that sumptuous lily from the Himalaya with a flower spike that can rise four metres in height.

Fig. 1. David Moore: photograph c. 1865

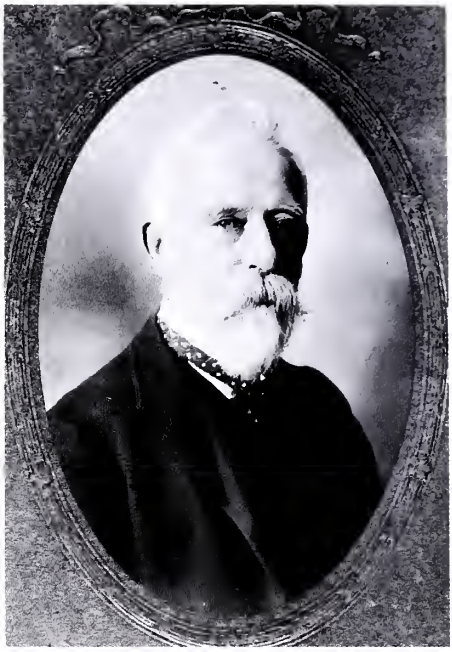

Fig. 3. Wilhelm Keit, who as propagator at the Royal Dublin Society's Botanic Gardens, Glasnevin, assisted David Moore in raising the first *Sarracenia* hybrids: photograph c. 1900 (by courtesy of Dr. L. E. Codd and 0. Keit).

Fig. 2. One of the gold medals awarded to David Moore at the International Botanical and Horticultural Congress, 1874, in Firenze by Royal Horticultural Society of Tuscany (by courtesy of Major-General F. D. Moore).

Insectivorous plants were among David Moore's particular favourites and he evidently assembled a good collection of species. But he was not content just to grow species; Moore and his gardeners, especially the young German-born propagator, Wilhelm Keit[5], realized that by artificially cross-pollinating *Sarracenia* species, hybrids might be produced. This they did, raising a batch of seedlings from *S. drummondii* (correctly *S. leucophylla)*, and from *S. rubra* both of which had been pollinated with *S. flava*. The exact date of this work is not known but one document suggests the *S. leucophylla* x *S. flava* hybrid was created in 1870 and the other in 1872. The first hybrid acquired the name *Sarracenia x moorei* as a compliment to Dr Moore, and the second was named *Sarracenia x popei* after William Pope, a foreman in Glasnevin Botanic Gardens. Dr David Moore brought the Glasnevin hybrids, and foliage of that wonderful aquatic lace-leaf, *Aponogeton madagascariensis* (formerly *Ouvirandra fenestralis)*, to the International Botanical and Horticultural Congress, Firenze (Italy), in June 1874. For his achievements in raising the hybrids and growing the lace-leaf, Moore was awarded two gold medals, both of which survive, one in the National Museum of Ireland, Dublin, and the other in the family. Which medal was for which achievement is not known - they are identical. By the late 1870s Glasnevin was a thriving garden, a veritable mecca for plant enthusiasts - many Irish gardens benefited from the largesse of Glasnevin in distributing new and rare plants, and gardens, both public and private, in other countries were not omitted when new glories could be spared.

David Moore married three times. His first wife died of typhoid in 1836 leaving two young children who, it seems, went to foster-parents. David's second wife died in 1847, again leaving two children who were cared for by others. Margaret, his third wife survived him, and they had five children, the eldest boy being Frederick who also became a brilliant horticulturist. When David Moore died in June 1879, Frederick was quickly appointed to succeed him as curator in Glasnevin. Following his father's successful early crosses, Frederick Moore continued to raise *Sarracenia* hybrids, including back-crosses (see Table l) during the 1880s and 1890s. Dr David Moore[6] - born on 23 April 1808 at Dundee. Scotland: died on 9 June 1879 in Dublin - is commemorated in many plants: *Sarracenia x moorei*, *Apium x moorei* (a natural hybrid found in Ireland), *Crinum moorei* (a lily from Natal, South Africa), *Passiflora mooreana* (a passion flower from Argentina). *Moorea* was proposed as the generic name for the pampas grass but was never taken up and *Cortaderia* is now conserved against it.

Notes

1. For a comprehensive history, see E. C. Nelson & E. M. McCracken. 1987. *'The Brightest Jewel': a history of the National Botanic Gardens, Glasnevin, Dublin.* Boethius Press, Killkenny.
2. This nomenclatural quagmire is discussed fully in E. C. Nelson. 1986. *Sarracenia* hybrids raised at Glasnevin Botanic Gardens, Ireland: nomenclature and typification. *Taxon* 35: 574-578.
3. Not for Thomas Moore of Chelsea Physic Garden, as was stated by J. A. Mazrimas & L. C. Song, Jr. 1984. *Sarracenia* hybrids—the F_1 generation. Part I. *S. flava* hybrids. *Carnivorous Plant Newsletter* 13 (2): 41-44.
4. E. C. Nelson. 1987. The Scottish connexion in Irish botany and horticulture. *The Scottish Naturalist* 1987:3-31.
5. E. M. McCracken & E. C. Nelson. 1990. Julius Wilhelm Keit, a German horticulturist at the Botanic Gardens, Glasnevin. *Moorea* 8: 34-40.
6. Various sources state that his surname was originally Muir; his baptismal register gives it as Moir which is another variant of Moore. For date of birth see E. C. Nelson. 1983. David Moore's date of birth—a correction. *Glasra* 7: 24

Table 1: Hybrids created in Glasnevin 1870-1885: this is an exact transcription of a list made c. 1900 by Frederick Moore (nomenclature has not been updated. nor has the orthography of the names been altered although neither accords with present-day rules of nomenclature.)

1870 *S. Moorei* (*S. Drummondi* x *S. flava* F)
(ed. note: F=female)
1872 *S. Popei* (S. *rubra* x *S. flava* F)
1878 *S. Drummondi* x *S. flava* F 3 pots
1879 *S. flava* x *S. purpurea* F

1880 *S. Popei* with sps ? [i.e. sp. ined.]
S. Popei x *S. purpurea* F
S. Moorei x *S. purpurea* F
S. Drummondi alba x *S. Moorei* F
S. flava x *S. Drummondi* F
S. flava x *S. purpurea* F
S. Drummondi x *S. purpurea* F

1881 [second parent is **male** in all subsequent crosses]
S. *Drummondi* x *S. Chelsoni*
S. Drummondi alba x *S. Chelsoni*
S. flava x *S. Drummondi*
S. rubra x *S. Chelsoni*
S. flava x *S. Chelsoni*
S. Chelsoni x *S. Drummondi*
S. Moorei x *S. purpurea*
S. flava x *S. purpurea*
S. Popei x *S. Chelsoni*
S. Drummondi x *S. Chelsoni*
S. flava x male parent uncertain (self?)
S. purpurea x *S. Chelsoni*
S. rubra x *S. purpurea*
S. flava x *S. Chelsoni*

1882 *S. Popei* x *S. purpurea*
[ditto]
S. flava x *S. purpurea*
S. Moorei x *S.* purpurea

1883 *S. flava* x *S. Stevensii*
[ditto]
S. Popei plant with flowers and pitchers closely approaching *S. flava* x *S. Stevensii*
S. Stevensii x *S. flava*
S. .Moorei x *S. Stevensii*
S. Moorei x *S. purpurea*
[ditto]
S. Drummondi x *S. Chelsoni*
S. Popei x *S. Chelsoni*
S. Popei x *S. Chelsoni*
S. Popei x *S. purpurea*
S. rubra x *S. purpurea*
S. flava x *S. purpurea*
S. purpurea x *S. flava*
S. purpurea x *S. .Moorei*
S. Chelsoni x *S. Popei*

1884 *S. Chelsoni* x *S. Patersoni*
S. Williamsii x *S. Moorei*
S. Stevensi x *S. Moorei*
S. flava maxima x *S. Moorei*
S. purpurea x *S. flava maxima*
S. Chelsoni x *S. flava maxima*
S. Moorei x *S. Chelsoni*
S. Popei x *S. Williamsii*
S. flava maxima x *S. purpurea*
S. Stevensii x *S. purpurea*
S. rubra acuminata x *S. purpurea*

1885 *S. Chelsoni* x *S. rubra acuminata*
S. purpurea x [*S. rubra acuminata*]
S. Moorei x *S. Patersoni*
S. rubra acuminata x *S. Patersoni*
S. Patersoni x *S. Chelsoni*
S. rubra acuminata x *S. Madissoniana*
S. Drummondii x [*S. madissoniana*]

Want Ads

David Parker (523 Cascade Circle; Bennettsville SC 29512; USA. Tel. 803/479-4257): B *Dionaea muscipula* from anyone whom would have any for sale.

Randy Zerr (1509 Pennsboro Circle; Bossier City LA 71112-3717; USA; Tel. 318/742-0237): TS: *Cephalotus*, droseras, other CPs. Would like to correspond & trade with other CP enthusiasts.

The Blue Mountains
Proving Grounds of the Fork-Leaved Sundew

By Ivan Snyder

In November of 1991 I had the great pleasure of travelling to Australia. This was to be a very extensive trip of three weeks. First, flying from my home in southern California to Sydney, Australia. Then renting a car and driving to South Australia, up into Alice Springs in central Australia, next northeast to Cairns, and then returning back to Sydney driving along the coast. While in the Sydney area at the beginning of this trip, an Australian friend, Rick Tyler, had decided to go for a hike in the Blue Mountains. Rick, whom I had hiked with on a previous trip to Australia is not a carnivorous plant enthusiast like myself, but is a very experienced and powerful bushwalker. Rick asked me what type of area I would like to see since there were several options in the type of range in the Blue Mountains. I explained that I would like to explore an area with plenty of water as around creeks and springs to search for CP sites. Rick then led me on the most fantastic hike I have ever experienced. The precise location of the hike I will not reveal in order to protect certain plants which I will describe since I do not know of these plants rarity. The first CP species I found here was *Drosera binata*, known commonly as the fork-leaved sundew. I encountered the two forms, variations T-form and *dichotoma*. These plants were in a habitat growing under conditions in which I would not previously have expected to see this species. The conditions of the habitat proved the success of this species trap design and overall structure. These plants were growing on vertical sandstone cliff walls rooted in horizontal crevices where moisture seeped out from and down along the rock. Some plants were growing in beautiful miniature gardens of sopping wet green moss together with ferns. Other fork leaves sprouted out of dry cracks where it would seem difficult to root. The largest plants I saw were of the *dichotoma* variety and were growing from-crevices just above pools of water at the base of waterfalls. The leaf petioles drooped down towards the pools surface and the traps held above the water in a manner as if to capture insects flying about around the pools. The largest trap leaf I found is pictured in the photo, (left) the size of which would have to be witnessed to be believed. The photograph does not do the reality justice. This trap was full of captured mosquitoes. Rick and I hiked along a trail for several miles the path of which brought us down a cliff into a canyon and back up again. The trail was for advanced hikers only and was very narrow and wet from seepage in some places to offer a very treacherous foothold along the precipice of a very frightening height. For miles we encountered the fork leaves and I took notice of differences in growth habit in separated groups. Most plants growing in sunny spots had more strongly growing upright leaves, while

those plants which grew in shaded spots had more weakly formed leaves that drooped downwards. Also I noted that some plants grew in a radial fashion, the leaves spreading outward from the plant center in all directions and with the leaf petioles pressed against the stone of the vertical cliff face. Further on along the trail I nearly stepped on a cluster of fork leaves that were growing on the trail. These plants were growing as the others I had seen with their petioles pressed against the substrate, but these plants were growing horizontally with robust leaves which should be growing upright. It then occurred to me that perhaps this growth pattern was not simply caused by growth conditions in a particular spot, but maybe an inherent trait. I decided the test to this would be to see if this growth habit was sustained in cultivation under normal conditions in which a typical plant should form upright leaves. Now, at home, the plants I have grown still display the unusual growth pattern. In good light the petioles are pressed against the soil while they unfurl. I have not seen any reports of fork leaves with this growth variation, and I feel that this should be researched. Pardon my grandiosity, but I think that if this plant does turn out to be a new variation a good name for it would be *D. binata* var.*prostratus*, or commonly referred to as prostrate form. In addition to fork leaves I saw a few other CP species on this hike. Deep red plants of white flowered *D.spathulata* were growing in two patches on rocks next to a pool at the base of a waterfall. I was surprised not to have seen any of the typical pink flowered form on this trail since they are common elsewhere. I saw a single plant of *D. auriculata* flowering at the time on a stream bank. A good crop of *U. dichotoma* flowering around the edge of a pool on wet sandy soil was seen. And one other species that was probably *U. lateriflora* but not in flower at the time was found on the cliff wall amongst what seemed to be a very fine leafed liverwort, though from a distance it looked just like a moss. *D. binata* was by far the most prevalent of all the carnivorous flora I saw in this range. The Blue Mountains of New South Wales Australia is truly the proving ground of this species. For me, seeing these plants in such a spectacular habitat is a most memorable experience.

Cultivation of *Nepenthes* at Longwood Gardens An Update After 12 Years

By John de Kanel and Rolfe Smith
Longwood Gardens, Kennett Square, Pennsylvania

As Larry Mellichamp reported more than a dozen years ago in this journal, by the 1950s the Missouri Botanical Garden had developed one of the finest *Nepenthes* collections in the world under the direction of George H. Pring. In 1956, after retiring from Missouri, Pring brought representative specimens to Longwood to ensure the continued preservation of the collection.

Efforts were made in succeeding years to obtain specimens from all over the world to improve both the quality of breeding stock and the probability of desirable male and female specimens being in simultaneous bloom. In 1967-1968, Pat Nutt, the horticulturist responsible for the *Nepenthes* collection at Longwood, began a hybridization program with some success.

Longwood is a display garden and research must necessarily take second place to this primary function. Severe limitations of time and space and the increasing cost of heating over the years have prevented unrestricted expansion of the *Nepenthes* collection. There is no organized *Nepenthes* hybridization program currently underway. Despite this, we are happy to report that *Nepenthes* still flourish here. Both a growing house, devoted to propagation and maintenance (Illustrations 1 and 3), and a large display area (Illustration 2) are provided for *Nepenthes*. Species and hybrids grown at Longwood are listed in Table 1.

Nepenthes are grown under the following cultural conditions. Large specimen plants for display are grown in wooden slat baskets with dimensions of 8 x 8 x 6 inches (20 x 20 x 15 cm). Plants are frequently pruned to stimulate basal growth and produce numerous lower pitchers which are generally more attractive than upper pitchers. Rooted propagations and backup plants are grown to display size in clay pots.

The medium currently used is 50% osmunda fiber broken into 1 to 2 inch (2.5 to 5 cm) fragments and 50% long fiber sphagnum moss. The medium is thoroughly soaked in water before being used to pot up plants. Previously a mixture of equal parts medium fir bark, charcoal pieces, coarse perlite, and long fiber sphagnum was used with success as a growing medium but it was found to decompose more rapidly, requiring us to frequently repot in order to maintain healthy plants.

Humidity in the growing house is maintained above 80% with an automatic centrifugal humidifier and humidistat supplemented by frequent hand syringing. Temperature levels are maintained above 62°F (17°C) during winter nights with steam heat and above 72°F (22°C) during the day. Ventilation is kept to a minimum to maintain high humidity even in summer when temperatures rise due to solar heating.

Minimum light levels occur in winter so all shading is removed from the house. By April 1, 50% shading is applied to reduce light levels to approximately 4000 foot-candles. All baskets are thoroughly watered each day with warmed well water, but pots are watered every other day.

Nepenthes are fertilized once a month with 1/3-strength Peters 20-20-20 both as a foliar spray and as a root drench. As a supplemental feed, seaweed fertilizer has been used for its trace element content.

Nepenthes are propagated in 2-inch-diameter x 3-inch-high (5 x 7.5 cm) clay pots in the same 50% shredded osmunda fiber/50% long fiber sphagnum medium used to grow display plants. A mixture of half peat moss and half coarse perlite has been used

Illustration #1. The Nepenthes growing house. The mist propagation area used to root *Nepenthes* is shown in the foreground. Backup plants are grown in clay pots with large plants in overhead slat baskets. The centrifugal humidifier can be seen in the center of the house overhead. Photo by Larry Albee, Longwood Gardens.

Illustration #2. *Nepenthes* and Bromeliad display house. Hanging slat baskets are used to grow and display large *Nepenthes* plants which are groomed to stimulate pitcher growth. Photo by Larry Albee, Longwood Gardens.

Illustration #3. Pruning and maintenance of *Nepenthes* in a basket. Rolfe Smith feeds a trap of *N. x dyeriana*. Photo by Larry Albee, Longwood Gardens.

Illustration #4. *Nepenthes truncata*. Photo by Larry Albee, Longwood Gardens.

Illustration #5. *Nepenthes villosa.* Photo by John de Kanel/Rolf Smith.

Illustration #6. *Nepenthes truncata x N. alata.* Photo by Larry Albee, Longwood Gardens.

Illustration #7. *Nepenthes x mixta.* As reported in *Gardeners' Chronicle* (1893), "Under this name we now publish a figure of a *Nepenthes* raised in Messrs. Veitch's establishment between *N. Northiae* and *N. Curtisi* and which in consequence received the provisional name of *N. Northisii.* This name was indicative of the mixed origin of the plant, but was objected to as implying the existence of a Mr. Northis, a shadowy personage who has no real existence. It may be better designated as *N. mixta.*" Photo by Larry Albee, Longwood Gardens.

Illustration #8. *Nepenthes x dyeriana.* This plant resulted from hybridization of *N. x mixta* and *N. x dicksoniana* and was described in the *Gardeners' Chronicle* of 1900 as the finest of the season and, with the exception of *Nepenthes northiae,* the finest *Nepenthes* yet introduced. It was grown and raised in the nurseries of James Veitch & Sons and was first exhibited at a meeting of the Royal Horticultural Society. It was appropriately named for Sir William Thiselton Dyer, the director of Kew Gardens, who had constructed the *Nepenthes* stove house at Kew. Photo by Larry Albee, Longwood Gardens.

with success in the past. Cuttings are taken so that five closely spaced nodes are present on each. The apical meristem is removed. The next two leaves down the cutting are cut in half to reduce transpiration. The lower two leaves are cut off to expose nodes which are dipped in commercial rooting compound containing 0.4% indole-3-butyric acid and 15% thiram fungicide in talc. The treated nodes are then wrapped in the growing medium and inserted in the pots. The cuttings are rooted on a mist table with 70°F (21°C) bottom heat under ambient greenhouse conditions of temperature and light with intermittent mist (12 seconds on every 12 minutes during daylight hours). See the photograph of propagation area in Illustration 1. Fine roots are usually visible extending from the cuttings through the bottom of the pot within two to three months. The success rate exceeds 95%.

Large, clearly labeled display plants in hanging baskets currently share a brightly lighted house with bromeliads and other tropicals (Illustrations 4 - 7). Humidity is maintained with an overhead high pressure mist system at above 80%. Plants are rotated with those in the growing area to keep the best pitchers on display at all times.

Construction plans at Longwood Gardens calls for the removal of all N*epenthes* from the present display house. They will be relocated to an area with ferns and other insectivorous plants. Localized fog systems to maintain a humid micro-environment in the areas to be occupied by *Nepenthes* baskets will be necessary. We look forward to reporting on an even better display after another decade has passed. We recommend that anyone interested in these unusual plants plan a trip to Longwood Gardens, just a 30-minute drive southwest of Philadelphia.

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Table 1A

***Nepenthes* Species in the Longwood Collection**

N. alata (4 forms)	N. maxima
N. ampullaria	N. mirabilis
N. bongso	N. rafflesiana
N. burkei	*N. rafflesiana cv.* Vittata
N. fusca	N. thorelii
N. hirsuta	N. truncata
N. hookeriana (natural hybrid)	*N. ventricosa* (2 forms)
N. khasiana	N. villosa

Table 1B
Nepenthes Named Hybrids in the Longwood Collection

N. x atrosanguinea
N. x balfouriana
N. x boissiense
N. x chelsonii
N. x coccinea
N. x dormanniana
N. x dyeriana
N. x edinensis
N. cv. Ile de France
N. x intermedia
N. x mixta
N. x mixta cv. Superba
N. x morganiana
N. x paradisae
N. cv. Rokko
N. x williamsii
N. x wittei
N. x wrigleyana

Table 1C[1]
Nepenthes Named Hybrids which are not documented by Schlauer (1986)

N. x excellens **Bednar** = *(N. thorelii x N. maxima) x N. x mixta*
N. cv. Hachijo **Okuyama** = *N. thorelii x N. mirabilis*
N. x leessii **Bednar** = *N. mirabilis cv.* Gold Star x *N. x mixta* cv. Superba
N. x lesliei **Dodd** = *N. ampullaria x N. veitchii*
N. x margaretea **Bednar** = *N. kampotiana x N. ventricosa*
N. x splendiana **Bednar** = *N. kampotiana x N. maxima*
N. cv. St. Louis **Pring** = *N. x chelsonii x N. x dominii*

Table 1D[1]
Nepenthes Unnamed Hybrids in the Longwood Collection

N. x coccinea x N. x williamsii
N. x dyeriana x N. thorelii
N. globamphora x N. ventricosa
N. cv. Lt. R.B. Pring x N. hookeriana
N. cv. Lt. R.B. Pring x N. x intermedia
N. maxima x N. x mixta
N. maxima x N. thorelii
N. merrilliana x N. alata
N. x. mixta x N. mirabilis
N. rafflesiana x N. hookeriana
N. thorelii x N. x wittei
N. truncata x N. alata
N. veitchii x N. thorelii
N. ventricosa x N. alata
N. x wittei x N. thorelii

[1] Names in formulas are arranged in the way the plant was identified when Longwood received the plant. The sex of parent plants should not be assumed from this.

Venezuelan Tepui Excursion Tapes Available

Bill Scholl along with two other ICPS members has made several interesting and successful trips to the Venezuelan tepui recently.

Roraima($20.00 US postpaid) and Ilu(3O.OO US postpaid). These **tapes** are VHS North American configuration.

Write Bill at 11420 Winterpock Rd., Cheaterfield, VA 23832.

In Europe, contact Alan Hindle, 29 Montserrat Rd. Lee-on-the-Solent, Hampshire P013 9LT, England for pricing and tape/VCR compatibility information. The latter tapes should run on most European VCR's.

Pitcher Plant Germination in Sequential Photographs

By Teresa A. Golembiewski
Biology Dept., UW-Whitewater
Whitewater, Wisconsin 53190

As part of a larger study,* several photographs of pitcher plants (*Sarracenia purpurea*) in various stages of germination and growth were taken. These photographs reveal the emergence of the embryonic root, the seed leaves, the first true leaves (pitchers), the developing leaf wing, and the opening of the first pitcher.

Pitcher plant seed was collected in southeastern Wisconsin in October and November. The seed was stratified for several weeks during the winter, then was sown the following spring. The seeds were sown on moistened filter paper in petri dishes. The petri dishes were placed in clear plastic bags to help prevent desiccation; the bagged petri dishes were set out in a heated greenhouse. Seeds were started on several different dates in order to obtain these photographs, which were all taken on the same day in mid-April. The scale used in the photographs is a metric ruler, which displays millimeters and centimeters.

The emergence of the embryonic root, which occurred within two weeks after the seeds were placed out in the greenhouse, marks the visible beginning of germination. The roots evident in photograph #1 have been visible for three days. The root emerges first in pitcher plants, and in most plants, in order to enable the young seedling to become anchored in the soil and to absorb water.

At ten days from the visible beginning of germination, the seed leaves are nearly completely exposed (photograph #2). All pitcher plants as well as many other flowering plants have two seed leaves within their seed coats. The seed leaves have been present in the seed since its early development, and function in providing food for the developing seedling. The seed leaves will not attain much larger size, nor will they attain the pitcher shape. After the true leaves develop and the seedling becomes self-sufficient, the seed leaves will simply shrivel up and drop off.

Photo #1

Photo #2

At twenty days (photograph #3), the outer coat of the seed has dropped away, and the seed leaves are spread to capture light. The first true leaf (and the first leaf to become pitcher-shaped) has just become visible at the growing point between the seed leaves. In this photograph, the first true leaf is about two millimeters in length.

At two months, several true leaves exist (photograph #4). The seed leaves are still present, though they will persist only a short time longer. A close-up of the smaller, younger leaf reveals the early formation of the leaf wing (photograph #5). A close-up of the larger, older leaf (photograph #6) reveals that the first-formed pitcher leaf has already opened. The opening evident is one millimeter across; the leaf itself is about one centimeter (just under one half inch) long.

* Golembiewski, Teresa A. 1984. The influence of pH and nutrient availability on the distribution of *Sarracenia purpurea* (pitcher plant) in three southeastern Wisconsin fens. M.S. thesis. University of Wisconsin, Milwaukee. 104 p.

Photo #3

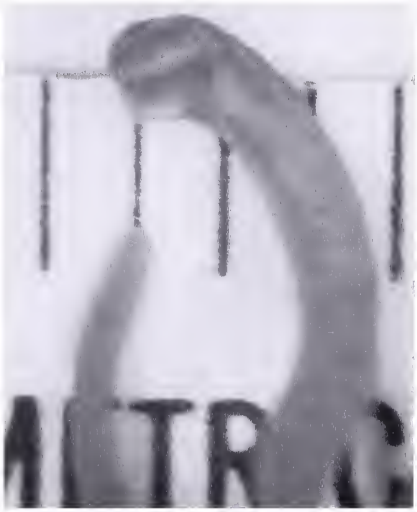

Photo #4

Photo #5

Photo #6

Nepenthes of New Guinea

By Matthew Jebb

(48 pp., 30 full page drawings. Science in New Guinea. Faculty of Science. University of Papua New Guinea; P.O. Box 320. University P. O., Papua New Guinea (PNG). 1991. ISSN 310-4303. Price US$12 (airmail) on application to Matthew Jebb; Christensen Research Institute; P.O. Box 305; Madang, Papua New Guinea)

Book Review by Martin Cheek
The Herbarium, Royal Botanic Garden,
Kew Richmond, Surrey, England UK TW9 3AB

The *Nepenthes* of New Guinea have been until now the most poorly known of all the regions of S.E. Asia. Recent members of CPN have featured information and illustrations on the species of Peninsular Malaysia. Borneo, Sumatra and the Philippines, but New Guinea, comparable in *Nepenthes* richness to at least the first and last of these, has been passed over. Several regional guides to the *Nepenthes* of S.E. Asia have been produced in recent years. The Malay Peninsula by Shivas (1984), Sumatra by Tamin and Hotta (1986) and most notably, Kinabalu (Borneo) by Kurata (1976) and north and west Borneo by Philipps and Lamb (1988). Dr. Jebb's account of the New Guinea species bears comparison with any of these. Indeed, it can be safely said that with this account an outstanding gap has been filled.

Eleven species, six of which are endemic, are recorded by Jebb. Each species is illustrated with a beautiful synoptic line drawing by the author showing stem, leaf and pitcher, together with inflorescence. Place of original publication, synonyms, types and range of distribution are given, followed by a detailed yet succinct description and notes on ecology. There follows a dot distribution map and list of the specimens examined. together with a paragraph or two of notes on relationships and diagnostic characters. No other regional monograph of *Nepenthes* is as scientific in approach or as fully illustrated.

The species of New Guinea are a mixture of the familiar and the unknown. The ubiquitous lowlanders *N. ampullaria* Jack and *N. mirabilis* (Lour.) Druce need no introduction, neither does the widespread *N. maxima* Nees of higher altitudes. But who has seen the endemic *N. neoguineensis* Macf., *N. papuana* Dans., *N. insignis* Dans., (all low altitude) or *N. paniculata* Dans.,. let alone the mysterious hooded *Nepenthes, N. klossii* Ridl. There is even a new species yet to be described. What is the explanation for the strange disjunctions seen in the distributions of *N. treubiana* Warb. (otherwise known only from Sumatra) and *N. veillardii* Hook. f. (New Caledonia)? Both species have their two localities separated by a distance the width of Australia though seemingly suitable habitats for each occur plentifully in the gaps between.

The account of the species is prefaced with a dozen or so pages discussing and illustrating architecture and morphology and ecology together with an identification guide to the species. As Kurata (1976) went beyond the confines of a mere floristic work in introducing the phytogeography and importance of altitudinal zonation of the genus, so Jebb excels in elaborating the architecture and predatory pattern of *Nepenthes*. As far as I am aware, he is the first to link the onset of 'upper' pitcher production with the initiation of flowering.

An outstanding feature of Jebb's account is the survey of the contents of 52 pitchers (of 20 plants) from a population of *Nepenthes mirabilis*. The contents are enumerated for each pitcher in order of opening on the plant. Each pitcher is recorded as either 'upper', 'lower' or intermediate in morphology and its length above the ground is noted. The data are analysed in two tables, the first comparing types of prey caught with

pitcher morphology (i.e. whether of 'upper' or 'lower' type). The second table compares type of prey with pitcher height (regardless of morphology). Figures are given for each of 12 sorts of prey: ants, cockroaches, myriopods, snails, spiders, others (i.e.walking and crawling animals - more likely to be accessible to ground or lower pitchers) and flies, ichneumons, beetles, orthopterans, moths and wasps/bees (i.e. flying insects - with more access to aerial pitchers). For perhaps the first time then, the hard facts are provided on predatory patterns in *Nepenthes*.

As expected. flying insects form a higher proportion in the diet of 'upper' and suspended pitchers than in 'lower' and grounded pitchers. Surprisingly though, an 'upper' pitcher still traps more crawling insects than flying ones. This seems due to the disproportionate preponderance of ants in this population at this time. If the figures for ants are subtracted from the data, flying insects become more important than crawlers in the diet of upper pitchers. It is important to note that that the figures relate to numbers and percentages of individual prey animals rather than weight of flesh. Weight for weight, a single orthopteran or cockroach might be the equivalent of a few hundred ants.

The identified contents of the pitchers represent a snapshot in time. In older pitchers, prey becomes so thoroughly digested that identification is impractical. It is interesting to note that freshly opened pitchers contain far more centipedes than older pitchers (whether 'upper' or 'lower') which, instead contain vast numbers (often 300/ pitcher) of ants. This seems to mean that the prey-specificity of pitchers changes with age (and not just morphology and physical position) as the author suggests.

There is a great need for more studies such as this. It would be interesting to have such data for other *Nepenthes* and to be able to compare the prey of different species in the same habitat to see if there is any segregation. Likewise, longterm studies of a population might reveal whether the spectrum of prey varies throughout the year. Much attention has been given to *Nepenthes* commensals and pitcher-robbers in recent publications on the ecology of that genus, but the most basic and interesting work remains to be done - more people should follow Jebb's example.

Little detracts from this account. Very few typo's came to light, though 'concensus' (p.8) and 'Hook. F.' (p.45) were noted. Something odd has happened in table 3 of Appendix A: the figures don't add up. It seems to me that at some stage beetles were transferred from the 'walkers' to the 'flyers' without adjusting the totals for either group.

Anyone interested in any aspect of *Nepenthes* is urged to get and read this work.

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Book Review

By Donald Schnell

Lecoufle, Marcel. 1990. ***Carnivorous plants— Care and cultivation.***. Blandford (Villiers House, 41/47 Strand, London WC2N 5JE; England; UK). 144 pages.

[US distributor: Sterling Publishing Co., Inc., 387 Park Ave. South, New York, NY 10016-8810. Australian distributor: Capricorn Link (Australia) Pty. Ltd., P0 Box 665, Lane Cove, NSW 2066.]

This long awaited book is an English translation of the original French published in 1989. Unhappily, in spite of many positive aspects, it is an overall disappointment which could have been prevented with more pre-publication attention to this English language version.

To start, the book is physically excellent. A bright, full color jacket is provided, the hard cover binding is strong and supple, the page size (ca 21 x 27 cm) allows for full size photo printing. The paper stock is glazed and of high quality, color photo and print production are faultless with very bright, accurately colored and sharp photos throughout. The print fonts are very clear and good and allow comfortable reading. Diagrams are well-designed and clearly show what they are supposed to. Near the center of the book is a fifteen page color photo album of very well printed pictures, but color photos are also liberally placed throughout the text, there hardly being a page without one.

While being very well plated and printed as mentioned above, about 15% of the photo subjects are not prime examples of what is to be shown. All photos are presumably by the author except a half dozen or so which are acknowledged on the title pages. I suspect many of the problem photos are due to shots of many plants in cultivation and not native to France. (The only field photos are of relatively few species in France, and borrowed pictures). The several photos of *Sarracenia x catesbaei*, for example, are not the best sample and the plant used appears introgressive and possibly diseased. There is confusion with S. *purpurea*. and its subspecies. One photo purportedly showing flowers of *S*.. purpurea and *S. rubra* side by side for comparison actually is of all *S. purpurea* flowers in two different stages of development. These are just a few examples, not to mention the many left/right, above/below, etc. mix-ups. Finally, I have noticed that many plants grown in Great Britain and France have a somewhat etiolated character, probably due to fewer fully sunny, clear, blue skied days during the growing season than we are used to here in North America.

Now we must discuss the text, and this is where the book is in trouble. The title page lists a translator from French to English, in addition to two editors of the English edition. Throughout the book, at least three to five times per text page there is clear awkwardness relating directly to the translation. One is tempted to excuse this since it is a translation after all, but when one spends what book costs, one must demand that the book stand on its own merit as presented. The fault clearly lies with very poor editing, either the guest editors or the publishing house editors, or most likely both. I have a feeling that the guest editors passed on the typescript (which they still should have worked on!), and it would have helped if they had also worked on the galley proofs.

As an example of the above, the very first sentence of the book, the first sentence of the "blurb" on the inside front jacket fold reads, "Carnivorous plants are the only vegetation on our planet capable of attracting, capturing and digesting animal prey for the purpose of both pollination and nutrition." First of all, pollinators are not captured in these species; secondly, it is difficult imagining digested prey accomplishing pollination! This continues on throughout the text at the conservative rate mentioned above.

Clumsy translation and finally editing might still be excused by the diehard really anxious to receive this book if it were not for the fact that the clumsy phrases often result in much misinformation and erroneous comments and recommendations. For example, the instructions for handling *Byblis gigantea* seeds are completely lost in muddle.

There is a forward by Jean-Marie Pelt, Professor of Plant Biology at the University of Metz which lends little to the book. Professor Pelt marvels at the concept of plant movement stating that at best we have simply noted it and that there are practically no in depth studies, this apparently totally ignoring the two dozen papers alone reviewed in recent years in CPN which describe very sophisticated studies and conclusions. A foreword by someone with more CP experience might been more useful.

The book is divided into three parts of several chapters each. Part one is GENERAL PRINCIPLES, and here there is limited and often inaccurate information beyond what can be blamed on poor translation and editing. These five chapters are the weakest in the book since the summaries of taxonomy, anatomy, morphology, physiology, etc. suffer much for brevity and the translation/editing problems noted. The author is clearly stronger on the subject of cultivation, and there is a useful section on pests and diseases, although the final "grabber"— how to treat them— is too often passed over too superficially. For instance, when use of fungicides or insecticides are finally mentioned, there is no detail on which ones would be recommended regarding safety for plants and growers, avoidance of plant-toxic solvents (present in nearly all products sold as solutions ready for dilution) and the avoidance of aerosol can sprays which can freeze a small plant if held too close. And what fungicide should be used for those sown seeds? Not a clue.

Part two is the photo album mentioned above. Part three is probably the strongest part of the book relatively speaking, but errors and bad translation persist. The section covers 35 species in eleven genera of carnivorous plants in more detail. These are mentioned as the most commonly grown species, but this is seriously open to question depending on where one lives and what is available. They more likely represent what is usually most available in the Lecoufle Nurseries.

Each species section or chapter runs either two or four pages and all are liberally sprinkled with fine color photos. There is a pictogram summarizing culture requirement The text begins with an entymology of species names, followed by descriptions of variable usefulness, (on *Nepenthes*: "... inflorescence is in the form of an elongated bunch... " Bunch?) and then culture and propagation (sexual and asexual). A few pests are listed with reference to the pests chapter previously. Again, there are difficulties with awkward translation, errors and poor editing. I will not dwell on these in detail.

I presume the species sections are intended to stand as independent references for the reader. Thus, if one wishes to look up *Sarracenia. psittacina,* one can do so and skip the other four sarracenias covered. Again, this does not quite work since common features of a genus are often dispersed over all the species sections, or are repeated. The first error causes frustration, the second wastes pages which might have been used for more species or pictures. For example, the various asexual methods of propagating sarracenias are dispersed one each over the five species chapters, and yet all apply to all sarracenias! Reversely, one is bombarded with description features common to all species repeated in each species section instead of a paragraph of differences between the species of a genus in one place.

The book winds up with a CP species and hybrids list which is strongest for *Nepenthes*;; a fairly useful glossary with some rather peripheral definitions; and an index.

In conclusion, from a world coverage viewpoint (that is, the most genera and species) regarding species descriptions and how to grow CP, Slack's INSECT EATING PLANTS AND HOW TO GROW THEM is still vastly superior and the leader still by far in this book category. Unfortunately, it is now hard to get. I regret,in some ways,

seeming so negative about the Lecoufle book since we all crave new CP books, but it does not stand well on its own. I would not recommend it to beginning or intermediate CP people because of its text errors and confusion in translation with very poor editing—at least as a first or only reference, especially considering the price. Experienced CP people may wish to buy the book simply to complete their libraries and to see how other people do things, after reading between the lines and using some imagination.

Literature Reviews

Albert, Victor A., et. al. 1992. Parallel evolution and phyletic co-occurence of different trapping mechanisms in carnivorous plants. II. Bot. Soc. Am. meeting abstracts for 9-13 August 1992, papers No. 378 and 379. (We should mention that the "et al"includes old CPN friend Stephen E. Williams).

These two papers came out of a series of polymerase chain reaction fired analyses of rbcL chloroplast genes in leaves of various CP. These studies are being done on various plant groups throughout the world in order to have another tool to enhance concepts of phylogeny. They seem to be a must for any serious taxonomy student and the journals are full of them. These concentrate on our CP. Some of the conclusions are that perhaps *Byblis* has a close affinity to the Lentibulariaceae, *Roridula* to the Sarraceniaceae, and *Cephalotus* to a large group including the Cunoniaceae and Oxalidaceae. Studies suggest that glandular specialization is a prerequisite for evolution of carnivory. Further, pitcher and "flypaper" trap plants may have evolved independently at least six times in parallel in flowering plants. [DES]

Case, F. W. 1992. Carnivorous plants for bog Gardens. Bulletin of the American Rock Garden Society, 50:205-210 (Color photos: pp.203-204)

This is a brief but useful review of the major American species of CP and their function in carnivory, and primarily the author's success in growing and propagating them in an outdoor bog in the Great Lakes area. The author's bog is located next to a pond, and there is a line drawing explanation of how to rig a siphon to keep the adjacent bog watered to proper level by using water from the larger pond. If the pond water subsides for whatever reason, it can be refilled with tap water since dilution and possibly other chemical and biological factors in the pond render the water non-toxic to the bog.

Cippolini, Donald, et. al. 1992. Total carbohydrates in nectar of pitcher plants (*Sarracenia purpurea*). Bot Soc Am meeting abstracts for 9-13 Aug 1992, paper No. 197

This abstract summarizes research in which pitcher leaf nectar was collected from pitchers of varying ages and at varying locations on the pitcher leaf. Collection was done using filter paper discs followed by carbohydrate estimation by the Anthrone method. They found that younger first year pitchers produced the most carbohydrate rich nectar, particularly in the pitcher mouth area. This correlates with the authors' observations that insects seem to show greater interest in younger pitchers during the season. [DES]

A recent issue of **CLIPPINGS** (15:6-7, 1992), the newsletter of the Atlanta Botanical Garden, contains two articles of interest. Madeleine Groves, a Garden intern from Kew, has completed a study in the southeastern US regarding the impact of harvesting pitchers from the field for the florist trade here and mainly abroad. She has found that as many as four million pitchers are harvested annually, and study of this factor along with examination of techniques and timing, leads her to the conclusion that such harvesting is indeed detrimental to pitcher plant bogs. She has endeavored to interest harvesters in propagation for the trade, which we would all hope will come to pass.

However, harvesters are probably not likely to invest time, money and in such efforts when the market may be ephemeral at best, and it is easier to harvest from private forest lands. There are funds to follow-up on Madeleine's efforts, and we can all hope my pessimism is misplaced here.

The second article is a page and half featuring a black and white photo of *Sarracenia rubra* ssp. *alabamensis* at the head and describing new outdoor container plantings of sarracenias on a patio adjacent to the outdoor bog area next to the Fuqua Conservatory. The second half of the article describes ABG's methods for seed propping in the Atlanta area. One of several questions often asked has been solved by their research and that is three weeks stratification at 38° F is sufficient to break dormancy of *Sarracenia* seed, and that germination is enhanced by bottom warming of pots or trays.

Fromm-Trinta, E. 1991. 0 genero *Utricularia* L. no Brasil. VI. Especies da regiao centro-oeste. Bradea 5:424-431. IN PORTUGESE.

This is a paper in the author's continuing series on the Lentibulariaceae of Brazil. This covers the Utricularias of the central- western portion of the country, particularly the states of Mato Grosso, Mato Grosso do Sul, Goias and the Federal District. She records 37 species and presents a key that should be use botanizing the area. The remainder of the paper lists notable occurrences and habitat of each species. She remarks that two usually terrestrial species can be found in unusual habitats: *U. triloba* as an epiphyte, and *U. viscosa* an aquatic.

Knight, S. E. 1992. Costs of carnivory in the common bladderwort, *Utricularia macrorhiza*. Oecologica 89:348-355.

The author proposes that when a plant produces structures with reduced or no photosynthetic activity at the expense of green leaves, such as the traps of *Utricularia*, then the plant is expending valuable energy and growth resources into this venture. The traps should provide some advantage to make up for this loss of photosynthetic productivity. Indeed, measurements of respiratory and other activity indicate that with bladders grow only to 21-83% of the size of plants with bladders extirpated in various lake waters and other solutions. Thus there clearly is expenditure into the traps, but the question of whether this proves useful to the plant is left. Perhaps further studies on various other aspects of growth, turion formation and reproductive capacity may clarify this.

Lowrie, Allen and Neville Marchant. 1992. Four new *Drosera* taxa from south Western Australia. Nuytsia 8:323-332.

In 1982, Marchant and George recorded 42 species of *Drosera* from south Western Australia in FLORA OF AUSTRALIA. Through the studies of Lowrie and friends, new taxa have been found bringing the current number to 68.

This paper describes four new taxa: *Drosera browniana, Drosera stolonifera ssp. monticola* (these are tuberous), *Drosera grievei* and *Drosera sargentii* (these are pygmies). The paper includes full page botanical drawings to scale of details for each taxon (similar to Lowrie's books) and detailed descriptions, habitat information, etc.

Mohlenbrock, Robert H. 1992. Boykin Springs Longleaf, Texas. Natural History, July, pp. 62-64(Volume number not available).

Boykin Springs Longleaf is a sector of Angelina National Forest in east Texas in the area once known as the Big Thicket. The sector has been set aside as a preserve. The area is interesting, generally much like the sandhills regions of the Carolinas and middle east Georgia. The country consists of rolling sandy soil hills originally covered by longleaf pines and a rather rich understory flora. Near the bottoms of many of the hills, there are seep bogs (seven in the preserve) due to water running through the upper sandy soil and then striking hardpan, resulting in some wet lateral outflow at the seeps. While the tops of the hills are quite dry most of the year due to drainage, the

seeps are a bog habitat in which sundews and *Sarracenia alata* grow. The article features three color photos, including one of *S. alata* plants full page in early spring flower with the pitchers yet unopened. There is a detail map showing the location of the preserve in relationship to numbered roads. [DES]

Newell, Sandra J., et. al. 1992. Proficiency of insect capture by pitcher plants (*Sarracenia purpurea*) Bot Soc Am meeting abstracts for 9-13 August 1992, paper No. 210.

This abstract briefly summarizes the authors' work on measuring the efficiency of *Sarracenia purpurea* in capturing insects in a Pennsylvania bog throughout the spring/summer season. The method is quite clever: A camcorder was set up to cover three or four pitchers over a two hour period, until a total of 70 or so pitchers were recorded for each date session. The resulting tape was studied and showed extreme variability in insect interest in pitchers. Many that did enter the pitchers seemed to escape easily, and the famous downward pointing hairs of the lid were easily maneuvered on in most cases. The authors concluded that proficiency of insect capture was extremely low. (Ed. Note—Low compared to what? What was relative energy expenditure over any gain? Apparently what is caught is sufficient to have sustained the species over possibly millions of years!). [DES]

Salter, Ian. 1992. Courting daughters? CPS News No. 3.

The author describes inducing vegetative budding in *Drosera capensis* by excising the head of the developing flower spike when it is no more than two to three inches tall. A new plant will then develop at the base of the peduncle. When it develops a root, it can be separated, or allowed to grow on along with the main plant.

Schlauer, Jan. 1991. *Pinguicula reticulata* spec. nov., ein neues fettkraut aus Mexico. Palmengarten 55:26-29. IN GERMAN.

The author describes still another new species of Mexico, this near San Luis Potosi. The flower has a white corolla with very distinct and striking purple veins. The article features a full page of diagnostic line drawings, including corolla hairs, and a small photo of the plant flowering in a pot. There is considerable discussion on distinguishing this species from several others.

Stoutamire, Warren P. 1992. Orchid seeds versus the mails. American Orchid Society Bulletin 61:578-581.

The reader is probably wondering what mailed orchid seeds have to do with CP, but I think we might extrapolate a lesson from this in our own CP seed mailings. In his usual thorough and precise manner, the author assesses damage done by mailing orchid seed in envelopes through the US Postal System. While there is partial tongue-in-cheek, he is basically quite serious. I will only briefly describe his methods and review the results. Orchid seeds are very small, dustlike, and several species from several genera were placed in cellophane envelopes, the envelopes containing relatively few seed to prevent a padding effect. The packets were taped side by side so a central one in a pile would not be shielded by the outer ones. These were placed in an envelope folded in an ordinary sheet of stationery and mailed from Akron, Ohio to various places around the US and to foreign countries, with instructions to mail the envelopes back to him. Microscopic examination of the well traveled seed disclosed appalling damage ranging from fragmentation to "flour" to crushing of embryos. Needless to say, the previously fresh or well stored seed did not do well in germination tests compared to control seed of the same lots kept in Akron. The clincher is that a follow-up study in which seed cellophane packets were padded with either tissue paper, convoluted foam or bubble pack (oops!—I had used that often—Note past tense now!) disclosed even more disheartening results with equal damage physically and zero to very low germination rates. It seems the mills of the USPS equipment are very

determined. The moral is that even the smallest seed should be shipped in some sort of rigid packet that will protect from milling damage as is required when mailing in envelopes, even with padding. I will no longer blame poor storage at point of origin out of hand for bad germination results of seed sent me in envelopes without some "rigidization"! [DES]

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Correspondents, Contributors & Photographers