CARNIVOROUS PLANT NEWSLETTER

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Cover

Sarracenia X *catesbaei* growing in the wild in Brunswick County, North Carolina on 03 May 1970. This is a naturally occurring hybrid between *S. purpurea* and *S. flava.*

Photo by T. L. Mellichamp

Editor's Corner

It is that time of year again. We are happy to announce that the rates for next year will not increase. Multiple-year subscriptions (with a three-year limit) will be available as a protection against possible future increases. Please send along your mailing label with any corrections with your subscription order.

Back volumes will continue to be available at the following rates:

	U.S., CAN., MEX.	All Others (Air)
Volumes 1-6	$5.00	$6.00
Volume 7	7.00	7.00
Volumes 1-6 (package)	27.00	34.00
Volumes 1-7 (package)	34.00	40.00

Orders must be accompanied by payment in U.S. dollars. Checks and money orders should be made payable to CSUF FOUNDATION – ARBORETUM.

This and a reminder in the December issue will be the only notice of renewal.

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

Copy deadline for the December issue is November 1, 1978.

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Seed Bank

Patrick Dwyer (St. Michael's Episcopal Church Gardens and Arboretum, 49 Killean Park, Albany, NY 12205) has filled 190 seed orders since January, and, as a result, the seed inventory is becoming depleted. Readers are encouraged to continue their fine support of this project by sending and/or ordering seed (see CPN 7(1):3-5).

SEED BANK INVENTORY
July 23, 1978
Cost $.50 per pack
Please list substitutes

Byblis liniflora; Darlingtonia californica; Dionaea muscipula, D. aliciae (pale) 3*, *D. aliciae* (purple) 1, *D. anglica, D. anglica* possibly mixed with *D. x obovata* 4, *D. burmannii, D. x californica* 5, *D. capensis, D. capensis* (reg. + narrow mixed), *D. capensis* (narrow), *D. capensis* (narrow) & *D. capillaris* (long) mix 3, *D. capillaris, D. capillaris* (long leaf), *D. filiformis filiformis, D. intermedia, D. montana* 3, *D. natalensis* 1, *D. nitidula* 6, *D. planchonii, D. pygmaea* 2, *D. rotundifolia, D. spathulate, D. spath.* (Australian), *D. spath.* (Kansai), *D. spath.* (Kanto) 5, *D. spath.* (white flower); *Drosophyllum lusitanicum* 11; *N. khasiana, N. mirabilis* 13; *Sarracenia alata* 8, *S. alata* (purple throat) 1, *S. alata* (x-ray, 100 rads), *S. alata* (x-ray, 550 rads) 7, *S. flava, S. leucophylla, S. purpurea* 1, *S. purpurea purpurea, S. purpurea riplicola* 3, *S. rubra alabamensis, S. rubra jonesii, S. alata x flava* (copper) 6, *S. alata x flava* (heavy veined) 8, *S. alata x leuco, S. alata* (purple) *x leuco., S. alata* (purple) *x leuco.* (green vein) 4, *S. alata x purpurea venosa* 5, *S. x catesbaei* 8, *S. x harperi* 14, *S. leuco. x minor?* 1, *S. leuco. x rubra* 8, *S. leuco.* (dark) *x wrigleyana* 8, *S. purp. x minor* 1, *Sarracenia mix; Utricularia lateriflora* 1, *U. longifolia* 8, *U. subulata* 4.

* Number of packets is listed if there are fewer than 15.

Round Robin Letter Exchange

TERRY BROKENBRO (37, Laburnham Gardens, Upminster, Essex RM 14 1HX, Great Britain).

With several RR's that are currently running, it turns out that some of them were damaged in the mail, and, with the varying sizes of paper used, some of the contributions were lost during the robin circuit. Therefore, a strong plastic container is used now for each RR and to make reading easier, a roll of paper is provided for participants to use. This means each participant has an equal amount of space to use, and postage costs will be equally distributed. However, a charge will have to be made to cover my ever-increasing material and postage costs. Charges will come into effect January, 1979: 1) A charge of $1.00 per RR year; 2) Robins starting on or after September 1 will include payment up to the end of the following year.

The above charge is based on costs of an average robin, and it's up to the RR participants to move their contributions along quickly. To reduce costs further, no letters in the future will be acknowledged, and I will devote the time to RR reviews in CPN. I request in writing any resignation of a particular RR member. Kindly advise me of this fact by October 1978. Please send all funds to me at my address given above (NOT to the CPN office).

News and Views

RICHARD ADAMS II (Bailey Hortorium, Cornell University, Ithaca, NY 14853) can supply copies of his magazine articles on *Cephalotus* and plant tissue culture (see reviews this and last issue). BE SURE to send a self-addressed *long* envelope with two first class stamps on it when requesting copies.

JOHN BOURGEOIS (2444 Cranmore Road, Victoria, BC, Canada V8R 1Z7) writes: Congratulations on producing the excellent new format of CPN. The old format was good but the new one is better. I am glad that I voted in favor of the new format.

My main reason for writing is to ask for answers to a strange phenomenon shown by one of my *Dionaea* plants. It started about three weeks ago when I noticed that the main flower stem appeared to be splitting up. I have kept a watchful eye on this plant over the last three weeks to see if any of the buds would blossom. They all appear to be quite capable of producing flowers now with the center (or main) part blossoming first. I have also noticed that the two side stems are separating further down the main stem.

I suspect that this phenomenon could be due to stress of some kind because I have recently noted a second occurrence of this phenomenon on a smaller specimen. In this case the plant was placed in dormancy, with *Sarracenia flava,* for four months under essentially dry, cool, and dark conditions.

If any of our subscribers have any other theories to explain this strange occurrence, I would sure like to hear them.

TERRY BROKENBRO (37, Laburnham Gardens, Upminster, Essex RM 14 1HX, Great Britain) writes: As the membership of CPN increases, I receive more requests for information on the various Round Robins in operation. One subject which would appear to be especially popular is *Nepenthes* and CPN subscribers may be interested in the following:

It seems that antagonism exists between various *Nepenthes* species when grown together in the same pot and the more dominant (vigorous) plant seems to outgrow the others. Grafting is a subject often mentioned in connection with *Nepenthes,* though this has been tried by Mr. Yamamoto without success. A developing callus causes the scion to fall off. If this problem can be overcome, it certainly would be ideal for growing the more vigorous species on a weaker growing stock, thus dwarfing the plant overall.

If anyone grows plants in a sphagnum mix and loses them to rot, then one successful medium they could try is a medium grade of orchid bark by itself. I personally use, in our damp English climate, an equal mixture of live sphagnum moss, vermiculite and pine bark. This is also ideal for *Sarracenia, Pinguicula, Utricularia* and more vigorous *Drosera,* eg., *D. capensis.*

Nepenthes cuttings often seem to either rot with wet compost or the opposite extreme due to hot, sunny weather. From the general comments, it would appear the foregoing points are worth noting for successful strikes:

1) Humidity should be constantly kept around the top of the cutting to prevent drying out. 2) Be patient—cuttings may take up to two months to root. 3) Bottom heat is important even during the summer if cool nights are common. 4) Various rooting composts based on live sphagnum moss are best but should always be moist and not wet!

The more vigorous *Nepenthes* often become leggy with age and CPers could try to notch older stems towards the base of the plant above a dormant bud to force growth. I would like to hear from growers who try this technique whether they are successful or not.

JOSEPH CANTASANO (2717 Jerusalem Ave., N. Bellmore, NY 11710) writes: Last spring in 1977, I started a bed of *Dionaea* (seeds and plants) and *D. capensis, S. flava* and other plants in a sphagnum bog on Long Island in which all plants grew without loss of any plants. In summer, the Long Island area is humid and sometimes very hot; in winter, it is humid and very cold. The fact that the southern CP can survive on this island indicates that they are very hardy. I hope to introduce *Darlingtonia* and *Cephalotus* this summer in this same bog.

I am now growing over 50 types of *Nepenthes* in my greenhouse, and of all my plants, *N. ampullaria* is the only one that produces rosettes all the way up the stem, even to the top of the plant. As you know, this is common in this species. This plant is producing good size pitchers from the tendrils and from the rosettes. To reproduce this plant, I easily pull off a rosette from the stem (with a downward or upward motion) and then plant it into shallow trays filled with sphagnum moss. *Nepenthes* seems to root better in the loose moss because it allows more air to reach the roots. I now have many new plants without chopping up the mother plant.

I found that *Nepenthes* and *Drosera* grown in the same greenhouse don't mix very well. I have a misting system that operates 24 hours a day, and it becomes so misty inside that it's like walking into a heavy wet fog. Sundews are waterlogged all the time and the stems are dropping to the moss with the tentacle tips a watery mess. At the apex of the flower stalk, instead of a normal flower, a tiny rosette of a *D. filiformis* plant grows here instead of producing seed.

ALAIN GODBOUT (38 Rue Labelle Beauport, Quebec, Canada G1E5R3) relates more of Darwin's letters on his CP studies: He wrote (July 29, 1860) to Sir Joseph Hooker: "Latterly I have done nothing here; but at first I amused myself with a few observations on the insect-catching power of drosera; and I must consult you sometime whether my 'twaddle' is worth communicating to the Linnean Society."

In August he wrote to the same friend: "I will gratefully send my notes on drosera when copied by my copier. The subject amused me when I had nothing to do."

He has described in the *Autobiography* (p. 47) the general nature of these early experiments. He noticed insects sticking to the leaves, and finding that flies, etc., placed on the adhesive glands, were held fast and embraced, he suspected that the captured prey was digested and absorbed by the leaves. He therefore tried the effect on the leaves of various nitrogenous fluids — with results which, as far as they went, verified his surmise. In September, 1860, he wrote to Dr. Gray: "I have been infinitely amused by working at drosera; the movements are really curious; and the manner in which the leaves detect certain nitrogenous compounds is marvelous. You will laugh, but it is, at present, my full belief (after endless experiments) that they detect (and move in consequence of) the 1/2880 part of a single grain of nitrate of ammonia; but the muriate and sulphate of ammonia bother their chemical skill, and they cannot make anything of the nitrogen in these salts!"

He wrote to Lyell (November 1860): "I will and must finish my drosera ms., which will take me a week, for, at the present moment, I care more about drosera than the origin of all the species in

the world. But I will not publish on drosera till next year, for I am frightened and astounded at my results. I declare it is a certain fact that one organ is so sensitive to touch, and a weight seventy-eight times less than that, viz., 1/1000 of a grain, which will move the best chemical balance, suffices to cause a conspicious movement. Is it not curious that a plant should be far more sensitive to the touch than any nerve in the human body? Yet I am perfectly sure that this is true. When I am on my hobby-horse, I never can resist telling my friends how well my hobby goes, so you must forgive the rider."

The work was continued, as a holiday task, at Bournemouth, where he stayed during the autumn of 1862. A long break now ensued in his work on insectivorous plants, and it was not till 1872 that the subject seriously occupied him again. A passage in a letter to Dr. Asa Gray, written in 1863 or 1864, shows, however, that the question was not altogether absent from his mind in the interim: "Depend on it you are unjust on the merits of my beloved drosera; it is a wonderful plant, or rather a most sagacious animal. I will stick up for drosera to the day of my death. Heaven knows whether I shall ever publish my pile of experiments on it."

He notes in his diary that the last proof of the *Expression of the Emotions* was finished on August 22, 1872, and that he began to work on *Drosera* on the following day.

C. D. to Asa Gray (Sevenoaks), October 22 (1872): " . . . I have worked pretty hard for four or five weeks on drosera, and then broke down so that we took a house near Sevenoaks for three weeks (where I now am) to get complete rest. I have very little power of working now, and must put off the rest of the work on drosera till next spring, as my plants are dying. It is an endless subject, and I must cut it short, and for this reason shall not do much on *Dionaea.* The point which has interested me most is tracing the nerves which follow the vascular bundles. By a prick with a sharp lancet at a certain point, I can paralyse one half the leaf, so that a stimulus to the other half causes no movement. It is just like dividing the spinal marrow of a frog; no stimulus can be sent from the brain or anterior part of the spine to the hind legs: but if these latter are stimulated, they move by reflex action. I find my old results about the astonishing sensitiveness of the nervous system (!?) of drosera to various stimulants fully confirmed and extended . . ."

C. D. to Asa Gray. Down, June 3 (1874): " . . . I am now hard at work getting my book on drosera and co. ready for the printers, but it will take some time, for I am always finding out new points to observe. I think you will be interested by my observations on the digestive process in drosera; the secretion contains an acid of the acetic series, and some ferment closely analogous to, but not identical with, pepsine; for I have been making a long series of comparative trials. No human being will believe what I shall publish about the smallness of the doses of phosphate of ammonia which act . . ."

The manuscript of *Insectivorous Plants* was finished in March, 1875. He seems to have been more than usually oppressed by the writing of this book, thus he wrote to Sir J. D. Hooker in February: "You ask about my book, and all that I can say is that I am ready to commit suicide; I thought it was decently written, but find so much wants rewriting, that it will not be ready to go to the printers for two months, and then will make a confoundedly big book. Murray will say that it is no use publishing in the middle of summer, so I do not know what will be the upshot; but I begin to think that every one who publishes a book is a fool." The book was published on July 2, 1875, and

2700 copies were sold out of the edition of 3000. (It was an extraction of the book *The Autobiography of Charles Darwin and Selected Letters,* edited by Francis Darwin, Peter Smith, Dover Publications Inc., New York, 1958).

Other references: *Charles Darwin, His Life Told in an Autobiographical Chapter and in a Selected Series of His Published Letters,* D. Appleton and Company, NY 1892. Pp. 340-342. *Correspondance Entre Charles Darwin et Gaston de Saporta,* Yvette Conry, Presses Universitaires de France, Paris, 1972, pp. 110 and 114.

JEFF GROTHAUS (1265 Iliff Ave., Cincinnati, Ohio 45205) comments on the new CPN look: I have mixed reactions to the new format of CPN; it seems shorter especially the "News and Views" section. Quality color pictures, however, are a definite advantage over the old newsletter form.

Ed. They are! Too many short notes getting longer! (JM)

MAKOTO HONDA (3748 W. 9th St., Apt. 308, Los Angeles, CA 90019). "Here are some stamps featuring *Pinguicula ramosa* MIYOSHI, issued on 6/8/1978 as a part of "Preservation of Nature" series. *P. ramosa* is indigenous to Japan and can be found growing in a very limited geographical region on Honshu, the main island of Japan. It is the first CP stamp to be issued in Japan.

LES KAUFMAN (103 West 29th St., Baltimore, MD 21218) writes: In the vicinty of the Pea Porridge Ponds, White Lake area in the White Mountains region of New Hampshire, we found ground mats of *Drosera rotundifolia* and *D. intermedia* in open areas at the pond margins. The leaves of the largest specimens were 9 cm long, these growing in the midst of sphagnum at the border between sand flat and blueberrry/laurel understory. Most plants were in flower. Several specimens were exactly intermediate in character between the two species, and may have been robust hybrids; i.e., leaf shape intermediate, plants erect but on short stems, traps at acute angle with main stem.

I would appreciate any information and/or specimens of *Drosera* spp. that produce leaves lacking glandular hairs some or all of the time. I am also trying to obtain ten large specimens of *Drosera macrophylla.* The purpose of these specimens is to continue study of the functional morphology and behavior of carnivorous plants in response to low or high prey availability. I would, in fact, be interested in beginning a joint-research group on growth strategies of CP's if others are interested. This is an area of personal research interest, i.e., I intend to use the information I obtain in publications, with proper credit or co-authorship.

P. S. LAVARACK (7a Cross St., Toowong, Queensland 4066, Australia) writes: My greenhouse heating system may be of interest to CPN. I use an immersion heater (cost $10) in a large garbage bin of water. It is rigged up to a thermostat and has no trouble keeping the temperature at 16-17° C when the outside temperature is about 4-5°C. The humidity is, of course, extreme when it is operating. The greenhouse is a simple house made of water pipes and covered with shade cloth and in winter enclosed in polyethylene. It's primitive but it works in our relatively mild, but very dry winters.

PAUL MC MILLAN (2155 Old Patagonia Road, Nogales, Arizona 85621).

Incidentally, in regard to growing terrestrial *Utricularia,* it might be interesting to add a note in CPN about an observation I have made which undoubtedly has been observed by some others. If

one will grow these species (as I do *U. longifolia*) in a perfectly clear, transparent plastic pot (these do not seem to be too hard to find in department stores now), the bladder-bearing rhizoids accumulate and cluster heavily around the periphery of the pot and show up very clearly and nicely through the sides of the pot even though they are "underground." If one uses dead, brown long-fiber sphagnum moss for the bulk of the potting material and surfaces the pots with living green sphagnum, the plants do very well and the contrast of the penetrating green rhizoids with their white bladders against the brown of the rather loosely packed dead sphagnum under the surface is very attractive and interesting to observe. This way the trapping mechanism of these plants is plainly visible and the traps can be observed with a hand lens. Also, since the rhizoids receive sunlight this way, they become green and benefit, I believe, from the increased photosynthetic activity.

GARRY NOLAN (20 Stratford Ct., Windsor, CT 06095 writes: I would like to report an interesting case of vegetative apomixis in plants of the species *Drosera montana.* Several months ago my plants began to flower; they were only four months from germination. All of the flowers appeared deformed and without petals, so I cut them off. Recently, the plants have been flowering normally, but I noticed one plant had those strange deformed flowers again. After taking a closer look, I noticed, to my amazement, there were tiny leaves present. Twenty or so tiny plantlets were clustered within one centimeter. There was a cuplike depression in the center; observations with a low-power microscope revealed "gemnae-like" (for lack of a better term) globes which appeared to "blossom" into plantlets as the periphery of the "flower" was approached. I will plant the plantlets when they get large enough to handle safely.

I recently finished building a new greenhouse and my next door neighbor came across to appraise my work. He was born in Poland and speaks with a heavy accent. After looking over my collection of sundews, he turned and pointed to *Drosera intermedia* and told me about bigger ones with longer leaves (*D. anglica?*) in the old country which he used to dig up in a bog when he was a boy. He would dry them and sell them to the "Old Jew", who would pound and mash them into a tonic. He didn't say what the tonic was for.

Does anybody know where I can obtain a list of chromosome counts (2n) for *Drosera?* I have attempted to count them myself under a microscope, but ended with nothing more than a resounding headache. I would greatly appreciate this information.

PHILIP SHERIDAN (5729 S. 2nd St., Arlington, VA 22204) has sent a copy of the first issue of the POTOMAC VALLEY CARNIVOROUS PLANT SOCIETY BULLETIN which is the publication of the local society in the D.C. area. Philip is editor and president. The Society meets monthly and the bulletin will be issued twice each year. The Bulletin publishes news relevant to the local society, reports of outings, etc. CP enthusiasts in the D.C. area including contiguous states are encouraged to join. Dues are $6.00 yearly plus $1.00 for the Bulletin. The Bulletin may be subscribed to separately if you live farther away and cannot participate actively in Society meetings or outings. Send all dues, subscriptions or requests for information to Philip at the above address.

Philip is also soliciting loans of CP slides, movies, photos or any graphic materials which can be used at meetings. He would appreciate any materials from the CPN readership worldwide. They will be promptly returned in good condition. Fi-

nally, if any CPN subscriber anywhere is going to be in the D.C. area anytime and would like to attend a meeting or speak or present a program to the Society, let Philip know as far in advance as possible so that meeting dates and time of visit can be coordinated.

A note from LARRY MELLICHAMP

Several people have asked if I am related to the Dr. Joseph H. Mellichamp mentioned in Botanists Corner (CPN Vol. VII, No. 2:56) in connection with *Sarracenia.* I am indeed related, as there was but one Mellichamp family which came from France and settled early in Charleston, S.C., but I do not yet know what exact relation. I have not found a great deal of biographical information on him, although I do know that he was born on 9 May 1829 in St. Luke's Parish, S.C.; graduated from the Medical College at Charleston in 1852 and became a physician in Bluffton, S.C.; was an ardent lover of nature; and was a true, proud Southerner. Even though he was dedicated to his large medical practice among the rich planters and the poor country folks in the district, he found ample time for much botanical research and collecting. He corresponded regularly with many of the eminent botanists of North America (and Europe) including Asa Gray and George Englemann, and collected specimens freely for them which now are very valued samples in many of the best herbaria. I actually saw a very good specimen of *Sarracenia purpurea* in the Smithsonian herbarium which he collected. He was intrigued by many of the rare and interesting plants which occurred in southeastern South Carolina; and especially is he known for his acute observations on the insectivorous habits of *Sarracenia minor.* Before he settled down in his medical practice, he visited Dublin and Paris; he served as a surgeon in the Confederate Army; and during his later years, he managed to visit the redwoods in California, to his great delight. I wonder if he ever saw *Darlingtonia* there?

Dr. George Englemann wrote of him in 1872: "Dr. Mellichamp has won laurels in the zealous investigation of the flora of his region, and has furnished me, in the most amiable manner, valuable material and notes for my botanical studies . . . " William Candy wrote in 1904: Dr. Mellichamp was an ardent lover of nature, with a poetic and artistic spirit, and his letters teem with fine descriptions of the various objects which attracted him in his professional drives about the country. He had the keenest sense of the loveliness and delicious warmth of a spring in the pines . . . the fragrance of the woods, of jessamine and of magnolias filling the air . . . Best of all, he was a man to be loved for his qualities of heart and mind." I would like to have known him.

He died on 2 Oct. 1903, and will best be remembered for his work on the local flora around Charleston and for his significant contributions to CP botany. See the chapter on *Sarracenia* in F. E. Lloyd's book *The Carnivorous Plants* for more details of Mellichamp's observations on the pitcher plants.

SPECIAL NOTICE

After sending out all the *Nepenthes* cuttings that I had (other contributors were Don Schnell and Ron Fleming), I expected to receive promptly the dollar cost that included postage and packaging for each package. So far, I only received compensation from 20% of the requestors of these cuttings. If CPNers expect this program to continue, it would be nice to receive a dollar as soon as possible from all of the requesters who have not yet sent in their payment. I would appreciate it. Joe Mazrimas, 329 Helen Way, Livermore, CA 94550.

SPECIAL NOTICES

ERRORS IN JUNE ISSUE

Front cover photograph was taken by Larry Mellichamp.

Page 57, line 7 under caption should read "probably the most *atypical* of all the *Sarracenia* species."

The World Carnivorous Plant List, published as a supplement to Volume 3 of CPN, is still available. To order a copy, send $1.00 U.S. to Pat Hansen, CPN, The Fullerton Arboretum, Dept. of Biology, California State University, Fullerton, CA 92634.

Short Notes

SUMMARY NOTE A CRITICAL REVIEW OF PUBLISHED VARIANTS OF *SARRACENIA PURPUREA L.*

by D. E. Schnell
(Rt. 4, Box 275B, Statesville, NC 28677)

My paper with the above title will be appearing in CASTANEA late in 1979. In the meantime, I felt that CPN readers might benefit by listing the published variants of *S. purpurea* along with author citations and the paper's bibliography. In my personal correspondence as well as in various comments in CPN, I have noted some confusion concerning the status, sources of original information, and indeed even spelling of these variants.

Since the original paper is quite lengthy, it cannot be duplicated here. Instead, I will give the barest summary consisting of variant name, bibliographic citation, a very brief description of key features of the variant, occasional comments, and some indication of my opinion of its status. The latter will be indicated by an asterisk (*) after the name if I have concluded that the variant is acceptably genetic, and no marking if I do not accept it at this time. Occasionally, there will be a question mark in parentheses (?) indicating that there is strong argument for accepting the variant but that some additional work is required. Since there is not space for detailing my arguments and reasoning, readers are referred to my full paper when it appears later. In the meantime, they may wish to consult papers listed in the bibliography at the end of this note.

ssp. *purpurea**

ssp. *venosa** (Wherry, 1933, 1972, 1973; Bell, 1949; McDaniel, 1966, 1971) The more northern ssp. *purpurea* is characterized by longer narrower pitchers of greater than 3:1 length/width ratio, usually glabrous (rarely sparingly hirsute), smaller hood wings. The southern ssp. *venosa* has shorter, wider pitchers of less than 3:1 length/width ratio, is externally covered by bristly hairs (rarely glabrous), and the hood wings are much wider. In

addition, I note floral differences (Schnell, 1978, 1979).

"Horticultural variety Louis Burk" (?) (Wherry, 1933). Occurs in southern Alabama and western Florida and is more easily found than previously suggested, in fact seeming predominant in most locations. This is the famous plant with a white to nearly white style disc, pink petals (often nearly white themselves) and green sepals.

f. *heterophylla** (Eaton in 1822, and Torrey in 1839, both quoted in Wherry, 1933. See also Fernald, 1922; Bell, 1949; Case, 1956; McDaniel, 1966, 1971; Korolas, 1977; Griesbach, 1977). This form of ssp. *purpurea* found in widely scattered areas of the northern range is mainly characterized by complete absence of red pigment in any growth stage. Flower petals are yellow, all other parts yellow-green. To qualify as f. *heterophylla,* plants must show no red pigment when growing in full light.

f. *incisa* (Rousseau, 1957). Quebec on a dolomitic island. Flowers have very deeply incised style discs, the lobes usually numbering five, but occasionally varying from two to more than five, some with secondary lobes.

f. *plena* (Klawe, 1955). A single plant found in Nova Scotia with a rosulate flower having no stamens or pistil.

var. *stolonifera* (Macfarlane and Steckbeck, 1933). In New Jersey pine barrens ponds where it grows in floating sphagnum mats with roots reaching into underlying muddy silt. Characterized by extremely clonal habit with greatly branching rhizomes having large numbers of growth points spread over a very large surface area. In addition, leaves and especially petioles seem longer.

var. *ripicola* (Boivin, 1951. Also, indirectly, see Mandossian, 1966). These plants of ssp. *purpurea* grow in sandy-clay or marl soils rather than sphagnum and are found most often on lake and river shores. Due to nature of soil medium vs. sphagnum, all aerial plant parts have greater sun exposure. This group is characterized by short, brittle, red pitchers, there being many more pitchers per growth point than on plants growing in sphagnum. In addition, the rhizome is shorter and more vertical. Most often in northern Great Lakes region.

var. *terrae-novae* (See Wherry, 1933, for earlier references to this epithet; Boivin, 1951 for implied current usage). This subgroup of ssp. *purpurea* apparently is to include all plants that are not var. *ripicola* (v.s.); that is, those with larger, fewer pitchers per growth point and growing in sphagnum. There is much historical confusion and inaccuracy concerning this designation, and a possible misprint in Boivin's paper.

LITERATURE CITED

BELL, C. R. 1949. A cytotaxonomic study of the Sarraceniaceae of North America. J. Elisha Mitchell Sci. Soc. 65: 137-166, Pl. 8-14.

BOIVIN, B. 1951. Centurie de plantes Canadiennes-II. Canad. Field Naturalist 65:21.

CASE, F. W. JR. 1956. Some Michigan records for *Sarracenia purpurea* forma *heterophylla.* Rhodora 58:203-207.

FERNALD, M. L. 1922. Notes on the flora of western Nova Scotia. Rhodora 4:165-183.

GRIESBACH, R. 1977. Minnesota site for *Sarrancenia purpurea* f. *heterophylla* (News and Views item). Carnivorous Plant Newsletter 6:47.

KLAWE, W. L. 1955. Additions to the flora of Yarmouth County, Nova Scotia. Canad. Field Naturalist 69:129.

KOROLAS, J. 1977. Ontario site for *Sarracenia purpurea* f. *heterophylla* (News

and Views item). Carnivorous Plant Newsletter 6:33.

LINDQUIST, J. A. 1975. Bacteriological and ecological observations on the northern pitcher plant, *Sarracenia purpurea* L. Masters Thesis, University of Wisconsin, Madison. x + 215 pp.

MACFARLANE, J. M. AND D. W. STECKBECK. 1933. *Sarracenia purpurea* var. *stolonifera.* A noteworthy morphological and ecological type. Bull. Royal Botanic Gardens, Kew (4) 161-169.

MANDOSSIAN, A. J. 1966. Variations in the leaf of *Sarracenia purpurea* (pitcher plant). Mich. Botanist 5:26-35.

MCDANIEL, S. 1966. A taxonomic revision of *Sarracenia* (Sarraceniaceae). Ph.D. dissertation, Florida State University (University Microfilms, Ann Arbor, MI 48106, No. 67-345).

MCDANIEL, S. 1971. The genus *Sarracenia* (Sarraceniaceae). Bull. Tall Timbers Research Station, Tallahassee, FL, No. 9.

ROUSSEAU, J. 1957. Nouvelles entites botaniques de l'enclave dolomitique du Lac Mistassini, Province de Quebec. Bull. Du. Jard. Bot. 27:378.

SCHNELL, D. E. 1978. *Sarracenia* L. petal extract chromatography. Castanea 43: 107-115.

———. 1979. Systematic flower studies of *Sarracenia* L. Castanea: In Press.

WHERRY, E. T. 1933. The geographic relations of *Sarracenia purpurea.* Bartonia (15):1-6.

———. 1972. Notes on *Sarracenia* subspecies. Castanea 37:146-147.

———. 1973. Reminiscences on carnivorous plants. Carnivorous Plant Newsletter 2:35-37.

(Received August 2, 1978)

ENVIRONMENTAL CHAMBER

by Brett Martison
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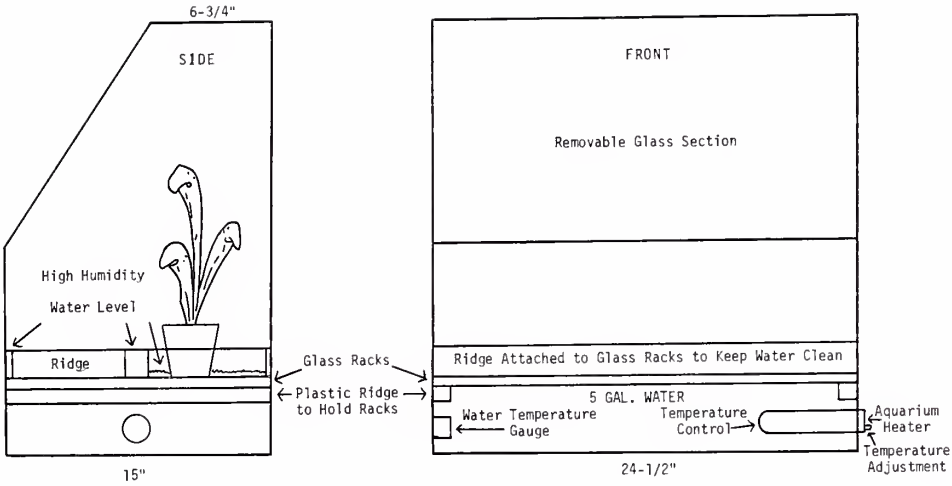
I have developed an inexpensive Carnivorous Plant growing chamber with which I can control humidity and temperature. I believe this will help a lot of CP growers that live in climates such as mine in Nebraska.

Information: Tap water may be used because of distillation. Venting controls humidity: This is done by placing pieces of glass between racks. Temperature is controlled by aquarium heater. Water and air temperature do not vary 5°F. It ranges from house temperature to approximately 100°F. It holds well at 90°F. Two removable glass racks for easy cleaning. Removable glass section for easy access.

Suggestions: Cheapest way to accomplish same is to convert old aquarium by gluing two pieces of glass in the center lengthwise and using aquarium heater in normal. This chamber is for general use, less expensive models could easily be designed using this same method for individual species, such as sundews. Lighting: I suggest natural light, southern exposure helps kill fungus. This chamber also has a cooling effect; the direct sunlight causes natural evaporation within the chamber as a normal terrarium does not. If using direct sunlight be sure to fill the glass trays with about ½ inch of distilled water when more humidity is desired or if you wish to water the plants from the bottom. This amount of water will evaporate from the tray in approximately two days at 90°. Allow tray to be dry one to two days and repeat. *Darlingtonia* does not seem to like a general chamber, but



other pitchers do very well. If you use tap water in the main body of water, do not allow this to overflow into trays.

Parts List: 1) glass, ¼ inch, 2) silicone glue, 3) aquarium heater, 4) two temperature gauges (water and air) 5) small plexiglass strips.

Additional Notes: When building, follow same procedures as you would to build an aquarium. This chamber is excellent for sundew cuttings. By pressing a leaf cutting tentacles down in soil, I've achieved good results. Also, one can use small pots and start seedlings or cuttings of other than CP and remove from chamber. I have had my chamber in operation for over a year, and nothing has gone dormant, although a slower growth rate has been noted.

I wish to thank Bill Carroll and Jan Hooft of Carolina Biological Supply for their expert help and encouragement, and especially for letting me know about CPN.

(Received January 20, 1978)

"A Crab Spider Associate of *Nepenthes rafflesiana*"

by Jonathan Reiskind
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In 1975 I had the opportunity to observe the activities of the crab (thomisid) spider, *Misumenops nepenthicola* (Pocock), in the Islamic Sultanate of Brunei (in northwestern Borneo). This spider was found in association with an Old-World pitcher plant, *Nepenthes rafflesiana* Jack., found growing on the dry hillside along the Brunei River. Such an association has been reported from the nearby island of Labuan by Pocock (1898) and in Singapore by Fage (1928) and Bristowe (1939). In these studies three different species of *Nepenthes* are mentioned. Pocock had the host plant tentatively identified as *"Nepenthes phyllamphora"*, but due to poor and inadequate material this identification should be con-

sidered highly doubtful. But Fage positively identified *N. gracilis* Korth. as the associated plant while Bristowe reports a less common association of the spider with *N. rafflesiana* in Singapore. The spider is found resting on the smooth inner surface of the pitcher portion of the plant above the liquid contents. Its dark maroon-brown color is cryptic with respect to similarly colored pigmentation spots on the pitcher plant. My observations confirmed the accuracy of Pocock's and Bristowe's description of the spider's habits, including its remarkable escape behavior in which the spider drops into the digestive fluid held by the pitcher and emerges (up to two minutes later) apparently unaffected.

The complex adaptations to insectivory in pitcher plants are associated with their ability to thrive in nutrient poor soils—obtaining sufficient supplementary nutrients, especially nitrates, from insects which they have attracted, trapped and digested (Heslop-Harrison, 1976). On several occasions I observed the spider capturing prey. In each case a fly entered the pitcher and fell into the fluid. The spider moved toward the struggling prey of the plant and picked it off the surface of the fluid. Thus it was depriving the plant of a source of nutrition and represents a clear case of kleptoparasitism. Kleptoparasitism is a symbiotic association in which one organism (the kleptoparasite) preys on whole organisms that have been trapped, for later consumption, by another (the host). A kleptoparasite exploits the trapping capabilities of its host and consumes food that would otherwise be used by the host. If the spider sometimes captures an insect before it actually is caught in the fluid, as was the method reported by Bristowe, the spider would still be exploiting the chemical the pitcher plant uses to attract insect prey and still could be considered a kleptoparasite. An opposite sort of symbiosis was reported by Bristowe in which the spider "assists" the plant by knocking distasteful (to the spider) insects into the fluid—a case of mutualism (an association where both spider and plant are benefited). Also, within the microcosm of a single pitcher it is likely that the spider returns some nutrients "stolen" from the plant via its excretion into the pitcher. More careful and quantitative studies would have to be made before one could establish whether the plant suffers a net loss or gain of nutrients by this association.

In many pitcher plants certain dipterans (predominantly mosquitoes) breed in the fluid (Barr & Chellapah, 1963). I was not able to establish whether the spider also preys upon these insects as they emerge from their pupal stage. If it does, it would be a simple case of predation. Those aquatic larvae breeding in the pitcher could be considered ordinary parasites of the plant drawing nutrients from the fluid contents.

Two other spiders have been reported in association with *Nepenthes*: *Thomisus nepenthiphilus* in Sumatra and *Theridion decaryi* in Madagascar (Fage, 1930).

References cited:

Barr, A. R. & W. T. Chellapah. 1963. The mosquito fauna of pitcher plants in Singapore. Singapore Medical Jaurnal 4: 184-185.

Bristowe, W. S. 1939. "The Comity of Spiders" Ray Society. London.

Fage, L. 1928. Notes on the fauna of pitcher plants. Part IV.-Araneae. Journal of the Malayan Branch Royal Asiatic Society 6(3): 13-19.

———. 1930. A sujet de deux Araignées nouvelles trouvées dans Ies urnes de *Nepenthes*. Treubia 12: 23-38.

Heslop-Harrison, Y. 1976. Carnivorous plants a century after Darwin. Endeavor 35: 114-122.

Pocock, R. I. 1898. Spider and pitcher-plant. Nature 58: 274-275.

(Received August 2, 1978)

On the Foraging Strategies of Carnivorous Plants:

II. Biological Stimulus versus Mechanical Stimulus in the Fast-Moving Periphery Tentacles of the Species *Drosera burmanni.*

by Garry Nolan
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Abstract

The periphery, non-glutinous (comparitively) tentacles of *Drosera burmanni* were stimulated with a biological/mechanical stimulus rather than a mere mechanical stimulus. The resulting movement-response using the biological approach was much more acute and reactive than those stimulated in a mechanical manner.

Introduction

Carnivorous plants in the wild are subjected to varying trap stimuli throughout the course of their life. These stimuli can be separated into three distinct classes: digestible food, insect and the like; semi-digestible food, bits of wood or grass; non-digestible 'food', rain, soil or stimulus by a moving object. Of these three categories, the former two are a source of energy, but the latter is a waste if such stimulus were to result in "digestion".

In order to be more efficient predators, carnivorous plants must be able to distinguish between palatable matter and that of the third category above. Efficiency is their game, and they don't miss a trick. Members of the genera *Drosera* are no exception; the fact that they can be found all around the world in varied form testifies to their adaptability. *Drosera burmanni* is especially interesting however, owing to a set of outer tentacles which are extremely biological/mechanical sensitive. These tentacles have the added distinction of being able to move in an arc as fast as 120 degrees in six seconds, swift enough to observe unaided. These tentacles *appear* to be used to push prey on the brink of escaping to the center of the trap. They are relatively non-glutinous compared with the more fluid-covered tentacle closer to the middle of the trap. I hypothesized that in order to be more efficient predators, these outer tentacles must be in some way "organic" sensitive so that they may differentiate between mere mechanical stimulus and that stimulus provided by an entrapped insect.

Materials and Methods

Ten mature, healthy *Drosera burmanni* were chosen for the experiment. They were grown in the same pot; soil consisted of long-fibered sphagnum moss.

Stimulus was provided by two steel probes, tipped with sponge. The probes brushed the tentacle ends briefly into a 90 degree angle. One probe was dipped in water, the other in a milk/egg mix. A milk/egg mix was used to provide the biological portion of the biological/mechanical stimulus. The milk/egg mix probably contains several of the active ingredients present on the carapace of insects.

The tentacles were timed in pairs, residing consecutively around the leaf, for ease in timing, with twenty pairs in all for each portion of the experiment. Timing was provided with an electronic racing timer which timed to the hundreth of a second.

Times were recorded in the following manner:

1. Stimulus provided; timer started at commencement of stimulus.
2. Start of movement; time elapsed recorded by means of "split" facility in timer.
3. End of movement; time until tentacle stops recorded; this is approximately at 120 degrees.

TABLE I

One Stimulus (Part A)

Test #	Biological		Mechanical		B - A	D - C
	A	B	C	D	E	F
1	7.87	15.46	—	—	7.59	—
2	7.04	23.49	—	—	16.45	—
3	9.67	17.20	—	—	7.53	—
4	17.39	23.42	17.54	42.30	6.03	24.76
5	5.02	16.58	—	—	11.56	—
6	4.41	19.54	—	—	15.13	—
7	5.54	18.50	—	—	12.96	—
8	5.70	33.97	—	—	28.27	—
9	6.62	26.40	—	—	19.78	—
10	4.70	13.84	—	—	9.14	—
11	4.00	11.17	—	—	7.17	—
12	—	—	8.58	23.63	—	15.05
13	4.11	18.07	—	—	13.96	—
14	6.10	23.56	—	—	17.46	—
15	3.06	36.39	—	—	33.33	—
16	4.79	31.41	—	—	26.62	—
17	25.59	58.39	—	—	32.80	—
18	—	—	—	—	—	—
19	6.97	46.34	—	—	39.37	—
20	11.62	53.55	—	—	41.93	—

Three Stimuli (Part B)

Test #	Biological		Mechanical		H - G	J - I
	G	H	I	J	K	L
1	4.32	29.56	—	—	25.24	—
2	11.65	42.79	—	—	31.14	—
3	2.59	23.12	2.63	—	20.53	29.36
4	36.16	66.76	—	31.99	30.60	—
5	9.38	14.45	—	—	5.07	—
6	3.60	18.72	—	—	15.12	—
7	4.34	24.63	8.65	58.61	20.29	49.96
8	6.80	36.72	—	—	29.92	—
9	—	—	—	—	—	—
10	4.50	32.67	—	—	28.17	—
11	5.35	23.73	—	—	18.38	—
12	6.17	18.54	—	—	12.37	—
13	3.83	21.93	9.80	46.18	18.10	36.38
14	2.44	15.30	2.80	33.94	12.86	31.14
15	18.17	48.07	8.26	61.92	29.90	53.66
16	6.02	29.05	—	—	23.03	—
17	12.80	35.73	—	—	22.93	—
18	5.57	24.20	—	—	18.63	—
19	10.56	36.22	—	—	25.66	—
20	5.06	19.13	—	—	14.07	—

Key to Table I

Biological — Biological/Mechanical Stimulus.
Mechanical — Mechanical Stimulus.
A — Elapsed time at first movement for Biological (in sec.)
B — Elapsed time at last movement (120 degree movement) (in sec.)
C — Same as A except timed for Mechanical Stimulus.
D — Same as B except timed for Mechanical Stimulus.
E — (B - A), total time for movement for Biological/Mechanical
F — (D - C) total time for movement for Mechanical
G through L — follow same conventions as A through F except are for Part B.
(—) — denotes no reaction after two minutes of timing.

TABLE II

	ONE STIMULUS Part A						3 STIMULI Part B					
	A	B	C	D	E	F	G	H	I	J	K	L
Summation	140.20	487.28	26.12	65.93	347.08	39.81	159.31	561.32	32.14	232.64	402.01	200.5
Average*	7.78	27.07	13.06	32.96	19.28	19.9	8.38	29.54	6.42	46.52	21.15	40.1

*Averages computed by dividing by number of **positive** reactions. Negative reactions were not used in the averages.

The experiment was divided into two sections: twenty stimuli were given with one stimulus, twenty with three. This is to explore dually the effect of repeated stimulations. The three stimulation experiment was performed by brushing the ends of the tentacles consecutively three times at one second intervals.

Results

From the data received, Table I, it can be theorized that the presence of biological matter, in this case a milk/egg mix, is the dominant factor in the stimulation of movement of the periphery tentacles in *Drosera burmanni.* I do not pretend to guess what the precise substance that produces the reaction, only that it is one of the substances present in egg or milk.

By analysis of the data, all of the following conclusions, and others, can be theorized:

1. Merely mechanical stimulations rarely result in a reaction; out of all forty stimulations combined, only 17.5% promoted movement with a mechanical stimulus compared to 92.5% with biological/mechanical.
2. The time from stimulus to first movement in those stimuli which do react, despite mechanical or biological stimulation, is practically the same; when the total averages of parts A and B were combined, biological in part A with biological in B and same with mechanical, the average time for a biological stimulus was 8.09 seconds compared with 8.32 for mechanical.
3. However, biological stimulations result in a faster total reaction from start to finish than mechanical; biological-20.24 seconds, mechanical-34.33.
4. The number of biological stimulations per test did not significantly matter with regards to the average time for the reaction to complete; Part A-19.28 seconds, Part B-21.15 seconds.
5. An increase in the number of mechanical stimulations per test brings about an increase in the number of complete reactions; five in Part B compared to two in Part A.

Discussion

All of the conclusions reached by my experiment are logically derived assumptions. The experiment does support my hypothesis concerning the biological sensitivity of the outer-most, non-glutinous tentacles. Further, more detailed experiments could elucidate the precise area of sensitivity and the mechanism involved.

One set of data, however, did not reconcile properly. When conclusion four (above) was applied to mechanical stimuli it falls apart due to unagreeable data.

I welcome any and all observations, criticisms and discussions directed towards me. In this way I may tailor future experiments with more objectivity.

Conclusions

Are all the periphery tentacles of *Drosera* species (those which have them) as biological sensitive as *Drosera burmanni?* Spot-checks throughout my collection tells me yes, many are. But none were quite as swift as *Drosera burmanni.* The benefits of such behavior are obvious; while other experiments have shown the protein sensitivity of the inner tentacles, these periphery tentacles are equally desirable subjects for study due to their swiftness of movement.

Acknowledgements

I would like to thank Mrs. Ellen Gamer for the use of her stopwatch. I would also like to thank the heroic gnat that sacrificed its life so that I could notice the sudden tentacle movement that clued me in on these spectacular tentacles.

(Received July 5, 1978)

BOTANIST'S CORNER

by Larry Mellichamp

Botanical History of CP
II: Darlingtonia

Darlingtonia californica, the Cobra Plant, is one of the most striking plants in western North America. It occurs in northwestern California and southwestern Oregon (see CPN Vol. 3 p. 24); and while it is not really rare, it would appear to be because it grows only in a specialized habitat within the region. In 1974 my wife and I were able to travel 3000 miles clear across the country to Del Norte Co., Calif., and with general directions as to locality, drive right up to a large population and see this remarkable plant for the first time in nature. With some searching we were able to discover several other populations in the vicinity just by looking for its characteristic habitat. *Darlingtonia* likes to grow in and around cold mountain streams flowing through hilly country at low elevations where serpentine soil is common, a greenish substrate noted for its low availability of certain important nutrients (see CPN Vol. 3, p. 22) (See photos below)

Generally we take the botanical history of a species for granted, most CP growers being unaware of the colorful events surrounding the early recognition of our favorite plants. As you know however, all plants must have Latin scientific names, and they must be *discovered* before they can be so designated. As we shall see, four important men have been associated with *Darlingtonia*: William D. Brackenridge, John Torrey, William Darlington, and E. L. Greene.

The eastern pitcher plants, *Sarracenia,* were more "casually" discovered as early as the late 1600's because the East had been more widely explored. On the other hand, northern California and southern Oregon were not at all well known until the 19th Century when the first significant government-sponsored expedition set sail from Virginia in 1838 under the command of Captain Charles Wilkes. Of course, they had to travel down around Cape Horn (after visiting Spain first!), then on to Chile, Peru, Tahiti, Samoa, Fiji, Australia, New Zealand, and Hawaii. Yes, I did say they were headed for the Pacific Northwest; but everything being new to them, these early explorers wanted to make the journey worthwhile and they were in no hurry — the trip lasted 4 years! On board the six ships in the Expedition were 12 civilian scientists, three of whom were botanists whose job it was to collect

Darlingtonia californica.
Photo by Steven A. Frowine

dried specimens, living plants, and seeds of everything they could on the trip. The most important person for us was William D. Brackenridge, assistant botanist and horticulturist. It was he who first discovered the plant we know as *Darlingtonia.*

Brackenridge was born in Ayr, Scotland in 1810 and was therefore fairly young when he joined the Wilkes Expedition. He worked in Edinburgh, Scotland at the famous Royal Botanic Gardens (where he acquired his horticultural expertise) until he moved to the USA in 1837. On the Wilkes Expedition he collected some 40,000 specimens of 10,000 different species and was in charge of the living plants collected on the tour. Back home, these plants were kept in a large greenhouse in Washington, D.C., which was to become the beginnings of the U.S. National Botanic Gardens (next to the Capitol) with Brackenridge as its first Superintendent.

The following is an account of a sequence of events from the Wilkes Expedition in northern California:

> The expedition arrived off the mouth of the Columbia River [Oregon] late in April 1841 . . . Brackenridge, with Pickering, accompanied a party into the interior . . . The trip into the interior and that to Gray's Harbor [Wash.], each of about six weeks duration, occupied the entire summer; and early in September Brackenridge, with other members of the scientific corps, joined Lieut. Emmons' overland party to San Francisco, while the squadron sailed down the coast to the same place. The overland party went up the Willamette River, and through the Umpqua and Shasta regions to the headwaters of the Sacramento River [Calif.], which was followed to its mouth. It was on this trip, near Mt. Shasta, that Brackenridge, who had dropped behind the rest of the party and was hurrying to rejoin them, hastily gathered an odd-looking plant that had attracted his attention. It was the fifth of October 1841 and the season for flowers was long past, but the specimen was sufficient to show evident relationship to the group of pitcher-plants known, then and now, only from east of the Rocky Mountains. (Barnhart, 1919) [Another account indicates that at this point the party was hastily retreating before attacking Indians, a frequent predicament on such early expeditions.]

The scientific community had to wait until ten years later, in May 1851, when the plant could be recollected in flower so it would be possible to give a correct scientific description. This was accomplished by John Torrey in 1853. Torrey was the most eminent botanist in the U.S. in the 19th Century, working very hard on describing many of the new plants being collected in North America in an effort to write a book containing all the known plants at that time. Torrey gathered together many of the dried herbarium specimens from the expeditions of the era into what became the nucleus for the U.S. National Herbarium at the Smithsonian Institution. Torrey writes on the new pitcher-plant:

> On *Darlingtonia californica,* a new Pitcher-plant from northern California. The foliage and scape of this plant, without flowers or fruit, was discovered by Mr. Wm. D. Brackenridge, assistant botanist of the U. S. Exploring Expedition . . . on the route from Oregon to San Francisco. The curious fish-tailed appendage to the hood of the pitchers, and the bracteate scape suggested the idea that the plant might be a new Sarraceniaceous genus, rather than a true *Sarracenia.* This proved to be the case, when flowering specimens were obtained from the same locality (near Shasta Peak) by Dr. G. W. Hulse; as these have several-flowered scapes, no calyculus, a very reduced proper lamina to the petals, almost definite stamens in a single row, a turbinate ovary with a depressed and dilated top, and, above all, a naked (five cleft) style, without the umbrella so characteristic of *Sarracenia.* From *Heliamphora* (of Guiana) [discovered in 1839] it differs quite as widely; in fact it is a perfectly distinct third genus of this remarkable type, intermediate between the two before known [*Sarracenia* and *Heliamphora*]. The only character it affords likely to throw additional light upon the affinites of the group, hitherto so obscure, is that of the almost definite stamens, which so far as it goes, favors Dr. Planchon's view that it is related to Pyrolaceae [Ericaceae, the Heath family]. We are well pleased that this most interesting and striking

In this photograph by L. Mellichamp, the serpentine area is clearly visible as the bluish-green area. Found in many parts of California, it often has its own unique vegetational type.

Dense colony of *Darlingtonia* in stream bed. Photographed by L. Mellichamp near Florence, Oregon, on 21 August 1975.

Individual rosette of *Darlingtonia,* with mouths of pitchers pointing outward from central axis. Photo by L. Mellichamp near Gasquet, Calif., on 10 August 1974.

Close-up of flower. Photographed by Kim Lynch.

accession to the flora of our country is to commemorate one of the oldest and best of our botanists, Dr. Darlington. During the autumn and winter, living roots of this plant, packed in dry peat moss, might be transported to the Atlantic coast, with good hope of success. Let our California readers take notice, that a small box of such roots, delivered alive at

Boston, New York, or London, would be pecuniarily as valuable as a considerable lump of gold, and would furnish a handsome and highly curious acquisition to our gardens. (Torrey, 1853)

The recognition of *Darlingtonia* as a distinct genus in the Sarraceniaceae was a significant event; and moreso when considered in light of the controversy over the use of Darlington's name. It seems that John Torrey had been trying for some time to honor Dr. William Darlington, a very famous botanist from near Philadelphia. Darlington's name had previously been used for a legume genus, which later turned out to be a *Desmanthus*. Also, Torrey had earlier named a new Californian tree after Darlington, but this turned out to be just another species of *Styrax* when the flowers had been studied. Finally, Torrey thought, he could suitably honor Dr. Darlington by naming the new pitcher-plant after him, and so he did. Thus, Darlington's name had been used three different times (two of them unsuccessfully), a practice which was not considered legal later in the 1800's. *Darlingtonia* was thus an invalid genus name from 1853 until 1891, when the respected California botanist E. L. Greene (the first Professor of Botany at University of California, Berkeley) recognized the problem and renamed the plant *Chrysamphora,* a new name which had not been used before. While the name *Darlingtonia* was perhaps better known and more often used, *Chrysamphora* was the correct name from 1891 until 1954, when a committee of the International Botanical Congress voted (narrowly) to reinstate and conserve the generic name *Darlingtonia* for the California pitcher-plant. This bit of legislation made *Darlingtonia* the official correct name no matter what else might turn up. (See CPN Vol. 3, p. 22; Vol. 6, pp. 41-42.). So we see that while it is true that a plant can have only one generic name, and a name can only be used once (whether it remains permanently or not), it may take some time before this attempted stability becomes fixed.

It might be noted that William Darlington is best known for his writings on John Bartram, the father of American botany. Darlington never saw a living specimen of *Darlingtonia,* although he wanted to very much. He did have the satisfaction of knowing, however, a few days prior to his death, that Dr. Asa Gray, famous Harvard botanist and coworker with Torrey, had succeeded in growing a plant from seed at the botanic garden at Cambridge, Mass.

And thus the history of *Darlingtonia californica,* one of our truly distinctive American plants. May we think about the personalities involved with this story whenever we see this beautiful species, and be thankful for the roles they played in making North American botany great.

Bibliography

Bailey, L. H. 1914. The Standard Cyclopedia of Horticulture. Vol. I. pp. 964-965.

Barnhart, J. H. 1919. Brackenridge and his book on Ferns. Journ. New York Botanical Garden, Vol. 23. pp. 117-124.

Ewan, Joseph, 1955. "San Francisco as a Mecca for Nineteenth Century Naturalists." Pages 1-63. In A Century of Progress in the Natural Sciences. Calif. Academy of Sciences, San Francisco.

Ewan, Joseph. 1969. A Short History of Botany in the United States. Hafner, N.Y.

Rodgers, Andrew D. III. 1965. John Torrey: A Story of North American Botany. Hafner, N.Y.

Torrey, John. 1853. On *Darlingtonia californica,* a new pitcher-plant from northern California. Smithsonian Contrib. to Knowledge Vol. 5. Page 1.

I wish to thank the Hunt Library for Botanical Documentation in Pittsburgh for providing valuable reference material.

Beginner's Corner

by
Don Schnell

SARRACENIA PROPAGATION

(Continued from last issue)

2) Asexual propagation

a) Leaves — As far as I know, leaf cuttings or buddings have never been successfully accomplished with this genus. If you know of a certain technique, please inform the readers through us. If you wish to experiment, the most likely success may be accomplished by using the stout, pointed little bud scales clustered around the growing point of a rhizome. These, I would guess, would have to be peeled off, and budding would occur in the bases placed in sphagnum, similar to the technique used for winter bud scales of certain Pinguiculas. If it works for you, let us know, giving details!

b) Rhizome — The actual stem of Sarracenias is the stocky underground portion of the plant referred to as the "root" by the uninformed. Actually, the fibrous roots can be seen to grow from this rhizome. The stocky, starchy rhizome grows either parallel to the surface of the ground as in *S. flava,* or is small and more or less vertical as in *S. purpurea.* As the rhizome grows in salubrious conditions, it frequently branches, this branching activity being most marked in *S. rubra* and its infraspecies. One can accomplish propagation using rhizomes by two different methods, or variants thereof:

1. Break off the branching "points" of a rhizome and plant these in sphagnum. Leave at least one point (growth bud) on the main portion of the rhizome. You will observe the most rhizome branching and budding on large, old and vigorously growing specimens.

2. Rhizome division with inducement of new buds. Steve Clemesha has developed one of the easiest and most useful techniques of doing this. It works best with a horizontal rhizome. Uncover the upper surface of the horizontal rhizome so the upper surface is exposed to the air, the lower surface with roots still in the growing medium. Then, using a fresh razor blade, carefully make multiple cross cuts about 2 cm apart along the rhizome, the depth of the cut being about halfway through (not *all* the way through). Do not recover the upper half of the rhizome. In a few weeks, new green plant buddings will be seen to appear from both sides of the cut areas. After the new growths have attained sufficient size that new roots have been put down for each section of the rhizome, you may lift out the rhizome, complete the separation, and repot each plant separately.

The foregoing is a very abbreviated description, but the techniques (except those noted as experimental or theoretical) work and are simplest to accomplish. If you have difficulties, or note aspects, successes or problems insufficiently emphasized above, let us know so we can share the information with other readers. Also, by all means, if you develop or know firsthand of other useful techniques of propagation in *Sarracenia,* send your information to one of us for inclusion in CPN.

Propagating Common Droseras

by
Larry Mellichamp

The Sundews (*Drosera* species) are among the easiest of CP to propagate by seeds or vegetative means; in fact, some of them are downright prolific and may become weeds in your CP collection!

The easiest way to propagate many droseras is simply to leave them alone. The flowers of most species are self-compatible and self-pollinating, not even requiring insects or the "camel hair brush" to transfer pollen. In a few species, such as *D. rotundifolia, D. intermedia,* and *D. capillaris,* the flowers may not even open fully to expose the anthers (pollen producing organs) or stigmas (pollen receptive organs) but remain closed and self-pollinating, a condition termed *cleistogamy.* This may occur in nature during periods of dull, cloudy weather, as strong sunlight seems to be necessary to cause the flowers to open fully. If you want to ensure pollination, however, or to cross specific plants, then you can hand pollinate by gently rubbing two fully open flowers together using a circular motion to "spread the pollen around" and make sure that each stigma receives at least some pollen. You can also transfer pollen with a brush, but since the brush is difficult to clean, contamination by unwanted pollen is harder to avoid. Sundews such as *D. capensis* will set and disperse such abundant seed that young plants will come up in any available location, contaminating other pots with unwanted offspring. *D. capillaris* tends to behave as an annual, dying off and coming up from seed each year in various pots whether you want them or not.

In sexually propagating the droseras which do not go dormant, such as *D. capensis, D. burmanni, D. aliciae,* and *D. spathulata* the seeds can be started anytime as ripe (6-8 weeks after pollination) on the surface of finely milled sphagnum moss kept quite moist. Avoid germinating seeds in tightly sealed containers as fungus will tend to grow rampant in the near 100% humidity. You may want to treat the seeds with a sprinkling (dry, or liquid suspension) of captan or benomyl fungicide to help prevent "damping off." As the seedlings get bigger, after several months to a year, transplant them into larger containers in a medium of 1 part ground, brown peat and 3-4 parts white quartz sand.

With the North American droseras which go dormant in winter, it is best to stratify the seeds to get uniform germination. To do this, sow the seeds as normal on moist, milled sphagnum, then place the containers in the refrigerator (or cool place at 40°F.) for 4-6 weeks. Remove, keep moist, warm (60-70°F), and shady, and germination should occur in 1-4 weeks. [See CPN Vol. 3, No. 2, page 19-21] Again, watch out for fungus and try to use clean, sterile materials and distilled water if available.

Some droseras, such as *D. binata, D. binata* var. *dichotoma,* and *D. binata* var. *multifida* may not readily set seed. These types are self-sterile, and must have a different individual from a different clone with which to cross pollinate. This is sometimes difficult to obtain since many of the specimens in cultivation are from one or a few original specimens that have been widely distributed among growers. Thus a clone is simply many individuals vegetatively propagated from a single individual.

However, *D. binata* and varieties, as well as most other droseras, can be propagated by vegetative means. One such technique is to use root cuttings. The large, thick, black roots of *D. binata* and varieties may be cut into 2-4″ pieces and

potted 1-2″ deep in the growing medium (peat & sand, peat — perlite or whole-fiber sphagnum) and they will readily send up new shoots. The brittle roots will soon fill the pot, and new divisions can be made.

The more typical method of propagating sundews vegetatively is by leaf cuttings. With the short-leaved types, such as the North American species *D. intermedia, D. rotundifolia, D.* x *anglica,* the whole leaf can be cut off at the base of the petiole near the stem, and the whole leaf can then be pressed onto the surface of moist, finely milled sphagnum and kept cool and shady. Be careful to keep the leaf flat against the sphagnum surface; it may require re-pressing regularly for the first few days. The long-leaved sundews, such as *D. filiformis* and *D. binata* may be done by cutting a mature leaf (the portion where the sticky glands are produced) into 1-2″ segments with a sharp razor blade, and pressing the segments onto moist sphagnum as above. I have done this twice with *D. filiformis filiformis* and both times it took exactly 6 weeks to the day for the first little buds to appear all along the margins of the leaf cuttings. The conditions were in the greenhouse, in the fall, part shade and 70°F. There is no need to use rooting hormone, although you can experiment to see if it speeds up the rooting time or produces more plantlets. After the plantlets produce new leaves 1-2″ long, they may be separated and potted up as the parent leaf cutting should have rotted by then. Not every bud will grow to maturity, but you will still have plenty of new plants. Fungus infection may also be a problem here; try and keep a little air circulating in your propagation container.

Finally, the hybernacula (over-wintering buds) of the temperate sundews that form them may produce several buds as they grow older from year to year. These hyberacula may be carefully divided in the early spring before growth commences and repotted in the same or individual pots.

Review of Recent Literature

Adams, Richard M. II, 1978. *Cephalotus follicularis*: The Australian pitcher plant. Am. Horticulturist 57:4-5.

A brief but good descriptive article and with horticultural instructions. Two photos, one of which is unfortunately printed upside down.

Bamforth, S., Rhizosphere-soil microbial comparisons in sub-tropical forests of southeastern Louisiana. Trans Am. Microsc. Soc. 95(4):613-621 (1976).

Bacteria, protozoa and fungi were studies from rhizospheres and nearby soils from *Sarracenia* sp. and 15 other plants.

Bradshaw, W., Lounibos, L. P., Evolution of dormancy and its photoperiodic control in pitcher-plant mosquitoes. Evolution 31(3):546-567 (1977).

The authors studied the two mosquito species, *Wyeomyia haynei W. smithii,* in *Sarracenia purpurea* over its entire range in the U.S. Despite the diapause in different stages of dormancy, the critical photoperiod mediating its onset and maintenance varies continuously, one hour for each increase of 5.4°N latitude or 769 meters of altitude. The ratio of these parameters, 142 meters per degree north permits calculation of an equivalent latitude for any locality. The direction of evolution of dormancy proceeded from south to north and has taken place via the progressive influence of photoperiod on the prediapause instar.

Cameron, C. J., Donald, G. L., and Paterson, C. G., Oxygen-fauna relationships

in the pitcher plant *Sarracenia purpurea* L. with reference to the chironomid. *Metriocnemus knabi* Coq. Can J. Zool. 55(12):2018-2023 (1977).

A dissolved oxygen concentration in excess of 77% saturation was measured inside the fluid of the CP pitcher. The source of this oxygen is mainly from diffusion through the wall of the pitcher and is not affected by plant photosynthesis. Thus, the organism, *M. knabi,* adapted to high oxygen concentration is able to survive in this envioronment.

Komiya, S., Shibata, C. Distribution of the Droseraceae in Japan. Bull. Nippon Dental Univ. 7:3-39 (1978).

This report is a well-documented treatment of the distribution of *Aldrovanda* and eight *Drosera* species in Japan with maps and references.

Menage, R. H. 1975. Growing Exotic Plants Indoors. Henry Regnery Co., Chicago. x + 137 pp.

Pages 57-77 contain a fairly good discussion of CP culture in this generally overlooked paperback book. The author presents a brief but interesting introduction to CP, their habits, the nature of the digestive process, and their general cultural requirements. He then goes into somewhat more detail for each family of CP, although he does not attempt to be complete in listing or describing all the common species of any genus. His suggestions seem to be fairly appropriate, compared with other books of this type. I found only two important shortcomings; one is that he makes the statement that "ordinary fertilizers are absorbed by the roots in the normal way," meaning that you don't have to feed them. We know that while this may be OK for *Nepenthes, Sarracenia* are harmed by fertilizing the roots. He also fails to mention the need for winter dormancy in many species of CP (TLM)

Pant, D. D., Bhatnagar, Morphological studies in *Nepenthes.* Phytomorphology 27(1):13-34 (1977).

The authors study the details of the cuticle and epidermis of shoots and pitchers of *N. khasiana, N. gracilis, N. ampullaria* and *N. rafflesiana.* The lunate cells are a kind of deformed or specialized stomata. The pitcher is formed by the peltate portions of the leaf. An unidentified parasitic fungus was found inside the pitchers. The authors surmised that this genus apparently evolved from the Ranunculaceae or Berberidaceae.

Schnell, Donald. 1978. *Sarracenia flava* L.: Infraspecific variation in eastern North Carolina. Castanea 43:1-20.

Five infraspecific venation pattern and color variants of *S. flava* are herein recognized, briefly described and illustrated. Hybridization among the five basic forms has resulted in a spectral field picture that has confused some observers. Various observations and analyses presented indicate that the variations are non-adaptive, and there follows a broad comment on evolutionary relationships. Pollination mechanisms are also reviewed and described. (Reprints: D. E. Schnell, Rt. 4, Box 275B, Statesville, NC 28677).

Shetler, Stanwyn G. 1974. "Nepenthales" and "Sarraceniales" *In* The Encyclopedia Britannica, 15th Edition.

These two very scholarly articles summarize well a great deal of information on these groups of CP: Nepenthales includes Nepenthaceae and Droseraceae; Sarraceniales includes Sarraceniaceae. In addition to general characteristics, distribution, reproduction, trapping mechanisms, and specialized forms, there is an up-to-date summary of ideas on the evolutionary relationships and classification of the two groups in relation to one another. There are also some good line drawings. Reprints are available by writing Stanwyn G. Shetler, Dept. of Botany, NHB #166, Smithsonian Institution, Washington, D.C. 20560. (TLM)

Smorsten, S. Some Carnivorous Plants and their mechanisms. Pacific Hort. 39: 27-

31 (1978).

This article is a short review of the various mechanisms used by carnivorous plants to trap their prey. The author describes in detail an example of each type of mechanism using a particular species of plant. The article is well-written and ends on some horticultural advice that beginners can use to grow plants in their own collection.

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Scott Cumming, 45 Willow Ave., Cornwall, NY 12518. (TB) Plants or seeds: Drosera schizandra, D. linearis, D. anglica, D. adelae, Byblis gigantea, Drosophyllum, Pinguicula caudata, P. primuliflora, Sarracenia oreophila, Heliamphora. (TS) Plants: Drosera binata, D. capensis, D. capensis narrow-leaf, D. x nagamoto. (TS) Small plants: Drosera binata var. multifida, D. binata var. dichotoma, D. rotundifolia, D. x californica, D. filiformis

Bruce Dudley, 51 Dogwood Dr., Weaverville, NC 28787. (S) Utricularia longifolia (small plantlets). (B) Heliamphora (plants, seedlings), Nepenthes (plants, cuttings, seedlings), tuberous Drosera (plants), Sarracenia psittacina x purpurea (courtii) (plants, cuttings, seeds), S. leucophylla x formosa (plants), S. courtii x melanorhoda (plants), Byblis gigantea (plants), D. linearis (cuttings, seeds), D. anglica x capensis (plants).

Ron Fleming, P.O. Box 3834, Kenai, AK 99611. (W) N. x mizuho, N. x mixta, N. x princeps, N. x tiveyi, N. x edinensis, N. x formosa. (T) P. villosa, enquire.

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T. L. Mellichamp with *S. minor*
Green Swamp, 24 May 1978 Photo by Don Schnell

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Sarracenia alabamense ssp. *wherryi,* or *S. rubra* ssp. *wherryi* depending on the author, crossed with *S. minor.* This hybrid was made and grown by Frederick Case. It is growing in a ground planting where a portion of his collection can also be seen.

Photo by T. L. Mellichamp