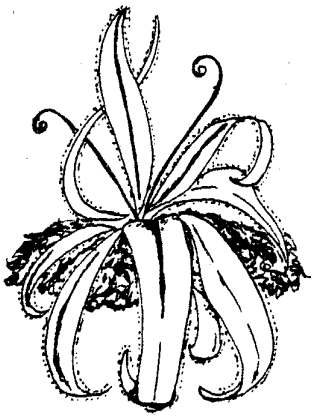

CARNIVOROUS PLANT NEWSLETTER OF AUSTRALIA

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FROM THE EDITORS.

Unfortunately I must start this issue with the news that it is to be the last. There are two main reasons for this decision, they being firstly the almost complete lack of response from contributors except of course those faithfull few whom you all should know from their regular articles.
The other reason being that Exotic & Bizarre Plants has now opened up a large retail nursery in Perth and our work load is such that we no longer can devote the time necessary to run the newsletter.
If there happens to be any reader who wishes to carry on the CPNA we would be only too happy to help them to get started.

As there are two issues 7 & 8 to complete the subscription, we are combining the two together.

We take this opportunity now to thank those who have helped the newsletter to be the success it has been over the past two years.

Good Growing.

Editors.

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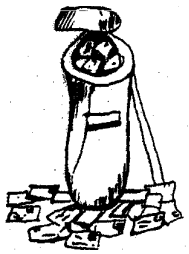
FRONT COVER DROSERA HETEROPHYLLA.
HABITAT WESTERN AUSTRALIA.

C.P. LETTERBOX.



GRAYDON RIXON OF SPRINGWOOD, N.S.W. WRITES : Congratulations on a very informative and helpful newsletter. I find that I am constantly reffering to its pages for help and encouragement as I delve further into this fascinating hobby: I would like to increase my collection of c.p's and as I have insufficient stocks I am wondering if there is anyone in the Lower Blue Mountains or Sydney district who would exchange Bromeliads for c.p's? The Broms are of several varieties and range from small compact species to large 18 inches high specimens, hope someone will trade. For the past 12 months as I travelled each time along the Sydney to Newcastle expressway, I was often aware of a flash of red growing on the rock face. Then one weekday when there was little traffic I was able to stop and see that it was indeed clusters of Drosera plants. These natives are growing on the excavated rock face in almost pure clay that has evidentally seeped down a moist crack kept supplied with water even in the 4 years of dry time we are experiencing here in N.S.W. The original seed probably was bought in by wind or birds as these plants can only be as old as the excavation. Bright sun, acid soil, water seepage plus some seed and the little colony exists - Please let us observe it and leave it where it has found a foothold on life. I would like to add that I would be delighted to hear from collectors in my area or visitors to our beautiful Blue Mountains. My telephone no is (047) 541413, and address 192 Hawkesbury Rd, Springwood Nth, 2777.

SARA ZART OF ILLINOIS, U.S.A. WRITES : The genus Utricularia, or bladderwort, has the greatest number of species of any carnivore, with over 165 species in it. They are native to usually 'wet areas and there are three groups they fit into : Aquatic, growing in water; terrestrial, usually growing on land in some sort of soil; or epiphytic, kind of like an air plant, growing on or at the base of another plant, (but are not parasites). Most Utricularia's like lots of water depending on species and low light levels, growing in semi-shade, or 6 to 10 inches from flourescent tubes grown indoors. The traps or bladders, are very small and are located on the roots of the plants. The trap is like a tiny oval shaped balloon, having an airtight door at one end. Sticking out near the door of the trap is its trigger. This tiny hair like projection, sometimes branched, is very deadly to any unsuspecting victim. When the victim touches this trigger, the door opens. Immediately, the vacuum inside causes the victim to be sucked into the trap. At the bottom of the trap, is a small pool of digestive juices that drown and digest prey. The bladder expels any extra water that might have been sucked in, creating another vacuum and resetting the trap. The action of the trap is faster than the human eye can see.
Since the 'bladders' of the Utricularias are so small, they eat only small insects such as mosquito larvae and water fleas. It seems that once a plant fills its container and blooms, the plant seems to slowly decay and die. So what you do is start a new batch by dividing the plant or taking small pieces of the plant, put in a new pot with fresh sphagnum (or whatever potting medium works best for you) and let the cycle repeat itself.

C.P. LETTERBOX CONT.

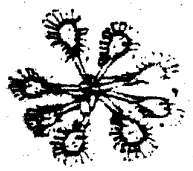
Utrics can be grown in any kind of container though I have. read that light coloured or clear containers are better. I keep mine in clear containers where the light can penetrate the soil. The bladders gather arounf the sides of the pot where you can see them, which adds to the fascination of the plant.

MISS FRANCIS FYN. OF TOOWOOMBA Q.L.D. WRITES : My fiance and I had decided to go to the coast one weekend and also thought we would look for a Venus Flytrap. The first place we went to had a sign 'Insect Eating Plants for Sale'. Inside we looked at the incredible display they had, then looked at the plants for sale, their prices almost knocked us over, we thought they were rare but expected the flytrap to be bigger than a five cent piece. We paid eighteen dollars for it and also bought a Drosera capensis for $7-90 which sounded reasonable to us. When we arrived home we sat them in water and fed flies to the capensis. A few months later and several repotting dramas each time expecting them to die, they reached a decent size. We had them in a one foot fish tank when we bought some spathulata and a West Aust pitcher plant. The capensis flowered and because of our ignorance we only kept a few of the young plants that looked like moss. From then on we learnt fast. An ad in the local paper helped us meet a Brisbane grower who supplied us a lot cheaper and helped us with cuttings. We now harvest our own seed and we had our first seeds from a flytrap. We now have thirteen varieties of sundews, a lot of flytraps, large and small Sarracenia, three Nepenthes and eight West Aust pitcher plants as well as one pinguicula. The tank we have them in is a four foot fish tank with glass on top in the natural sun as a grow-lux did nothing for the colour or growth rate. It was in display in the Toowoomba Home Show and attracted quite a crowd, now it looks even better. We are interested in meeting other collectors so anyone who wishes to write our address is 7 Mansford St, Toowoomba. QLD 4350.

JAMES LENNON OF Q.L.D. WRITES : Sometime recently, I was fortunate enough to find time to be able to look for carnivorous plants in their natural habitat. Under the advice of another more experienced collector and grower, I gratefully set out for the coast. It seems that Drosera spathulata is found over an enormous area on the sandy-flat region surrounding Brisbane. Following directions, I found three places where D. spathulata was growing in abundance. I one place however, located near Alexandra Headlands on the North Coast, many of the plants seemed to be just reappearing after a prolonged dry-spell beacause of recent rain. The curious thing about these plants was that they all seemed to be mutated in some different way. Careful observation of three mutations showed that the plants were definitely D. spathulata and that the amount of deformity would gradually decrease. One mutation actually had a large number of leaves amongst the buds on the stalk.
There are several forms of D. spathulata on the coast. The first and most common seems to be the ordinary pink-flowered form. The second is a white flowered form which has proved easier to grow and looks slightly better. The third is a little heard of species that can grow very large in diameter.
I am sure that any-one who finds carnivorous plants in the wild would find it a facinating experience indeed and is well worth the effort.

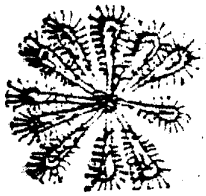
C.P. LETTERBOX CONTINUED.

MRS K CUDD OF PERTH WRITES We started nearly two years ago with 2 Dionaea and one Cephalotus, these were growing on a shelf under 2 - 2 ft gro-lux lights. They were given 17 hours of light in summer tapering down to 12 hours of light for winter periods. Last September the Dionaea started to flower and one day, on my son's birthday one of them got damaged. It was like someone had got a pair of scissors and cut the stalk off. Consiquently we were not very pleased but to our amazement another plant grew out of what was once the flower stalk. Anyway, we transferred our plants into an old aquarium 2'6x18'' high. We put about 1 and a half inches of blue metal on the bottom and 6 to 10 inches of German peat on top. The plants are 6 to 8 inches below the lights. Since we have put the Dionaea in the aquarium they have thrived sadly though the same cannot be said about the Cephalotus, we divided our original plant into 3 and these were put on higher ground so as not to be too wet. We put shadecloth between the lights and these plants so that they wouldn't have direct light. But they only seem to produce pitchers about the size of an asprin and then the pitcher dies. We thought that there must be too much heat, so we have transferred 2 out but it is too early to tell. Also we have some Drosera's in the aquarium which are thriving except the D. capensis, which has been flowering for quite some time and the mucilage has dried up. We have another D. capensis which is only just flowering and this doesn't seem to be affected. It is fair to say that all the energy has gone into flowering and it would be normal for the mucilage to dry up. We have now acquired some 4 ft gro-lux tubes, so we are hoping to fill the space with c.p's. We have bought a book 'Plants of Prey' and we hope to go collecting Drosera's during the winter.



D. spathulata (Kansai Type)

AUSTRALIAN PLANT & SEED SOURCES.



D. spathulata (Kanto Type)

NAME & ADDRESS	CATALOGUE	GENERA
CARNIVOROUS & UNUSUAL SEEDS. 3 Normandy Ave, Para Hills. S.A. 5096.	S.A.E.	Carries a good variety of seed only.
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Greenville, N.C. 27834. U.S.A.

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THE NORTH AMERICAN PITCHER PLANTS OF THE FAMILY SARRACENIA.

By Robert W. Riedl.

The genus Sarracenia was one of the first carnivorous plant groups to be discovered in the Americas by western man. The first known record of any species is an illustration of a leaf of S. minor dating back to the 1570's, probably drawn by a Spanish explorer to Florida. Some 25 years passed before Sarracenia makes its second European appearance in 1601 in the drawings of S. purpurea by Clusius. While it was not recognized as being carnivorous, the 1601 drawing was reproduced in the 1631 edition of Gerard's 'Herbal' in the hope that someone would rediscover the plant. It was ultimately found again in 1640 in Virginia by the famous plant collector John Tradescant who sent live specimens to England. In 1672 S. purpurea again makes an appearance in literature under the name 'Hollow Leaved Lavender' In Josselyn's book 'New England Rarities', yet it is not given a generic name until 1700 when the French botanist Tournefort named it in honour of Dr M.S. Sarrazin of Quebec, Canada, who had supplies Tournefort with a specimen. The name Sarracenia gained official acceptance in 1753 when CarlLinnaeus, the Swedish founder of modern biology, used it in his book 'Species Plantarum'. Yet still, although occasionally suspected, the carnivorous nature of Sarracenia had not been proven at this time. Darwin himself conducted no research on these plants although he mentions in his classic book 'Insectivorous Plants' of 1875 that due to pertinent work done by two American physicians and amateur botanists, Doctors Joseph H. Mellichamp and W.M. Camby, carnivory in Sarracenia is a distict possibility although not fully proven yet. The dominant view of the time was that insects found in the pitchers had initially moved there to shelter and, having had difficulty to escape again, had drowned in the pitcher fluid or had otherwise perished. The final proof confirming carnivory of Sarracenia came 12 years after Darwin's statement when experiments conducted by Dr. Mellichamp provided conclusive evidence that the bodies of animals caught by the pitchers are both digested and absorbed. In our century it was the eminent American botanist Dr. Edgar T. Wherry who undoubtedly contributed most to the study of Sarracenia. His observations led to the formal recognition of northern and southern forms of S. purpurea (S. purpurea purpurea and S. purpurea venosa), the formal describing of S. oreophila and the realization that distict forms exist in the S. rubra complex. He was the first to map the distributions of Sarracenia species and the first to indicate the significance of soil ph on their restriction to specific soil types. More recently, Dr Donald E. Schnell's extensive studies of Sarracenia come to mind and his book 'Carnivorous Plants of the United States and Canada' is considered a land mark in carnivorous plant publication. While Sarracenia has been grown in America and European collections for quite a long time its introduction into Australia (at least into the collections of private growers) has been comparatively recent and seems to have been pioneered by Stephen Clemesha who is well known through his prolific writing about carnivorous plants, Australian ferns and Australian orchids.

The genus Sarracenia belongs to the family Sarraceniaceae which it shares with two other genera ; the Sun Pitchers Heliamphora and the Cobra Lily Darlingtonia, which are all completely confined in natural distribution to the New World. There are eight generally recognized species in the genus Sarracenia, although there is still some debate amongst taxonomic botanists whether to elevate two subspecies of S. rubra - ssp. alabamensis and ssp jonesii - to species status. Many of the species occur in a number of sub species, all hybridize freely in nature with other Sarracenia species and most are found in various specific, geographically localized forms and variations.

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Generally, the various species are encountered in suitable bogs and wet savannahs throughout eastern North America, but find their greatest species diversity in the south-east of the USA.

As all species, subspecies, geographic forms and many hybrids have recently been exhaustively described and illustrated in various publications (e.g. Stephen Clemesha, 'The Sarracenia Species', CPNA Vol 4, pp. 5-7; Donald E. Schnell, 'Carnivorous Plants of the United States and Canada', pp. 22-51; Adrian Slack, 'Carnivorous Plants', pp. 31-62; and many others) I shall confine myself to a more generalised view of the genus and its horticultural requirements.

The North American Pitcher Plants discussed here are, in principle, perennial rosettes of leaves modified into funnel-shaped traps which arise from a fleshy underground rhizome. The traps or pitchers vary in hight from 10 to 100 cm depending on species and variant. Located at the opening of the pitcher is a lid-like structure called the hood which is connected to the trap funnel by a short stem of varying width, the column. The hood may be reflected over the pitcher opening or may be vertical as in S. purpurea. The hood is immoble. On the front of the pitcher (on the opposite side from the column) a wing-like seam runs down almost the entire length of the funnel called an ala, which varies in size and characteristic with the species. The mouth of the pitcher funnel, where not interrupted by the column, has a rounded lip termed the nectar roll. The frequently bright colouration of the pitcher and the secretion of nectar along the margins of the hood, from the nectar roll and from the free margins of the ala attract potential insect prey to the pitcher opening. The underside of the hood is lined with downward pointing hairs, which encourage descent, but make a return journey difficult. The nectar roll and the upper inside portion of the pitcher are covered with a waxy substance making this zone of the funnel smooth and slippery. This upper inside portion of the pitcher is also rich in glands which secrete digestive enzymes. An insect which has reached this part of the trap invariably slips and falls into the funnel which rarely provides enough wing space to allow upward flight and, therefore escape. Deeper in the pitcher, waxy cuticle is absent and the pitcher walls are covered with long downward pointing hairs which make ascent virtually impossible; this is the area where digested products are absorbed. The effectiveness of the trap in catching prey varies according to species, but, generally, the tall upright traps are extremely efficient while the reclining pitchers of S. psittacina and the widely flaring traps of S. purpurea are less effective. The digestive power of the enzyme system within the pitcher is by no means omnipotent as a number of life forms, notably bacteria, fungi, algae, protozoans and certain insect larvae have developed adaptations which resist digestion and, in fact, multiply within the protection of the pitcher.

All Sarracenia species undergo a restin period during winter when no new pitchers are formed and many of the mature ones tend to wither. The basic shape of pitcher leaves remains the same during the growing season from spring until autumn although most species produce the most luxuriant and largest pitchers from mid-summer on. The exception to this rule is S. oreophila, which produces non-trapping, sharply curved 'winter leaves' called phyllodia during summer after having grown impressive pitchers earlier in the season. S. flava is the only other species which develops phyllodia, but these are longer and straight and are only produced during autumn and early winter.

Depending on the species, Sarracenia flowers from late winter to early summer (a second, 'freak' flowering period in late summer or autumn may occasionally occur). The flower structure is the same for all species, the only variation being in size, petal colour, odour and some minor details of petal shape. The flowers are produced on tall scapes and each scape only supports one single flower. Just prior to opening of the globular, terminal flower bud, the scape assumes the shape of a shepherd's hook, and the flower opens

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facing down. The style (the female part of the flower) has its distal part grossly expanded, so that it resembles an opened, inverted umbrella. The umbrella has five points between which hang the pendulous red, rose, yellow or greenish-cream petals. At each point of the umbrella is a small, incision-like notch and at the terminal point of it is the tiny stigma projection, the pollen-receptive organ. The globular ovary and the anthers (pollen-bearing male organs) are located at the base of the style which is the point where one would expect the handle of the 'umbrella' to be cupped by sepals and hidden by the drape-like petals. Three to five days after the opening of the flower a large quantity of pollen is shed by the anthers, which accumulates in the inverted dome of the umbrella ready to be picked up by potential insect pollinators which are attracted to the flower by the scent of nectar. Only one stigma projection has to come in contact with viable pollen to effect fertilization. About two weeks after the flower has opened the petals are dropped, and if fertilization has occurred the flower frequently assumes a more erect position while the seed pods ripen. In autumn the brown, globular seed capsule splits at 5 seams to release the teardrop-shaped, smallish, usually light brown seeds.

The beautiful flower and large, vividly coloured and veined pitchers make these exotic plant carnivores most attractive subjects for cultivation by CP collectors and plant enthusiasts alike. As long as the correct growing conditions are established and maintained, Sarracenia species and hybrids are some of the easiest carnivorous plants to cultivate which further adds to their appeal.

I prefer to grow my plants in plastic pots or polyurethane fruit trays where gradual build-up of toxic salts is less likely than in clay pots. The containers are weighted with a layer of pebbles or sandstone pieces to make them less likely to fall over and to become buoyancy if placed into water particularly if polyurethane fruit trays are used, although Peter Tsang of Queensland successfully exploits the buoyancy of polyurethane by floating his CPs planted in fruit boxes on his fish and aquatic plant ponds like barges.

Although growers have time and again experimented with various kinds of potting mixes, there is really no substitute for growing Sarracenia than in pure Sphagnum whether it be live or dried as available from most garden shops. Dried Sphagnum will generally quickly recover and will start to grow again after it has been reexposed to good quality water and sunlight. After the planting container has been filled with Sphagnum the Sarracenia rhizome is slightly buries in it so that its upper surface and particularly its growing points are exposed to light. During the growing season from spring to autumn the pot or tray is placed 1/3 to 1/2 of its depth into good quality water; 2 litre plastic icecream containers serve well as water tray where only individual Sarracenia pots are concerned, but as one's collection increases a square plastic children's wading pool ($8-00 to 12-00 in most large discount stores) to which one fits a plastic drainage tap and a water overflow outlet may seem more appropriate for the accomodation of large numbers of pots and polyurethane boxes. Although water trays made from galvanised sheet metal are used by some CP growers, I personally would hesitate to use such material or other metals in general as many metal ions are toxic or at least growth inhibitory to carnivorous plants.

If the relative humidity of the air is chronically too low the edges of the pitcher hoods will begin to brown and ultimately the entire pitcher may wither prematurely. In most areas of castal Australia the relative humidity is usually sufficiently high to prevent damage, but in inland areas or even on the coast during dry, hot and windy weather a frequent overhead misting of the plants proves beneficial. S. Clemesha has successfully experimented with a transparent plastic screen surrounding certain of his plants prone to withering (S. psittacina and S. purpurea) thus reducing air movement

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around the plants while maintaining humidity high during dry wind and heat periods (care must be taken to prevent excessive heat build-up inside the screen).

To prevent decay of the rhizome as result of microbial attack and to effect growth of well-coloured, well-shaped pitchers the plants should be grown in full sunlight with only partial shade protection against excessive afternoon sun. Provided the plants are standing in water and the air humidity is sufficiently high, they are remarkably tolerant to high temperatures during the growing season and ideally suited to most Australian summer climates. Our winters are the problem here particularly in the coastal areas from Sydney in the east and from Perth in the west northwards as they are rarely as cold as the winters in most of the natural habitats of Sarracenia in America.
All Sarracenia species and hybrids undergo a period of dormancy during winter which in nature is triggered and maintained by a reduced photo-period, the drying up of habitats and low temperatures particularly during the nights (in fact some Sarracenia habitats are covered by snow for several months).
To simulate these natural dormancy-eliciting phenomena in cultivation the plants are only kept barely moist once new pitcher growth has ceased in autumn (the water trays are drained) and the plants, if necessary, are moved to a light, but cool spot in the garden until flower and new pitcher growth resumes in spring.
The total or partial denial of winter dormancy through high temperatures and high moisture levels invariably reduces the vigour of the plant, inhibits flower formation and may even lead to its death through decay. Particularly the more northern and mountain species of Sarracenia suffer somewhat in the milder winter areas of Australia through partial denial of dormancy. The last unseasonably warm winter in Sydney predictably affected all my Sarracenia plants which naturally occur in cold winter habitats such as S. purpurea ssp. purpurea and S. flava from the northern part of its range, and S. oreophila and S. rubra ssp. alabamensis from the mountains of Alabama; none of these species developed flower buds during spring (although they had done so profusely after colder winters), the northern S. flava is still looking frail and one specimen of S. rubra ssp alabamensis never recovered. Maybe one ought to experiment with storing Sarracenia species from cold winter climates in the refrigerator during mild winters to induce more total dormancy, a process which may have merit for all Sarracenia plants grown in tropical areas of Australia. If a large number of plants has to be fitted into the available space of the refrigerator, the plants can be removed from their pots, any pitchers cut off and the remaining rhizome dusted with fungicide and covered with a few strands of moist Sphagnum before being packed into a plastic bag and stored from June to late August in the refrigerator's vegetable compartment (freezing of the rhizome must be avoided).

Sarracenia propagation can be accomplished by both sexual and vegetative means: If large numbers of plants, new clones and hybrids are desired the plant parent must be made to produce seeds which are then sown and germinated. As there are no genetic barriers in Sarracenia one can effectively self pollinate any species or hybrid and cross-pollinate any species or hybrid with resulting viable seed. Pollination is best accomplished 3-6 days after the flower has opened. If insect pollinators are likely to 'interfere' with one's breeding program the opening flowers have to be covered with a muslin or gauze hood until the petals are shed. Pollen is quite copiously produced by the anthers and accumulated as dust-like powder in the dishshaped umbrella. To effect pollination some pollen has to be brought into contact with the pollen-receptive stigma lobe (the tiny raised, spur-like projection) at the terminal point of the incision-like notch or cleft found on each of the 5 points or corners of the umbrella. Theoretically, only one stigma lobe needs to be pollinated to fertilise the overies, but I usually pollinate all 5 for good measure and repeat the procedure on 2 or 3 consecutive days.

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To self pollinate I simply push the stigma lobes into the 'puddle' of pollen at the centre of the umbrella. If I wish to cross-pollinate, yet wish to avoid accidental self-pollination, I carefully force the 5 points or corners of the umbrella outward so that the stigma lobes come to rest on top of the sepals, by using the tip of my finger or a cotton bud I pick up pollen from the umbrella centre of the pollen donor and transfer it to the stigma lobes of the flower selected as pollen receptor; this procedure too should be repeated on 2-3 consecutive days to make certain that pollination has taken place. The same cotton bud is only to be used for one kind of pollen and finger tips must be thoroughly washed before a different type of pollen is picked up for pollination or undesirable crosses may inadvertently result. All flowers in a pollination program should be carefully labelled with a suitable code so that the pollination history is recorded and the resulting seed can be identified. Pollen wrapped in paper sachets can be successfully stored for several weeks in the refrigerator if pollination experiments are to be carried out with other Sarracenia species which come into flower later in the season. If pollination was successful the swollen globular ovary or seed pod will gradually ripen during summer and autumn. When it is fully mature it will turn brown and ultimately split at its 5 seams. The seed pod is now removed its compartments are forced open and the seeds are collected on a piece of paper to be stored in the refrigerator to reduce loss of viability in a labelled vial or paper envelop. Healthy, viable seed will be plump. Sarracenia seed can be sown in Australia at any time from spring to autumn after it has been stratified in the refrigerator for 4-12 weeks.
Germination of stratified seed is more certain, quicker and more vigorous although stratification may not be necessary with southern Sarracenia species. Stratification is achieved by placing the seed on a shallow bed of wet Sphagnum which is sealed into a small plastic or glass container (I use microbiological culture dishes for this purpose) which is then placed for the required time into the refrigerator. At the end of the stratification period the Sphagnum wad is simply transferred to the top of a pot filled with Sphagnum, stood into water and exposed to sunlight. Depending on the temperature the seed will germinate after 10-30 days (bottom heat is useful to accelerate germination during cool weather). During the first season seedlings of most species and hybrids look very much alike, but during the second season their specific characteristics become more apparent and the seedlings have usually grown large enough to be spaced out. The young plants will develop their first flowers between the third and fifth season. First generation hybrids are generally, halfway between their parents in appearance, but if their flowers are self-pollinated again and a large number of resulting seed is germinated, the much greater combination and permutation pattern of genetic traits will result in more variability of shape, colour and growth behaviour and may give rise to some outstanding horticultural clones which then can be further multiplied by asexual (vegerative) propagation. The first simply involves division or breaking of the fleshy rhizome or underground stem at branching points. I usually do this every two years at the end of the growing season or towards the beginning of spring when I routinely lift the rhizomes from their containers to cut away dead, old tissue to prevent infection of the younger portion of the underground stem. Each severed rhizome branch including the old stem should have at least one growth bud; the individual sections are then planted out into sphagnum. The second method has been developed by Stephen. Clemesha and involves rhizome division with inducement of new buds. During the active growth period the Sphagnum is removed from the upper surface of the rhizome exposing it to the air while its lower surface is left indisturbed and while its roots are still in the growing medium. With a clean razor blade or scalpel cuts are made halfway through the rhizome in about 2 cm intervals. The upper half of the rhizome is left exposed and a few weeks later new growth buds will appear on both sides of the cut areas. When each new growth has sufficiently matured and roots have been formed, the rhizome is lifted from its container, the cuts are completed and each

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resulting section is planted out individually.

My Sarracenia plants are occasionally attacked by caterpillars and grass-hoppers, but a twice-weekly spraying with Lane House Plant Spray (active ingredients : pyrethrins and piperonyl butoxide) usually keeps damage to a minimum; this spray used at moderation does not appear to have any detrimental effect on any of my carnivorous plants.

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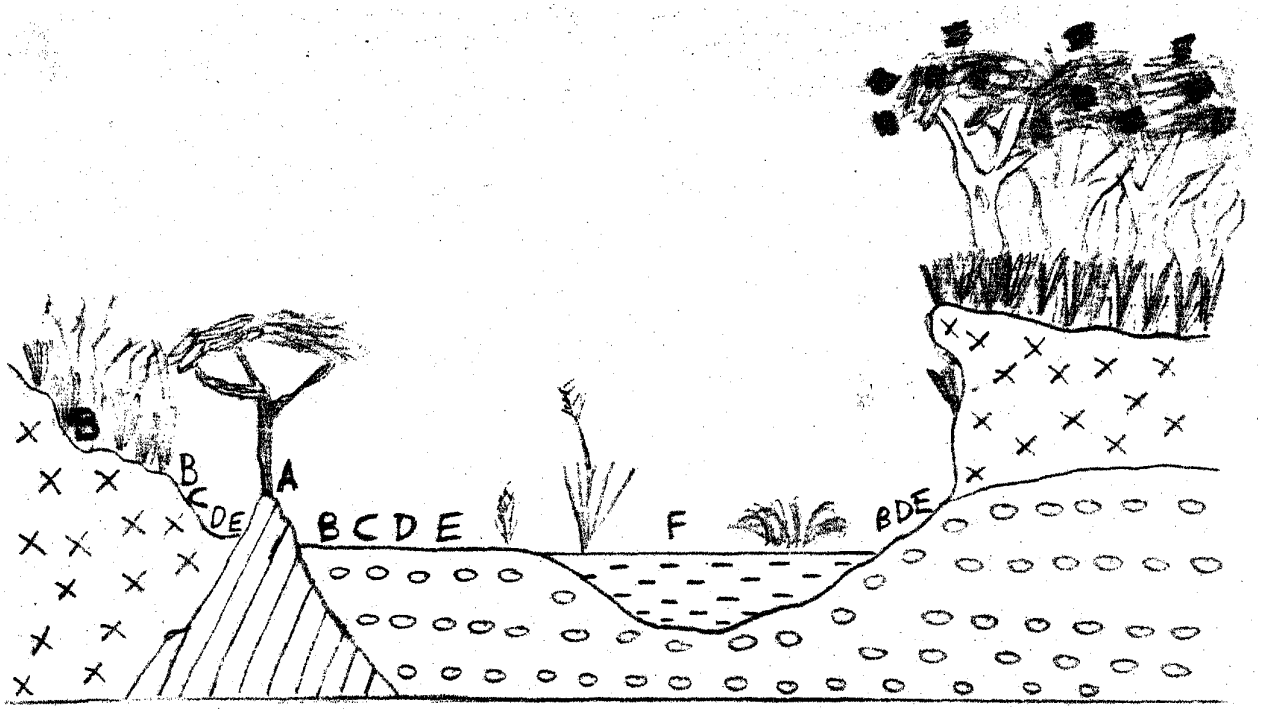


KEY

- Black, peaty sand. (moist)
- Sandy loam. (moist to dry)
- Pure, white sand. (soggy to moist)
- Brackish, freshwater.

Plant Habitats.

A - D. auriculata
B - D. spathulata
C - D. pygmaea

D - U. dichotoma
E - U. lateriflora
F - U. exoleta

C.F. Beginner.

P.G. Rhodes - S.A.

My Interest in Carnivorous plants started in about mid 1979 when I purchased some mixed Sarracenia and Drosera seeds from Fred Howell.

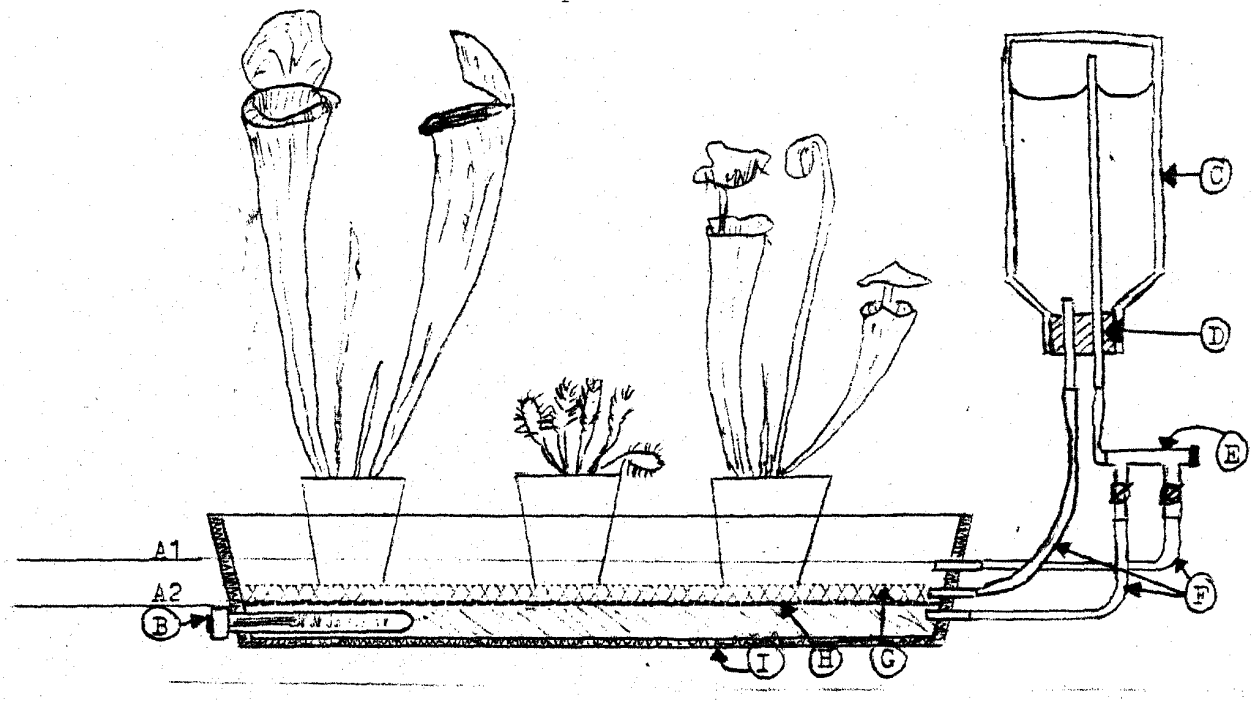
These seeds germinated and managed well until I moved from Sydney in September 1980, and through ignorance and possible mismanagement, I lost my complete collection, which also included two Dionaea muscipula.

About a month ago, a friend who knew that I was interested in c.p's, bought me a Drosera, which was labelled Drosera montana, which has rekindled my desire to grow c.p's that I had temporary lost due to my failure. On taking this plant home, I placed it in a trough under grow-lux lighting in which I am at present hydrophonically growing African Violets, to allow the duplication of the tray watering and lighting it had been grown in whilst in the shop. So far this plant has mainained a healthy outlook on life and survived, even though it is in a water mix containing a slow release fertiliser.

On further book research, I found that most species of c.p's do well in a peat and sand mix and put into a tray watering situation with a period of with-holding during the cold winter months. With this principal in mind, I had this idea of setting up c.p's without a terrarium but still maintaining the humidity and the summer, winter wet dry periods, using bits and pieces from my aquariums and gardening equipment.

The items that I antisipate that will be used are as follows : -
A foam plant trough, undergravel filtration base, Aquarium heater, Gravel, plastic tubing, air gang valve, bottle and stopper.

The tubes will be set up in a manner in which the winter-summer water levels are maintained at a correct depth (see diagram). The opinions of some experienced growers on this idea would be of great assistance, especially as I am still very much a novice in this field of plants.



A1	Summer water level	E	Gang valve
A2	Winter water level	F	Plastic tubes
B	Aquarium Heater	G	Gravel
C	Bottle	B	Plastic Grid(Underwater filter)
D	Stopper	I	Foam planter Box

TUBEROUS DROSERA - MY EXPERIENCES.

By John Graham.

Ever since I was introduced to my first tuberous Drosera, I have found this particular group of plants to be the most captivating of the genus. The multitude of variations in leaf shape, growth habit and flower structure are enough to fascinate any botanist. Unfortunately, my experiences with these plants go no further than the 'bush-house' shelf, so what I will do is describe to you a few interesting points about some of the plants in my collection. I will first discuss a few general points and then talk about a few individual species.
Last year, near the end of spring, I received a large selection of tuberous Drosera from a friend. Since most of them had completed their seasonal growth, I gradually let them dry out, and placed them in the dryest part of my bush-house. All during the summer, their potting medium remained bone-dry. Finally one day in mid Autumn, I decided to inspect the tubers. To my surprise, I found many of the larger tubers had split into 2 or 3 smaller ones during, their dormancy. I also found that many of the tubers had sprouted, despite their bone-dry medium. Then to my dismay I discovered an unforseen pest. During the summer, a certain species of ant had discovered some of my slumbering tubers, eaten them out completely, and made homes in their hollow remains. I found this to be the case with about half of the tubers. From now on, I think I will use Allen Lowrie's plastic bag method. (See cpna, Vol 4, p 12,).

Species Notes.

1. D. auriculata (Fig A.)
This is an erect plant, usually 30 cm or more tall, producing shield-shaped leaves on stalks along the stem. The plant is usually dark reddish, but colour varies with sunlight intensity. The flowers are about 1 cm in diameter, with white petals and smooth sepals. I grow this plant in pure sphagnum peat moss and keep the medium very moist during the growing season, but not soggy.

2. D. auriculata (Golden var.)
This plant is a small, pale form of D. auriculata, similar to it in every respect, except that it is not as large and red colouring is replaced by a golden yellow pigment.

3. D. bulbosa (Fig B)
This is a small, rosetted plant which produces about 5 or 6 leaves each about 2 cm long. When grown in bright light, the oval-shaped leaves become a deep red shade. White-petalled flowers are produced singly on short stems, usually 6 or 7 at a time. After flowering, new leaves appear and bury the flower stalks. A mixture of 50 pc sand and 50 pc peat moss kept fairly moist works well for this plant.

4. D. menziesii (Fig C.)
This erect Drosera is similar to D. auriculata in height, but not in other respects. The leaves are perfectly circular and are produced in groups of 3 along the stem. In each group of leaves, there is always one leaf which is on a stalk about twice as long as those of the other two. Near the end of its growth cycle, very pretty pink to reddish petalled flowers are produced. I grow this plant by the same method as described for D.auriculata.

5. D. pallida (Fig D.)
This is a very thin, climbing Drosera which usually reaches a height of 1 metre. The leaves are similar to those of D. menziesii, except that they are light green. Instead of growing straight, the plants stem goes upward in a zig-zag pattern, with a group of leaves on each point of the zig-zag. The flowers are numerous and have white petals.

(CONT)

TUBEROUS DROSERA CONT.

Since this Drosera is native to dry parts of S.W. Western Australia, it does not like an overly-moist potting medium. I use 75 pc sand and 25 pc peat moss, kept moist but not overly so.

6. D. zonaria (Fig E)
This would have to be the most beautiful Drosera in my entire collection. It is a rosetted plant which produces about 20 or more fan-shaped leaves which form a perfectly circular rosette. The leaves colouring, light green with red margins, makes this plant very conspicuous indeed. The entire plant is about the size of a 50 cent piece. As for floral characteristics, I must quote here from Rica Erikson's 'Plants of Prey', as flowering specimens of D. zonaria are rarer than solar eclipses. 'Scape single, much branched in the upper half, and bearing numerous white flowers...'
I cultivate this species by the same method as mentioned for D. pallida.

One last interesting point about these plants mentioned above is the usual size of the prey that they catch im my bush-house. Since I usually grow them singly in pots, or in small groups, plants like D. zonaria, D. pallida and D. menziesii are beyond holding anything larger than small flies. However, in their natural habitat where they grow in thick colonies, it has been noted that they can catch large butterflies.

Reference :-

Erickson, Rica, 'Plants of Prey', Uni of W.A. Press, 1968.

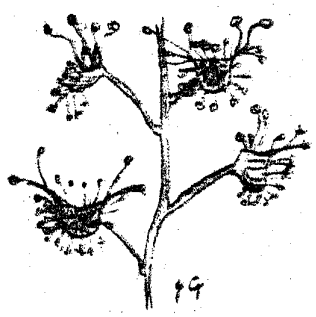


Fig. A

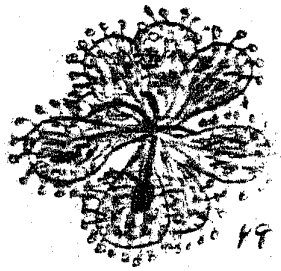


Fig. B

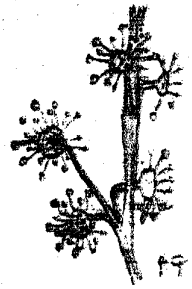


Fig. C

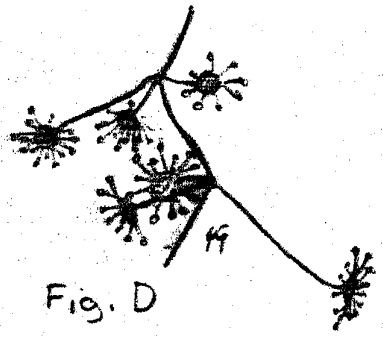


Fig. D

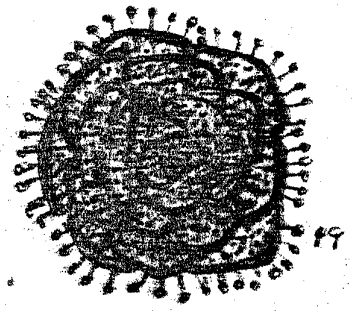


Fig. E

DROSERA BINATA.

By Stephen Clemesha.

Though Australia has many species of Drosera only a few can easily cultivated, propagated and maintained continuosly for more than a few years.
D. binata was the first Australian Drosera I grew. I collected it accidently in a clump of soil with a delicate ground orchid which I had collected in a wet sandstone cave in the Blue Mountains of N.S.W. I sat the piece of soil on a house brick and stood this in a saucer in which I kept water all the time. The orchid came up the next year but disliked the warmer climate and soon died, so I had a clump of D. binata and this thrived. This sundew-grows in swampy soils of the coast and highlands of South Eastern Australia (South QLD, N.S.W. VIC, TAS &parts of S.A.) and also New Zealand. It grows only in habitats that do not dry out as its long, rather thick black roots cannot stand this.
In cultivation it*grows well in pots of peat or sphagnum which can be stood in water and must never completely dry out.

The first form of this species I grew was the form which has leaves that fork only once. I took quite a while to realise that this was not a juvenile form of the more common variety of D. binata. I have found this single forked form only in some parts of the Blue Mountains and quite often near to where the commoner variety grows. I was rather surprised to find that this was the main variety of D. binata grown overseas. It grows on swampy flats, wet soaks, and wet rock crevices as does the variety below.
The commoner variety around Sydney and further south produces mature leaves that branch twice or occasionally more. Its juvenile leaves are like those of the above variety. When I first sent plants of this to the U.S.A. it was received with considerable excitement as it was unknown in the U.S.A. although it was being grown at Munich Botanic Gardens. It now has become generally distributed as D. binata var. dichotoma.

The third variety was unknown overseas until I sent it to USA and it also is now widely distributed. The nickname I used for it in one of my letters was D. binata var multifida, and it now is widely grown under this name.

I first saw it in coastal swamps of Stradbroke Island off Brisbane. It differs from the southern varieties in having narrower segmented leaves which branch much more and are more heavily pigmented, they are quite reddish.

Plants of this variety from Stradbroke Island and near Port Macquarie, maintain a few leaves through the winter whereas those from colder Stanthorpe like the southern varieties are deciduous, even if grown in a mild frost free climate.
The flowers of all varieties of D. binata are white except for the Port Macquarie plants. Their flowers are pink tinged.
When I moved from Sydney all my plants of D. binata became mixed, but because of their distinctive habits I have easily been able to sort them out.

There is a curious family of bugs that live on Drosera sp. and several species of it occur on different races of D. binata. They appear to live on the insects the plants catch. They are able to move up and down the leaves without getting caught. A colony of them lives on my plants and appears each summer especially in wet weather. They have taken a liking to D. filiformis from the USA, I usually find more on this species than on D. binata. Though overseas D. binata is propagated from leaf cuttings. I have not had much success with them. They will grow from root cuttings and occasional self sown seedlings appear. If grown in a pot by itself D. binata grows vigorously and increases well.

It also will persist in pots with other species like Sarracenia but is better grown alone or with Utricularia's which will not overpower it. Heavy frosts will kill the tops but not the roots or crown.

WATER AND THE GROWING MEDIUM.

By Joe Mazrimas.

One of the most overlooked factors that is indispensible to healthy growth of carnivorous plants is the quality of the water. Taking nature's course, one of the best sources of water is rainwater simply because it contains a low concentration of salt. If rainwater is not available, then a good substitute is either distilled or deionized water. These substitutes can be purchased but over a long period of time they can become very expensive especially if you need large quantities.

Carnivorous plants grow best when the salt content of your water does not exceed 150 ppm in total salt content. You can iquire from your local water company office on the hardness of your water. One must use water with low salt concentration in order to minimize the damage that occurs to the soil medium. Most cp grow in acidic soils or soil that contains a high concentration of peat or sphagnum moss. These acidic substances can act like ion exchangers by substituting hydrogen ions from the plant for cations that are in the water. The most common cations are sodium, magnesium, potassium and calcium with smaller concentrations of metal ions such as mercury, lead and iron. When these cations bind to the moss (either dead or alive), the moss in turn releases hydrogen ions which, of course, is responsible for the production of acidity needed by the plants. If the water contains a very high concentration of salts, then the exchange capacity of the moss is exceeded rather quickly (the moss can't grow fast enough) and you have a rapid salt buildup changing the growing medium from acidic to alkaline. It is this high salt buildup and alkaline medium which spells doom for your plants.

If you choose to grow your plants in a closed system such as a terrarium, then I would recommend using distilled water since only small amounts are needed to replace that which evaporates. Most of it gets recycled. In open systems, evaporation will be considerable and cost of distilled water becomes prohibitive and so some other substitute must be found.

One system that is simple to use is to make your own water with a process called reverse osmosis. A previous article in CPN described its function, and so I won't go into detail here. Usually, such systems can give you water that is about 10 times lower in salt content than your tap water, and it uses no other energy source than the water pressure from your tap. A unit that will give you a minimum of five gallons a day of low salt water can be rented for less than $10-00 a month. A home unit is available from the Culligan Water Co. called the H-5 model. The artificial membranes which filter the water will last a year or more depending on use.

For c.p. to thrive over a long period of time, they require an acidic soil with good drainage but still capable of holding moisture. I find that a good soil mixture consisting of Canadian sphagnum peat moss and perlite makes a light and ubiquitous medium for almost any situation that confronts c.p's. This peat moss is good because of its homogeneous consistency which lends itself to starting seeds of any size from Utricularia to that of Drosophyllum. I add either perlite or sand in various amounts up to 50 pc by volume to aid in keeping the roots well oxygenated and to allow for good drainage. By adding sand or perlite, there is less tendency for the surface to form a hard crust which later becomes impervious to water and discourages the formation of surface algae.

For those growers who prefer to use living sphagnum moss, it is important to remember that this moss doesn't like to be packed tightly but instead prefers a loose but firm structure in order to sustain growth. Perlite can be used to increase the volume of chopped sphagnum which keeps the moss healthy and contributes to good drainage. One can use up to 50 pc by volume of perlite mixture for most of your c.p. needs.

C.P. SEARCHING IN NORTHERN N.S.W.

By John Graham.

No matter how many times you see a plant in cultivation, it is always a great thrill to discover it in its natural habitat, growing profusely. I felt this thrill again just recently on a family trip to Ballina, in northern N.S.W.
We followed the Pacific Highway south from Brisbane, until we reached the small town of Bangalow. Here we took a. turn off which led us towards the sea and to a perfect area for c.p. searching. The environment along this seaside road was flat grass land on the landward side and Banksia-heath land on the seaward side. It was in this heath area that the c.p.'s were discovered. Surprisingly enough, they were found in an area only about three metres from the roadside and about 200 metres from the rolling surf. A man made ditch which ran for about 3 km parallel to the road provided the fresh water for the plants. The cross-section diagram I have drawn shows this ditch, the landscape, the various soil types of the area, plus the locations of the species of c.p. that were present. Now, on with the adventure of discovery.
The first plants to be noticed were large, glowing clumps of D. spathulata, glistening red on the far bank of the ditch. These formed a veritable carpet of sticky dew over the sandy soil. One strange thing about this species is its ability to adapt to a wide range of environmental conditions. I found some plants growing in almost dry conditions only feet away from the road (see diagram), while others grew literally underwater. These 'aquatic' Drosera had been growing under these conditions for some time apparently, as their leaves were extremely elongated, each leaf more than 3 cm long in fact. I found most specimens growing in full sunlight, with only a few growing in shade. Flowering must have taken place recently, as there were thousands of seedlings present, most only producing their 4th or 5th leaf. One other usual individual had produced a bifid leaf. (See Fig 1).
The next plants I noticed were D. pygmaea. Well, not so much 'noticed' as 'stumbled across'. Since the first plants I saw were growing in full sun, they were almost invisible because of their minute size. None of these 'sun growing' D. pygmaea were any larger than 1 cm in diameter. They were a deep maroon colour all over, and had no green pigment what so ever (even gemmae were light brown). Water practically covered them in some areas, as these sun-growing types were present in the most waterlogged areas of sand. Shade growing D. pygmaea were also present , and were completely different plants to their sun-loving brothers. They were larger (about 1-5 cm in diameter) and had green leafstalks and light reddish traps. They grew under grasses in moist, mossy areas of sandy loam (see Fig 2). Some of these shaded D. pygmaea had just finished flowering and seed pods were present. One interesting point about this plant is that it didn't carpet the ground like D. spathulata, but formed small colonies of 5 or 6 plants about 20 cm apart.

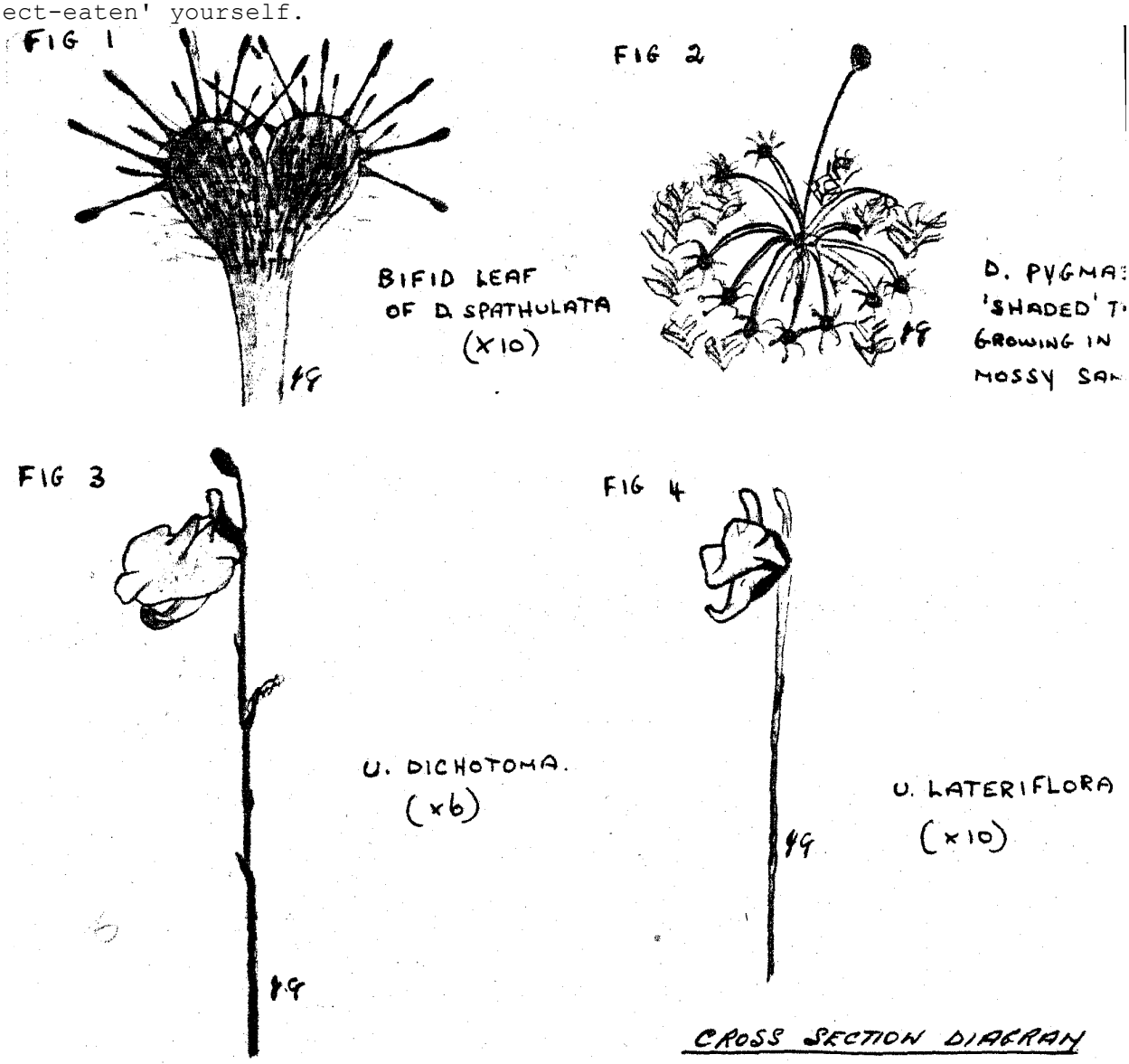
At least 3 species of Utricularia were present in this area, those being U. dichotoma (Fig 3), U. lateriflora (Fig 4) and U. exoleta. U. dichotoma and U. lateriflora were the most evident species, being present in most habitats in the area (see cross section diagram). Once again, these plants were stumbled across, as only a few specimens were in bloom. However, close scrutiny of the sandy ground revealed many large areas of tiny green leaves, characteristic of Utricularias. Also, large amounts of spent inflorescences were present, many with seed. As for U. exoleta, only a few small clumps could be found in the area. Strangely enough, only 6 months before the water was absolutely full of it, and in full bloom too. It was a beautiful sight to see literally hundreds of yellow flowers poking above the surface of the water. One possible reason for the demise of U. exoleta was the presence of a thick, greyish slime which was now thicker than U. exoleta had once been. In the never ending battle of 'survival of the fittest',

CONT

C.P. SEARCHING IN NTH N.S.W. CONT.

it seemed that U. exoleta had met its match.
After hours of searching through this sandy swamp, we finally came across a single clump of D. auriculata. There were about six plants in the group, each about 30 cm high and pure red in colour. Without a doubt, D. auriculata is most particular about its habitat, as the plants mentioned were found in a raised section of black, peaty soil, and were growing at the base of a small tree. This type of habitat was not common, thus the reason for D. auriculata's rarity here. (see cross section diagram). About 3 of the plants had recently flowered and dispersed seed and there were about 8 seedlings growing around the bases of the adult plants.

One warning to potential c.p. hunters. C.P. searching is not without hazards. While closely examining some D. spathulata, I noticed a small mound of soil, about 10 cm across, which had obviously been constructed by some sort of insect. Being curious in nature, I poked a small stick down a hole that was in the mound, not really expecting anything. A huge black and red ant, 2.5 cm long, raced out and started rapidly climbing the stick that I was holding. Seeing how large his pincers were, I immediately released the stick and moved rapidly away. So remember, while looking for insect-eating plants, make sure you don't become 'insect-eaten' yourself.



CROSS SECTION DIAGRAM
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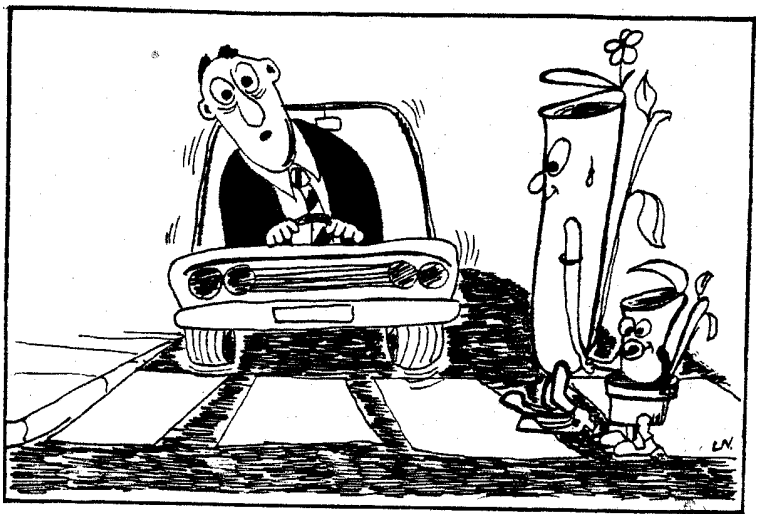

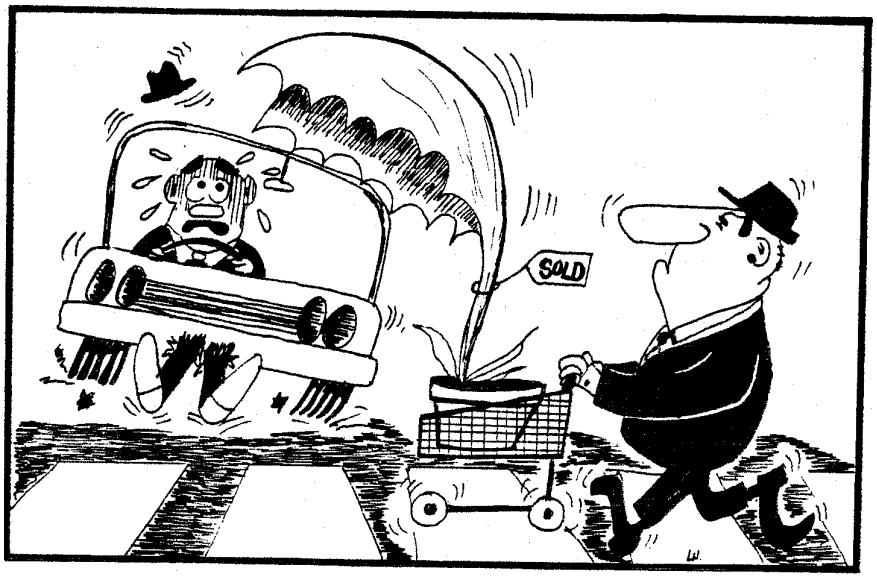
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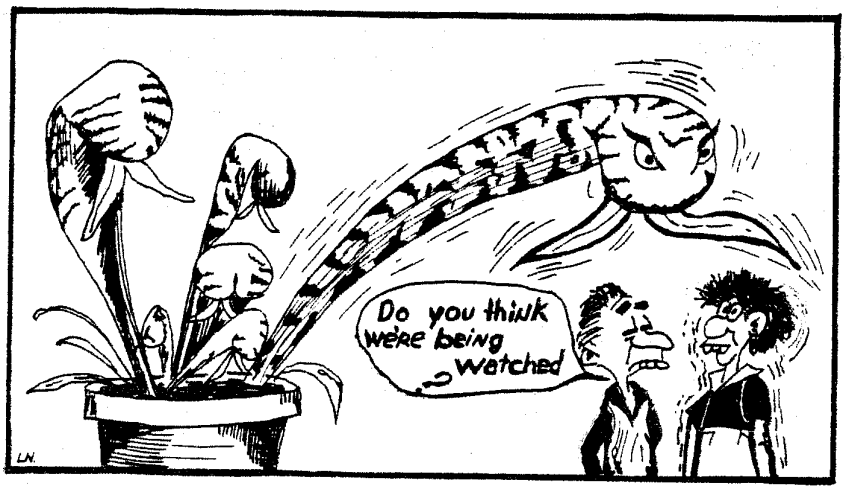
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Stephen Friedrich. 11 Glenorchy St, Lyons. A.C.T. 2606.

Would like to obtain any plants or rooted cuttings of Nepenthes.
Is willing to buy or trade for Desmodium Gyrans (Telegraph plant), this plant is capable of movement of its own accord.

. . . . . .

Ian Miller. 11 Barton Ave, Ferntree Gully. VIC. 3156.
Wants to buy Drosera, Sarracenia, Cephalotus, Dionaea and Nepenthes.

. . . . . .

Janice Emmins. 342 Gallaghers Rd, Glen Waverley. VIC 3150.

Would like to purchase Sarracenia drummondii (S. leucophylla) S. oreophila, S. flava (narrow-necked form only), S. minor, S. rubra and Darlingtonia californica. Janice would also like to meet other c.p. enthusiasts and can be contacted at the address above or by telephoning her on 561-2231.

. . . . . .

Ralph Lewis. 25 New Cemetery Rd, Ingham. QLD. 4850.

Wants to buy a large plant of Dionaea and also a large plant of Cephalotus. Wants to swap a Sarracenia psittacenia for any other rarer Sarracenia other than S. purpurea.

. . . . . .