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ON THE DRY SIDE
by Timothy Chapman

The month of March in Phoenix is a difficult time for me to get anything serious done. The weather is gorgeous. A pair of verdins are making a nest in one of the Texas ebonies in the back yard. And the succulents, of course, are waking up and blooming. Meanwhile I have art to make for an upcoming gallery exhibition and this article to write. Maybe I can combine some of these things: sculpture, writing, and the flowering parts of the euphorbia. The anatomy of the flowers have always been hard for me to visualize, and an actual larger-than-life model may help, I figure. Incidentally, this will be a project that you, with a little patience, can take part in, too. Just follow the easy instructions using the common and readily obtainable objects described.

The euphorbias are distinguishable from other plant families in a couple of ways. One is the milky and often irritating sap or latex they have. Another is the cyathium, or fancy little arrangement of the flowers. A single cyathium is situated at the end of a tiny stalk or peduncle. This can be represented by a vertically situated broomstick. (I have pounded mine into the ground so it will stand. The business end of the broom has been cut off -- the straws will come in handy later.) Now, the little colorful parts of the cyathium (there are two red ones in the Crown-of-thorns, E. milli) are not petals, exactly, but bracts, which are modified leaves that attract pollinators to the tiny male and female flowers at their center. A pair of shovels sans handles make lovely bracts. I have attached mine to the top of the broomstick peduncle, parallel to the ground, and pointing away from one another, using eight large machine screws and a gob of duct tape. A coat of red spray paint adds life-like realism. Atop this arrangement I have placed a large metal bowl, open to the heavens, held with a single roofing nail, to portray the involucre which protects the tiny structures held within. Along the rim of the bowl

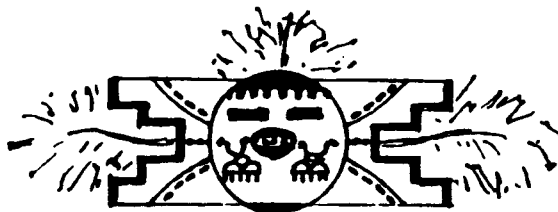
are five mackerel tails, all pointing skyward. These represent the glands, whose function it is to produce nectar. The mackerel tails are stuck on with -- well, after a while, they just stick by themselves.

Now some species of euphorbia are dioecious, which is to say that the male and female flowers are on different individuals. But most species have cyathia bearing both sexes and our lovely, if shakey, model will reflect this. Perched upon its own little stem (pedicel) at the very top center of this arrangement and in the middle of the bowl is the single female ovary, represented by a small salad-spinner which I have attached to our growing contraption with scotch tape and the contents of two tubes of super-glue. On top of this are three drinking straws, pointing straight up and stuck on with chewing gum, which bring to mind the styles, thin tubes which convey the male genetic material supplied by the pollen grains (which are in turn fortuitously portrayed by a few flies which have begun to ardently admire my sculpture. Art lovers.)

Okay. In the area bounded on the outside by the involucre bowl and on the inside by the salad-spinner ovary are a few screwdrivers set in a half-inch of concrete in the bottom of the bowl, handles pointing up. These are the male flower parts or stamens. The handles are the anthers which would contain the pollen. Surrounding these stamens are those broom straws (I hope you saved yours), also pointing upwards. These are the bracteoles which arise from the involucre. I don't really know what they do, but they look kind of nice.

While I appreciate the earnest portrayal of pollen grains by our friends the flies, it is not really an accurate one. Euphorbia pollen doesn't fly about on the wind, but needs an agent to transfer it. My cat May seems more than anxious to play the pollinator, attracted by the mackerel tail glands. And as I let the drama of nature take its course and watch my cyathium model clatter to the ground and set dogs barking around the neighborhood, I am reminded of the fragility of beauty, of life, and of goofy visual analogies. But now I think that

I will probably always remember the structure of the cyathium of the euphorbia. Unfortunately, I will probably always associate it with mackerel.

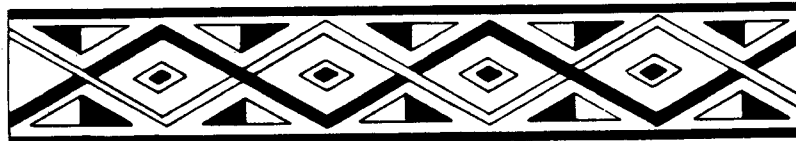


GROWER'S TIP: BIRDPROOFING

Many of us have had bad experiences with birds maiming our favorite plants. They uproot seedlings and small plants in their search for insects. Occasionally they do the crime dog thing and take a bite out of your lithops, conophytums, etc.

Lee and Fran Tolleson have come up with a very good solution with little covers made from hardware cloth. This material has small openings that stop the birds yet allow sunlight and water in. The wire fabric is strong enough to hold itself up and will hold a crease. Determine the width and length of the area you want to protect, add one or two inches to keep the critters at arm's (bill's) length, and add the height times two for the sides. Cut out squares from each of the corners equal to the total height you need, fold the hardware cloth to make your protective frame and use a fine wire to "stitch" the corners together. This frame is light in weight, rigid, easy on and off, and lasts for years.

Sample: A seedling tray 8" x 12" x 3". You will keep the seedlings in the tray until they are about 4" tall. If you want 2" of clearance all around you are ready to figure the size of hardware cloth needed. The total height is 9" (tray plus seedlings plus clearance: 3" + 4" + 2"). Total length is 34" (tray plus clearance at both ends plus twice the height: 12" + 2" + 2" + 9" + 9"). Total width needed is 30" (tray plus clearance at both sides plus twice the height: 8" + 2" + 2" + 9" + 9"). Thus you need a piece of hardware cloth that is 34" by 30". Now cut out squares 9" by 9" from each corner and fold. You will have a frame 16" by 12" that is 9" tall. Wire the corners together and place over your tray. No bird can get within 2" of your prize seedlings.



Numerous articles have been written about cacti as well as many books by very knowledgeable and well-known authors. This is in no way any competition with any others, as my knowledge is certainly minute. However, some years ago there was a great magazine entitled "House Plants and Porch Garden" which provided a wide range of informational articles along with colored pictures etc. and I have saved them these many years. Would like to share a few paragraphs with you from an article entitled Cacti by Judy Naftulin.

Cacti are not plants to be taken lightly as their very existence is somehow significant, certainly remarkable and so thoroughly unusual that they stand quite apart from everything else that can be cultivated both indoors and outdoors. Their exotic forms and features give them an appearance unlike any plants we grow. They offer the benefits of extraordinary durability and the fleeting pleasure of magnificent flowers. Cacti are special. And the people who grow them tend to be special themselves. So you see, WE are special too!

Among the vast number of different species and genera, there is a variety of form, size, color, and an array of flowers unlike any in the plant kingdom. Cacti grow in a surprising number of inhospitable climates and take on forms that seem, sometimes, to be unreal. Cacti are survivors, and unlike most house plants, they are not the products of lush and fertile jungles or rich rain forests. (Now that is not to say that some species cannot be grown under jungle or rain forest conditions, as there are some that do well under those conditions.) They develop their individual systems of survival in extreme hardship and barren environments, conquering with a beauty that is equal to anything that grows. Definitely, cacti are not to be taken lightly.

Cacti aren't just different, they are almost totally unlike any other form of vegetation. Cacti are succulent plants developing the ability to store water in their fleshy stems to enable them to survive periods when water is not available. The principle feature setting cacti apart from all other plants is the areole. An areole (a'-ree-ol) is a cushion-shaped structure that is a combination of 2 buds cemented together. A bud is the only point on a plant which initiates growth. Only cacti have 2 distinct growing points built into a single structure. All other plants have single buds. The lower bud usually develops spines, and the upper one produces ~~flowers~~ fruits, and branches.

As was mentioned above, all cacti are succulent plants. To a greater or lesser degree, their bodies are swollen and fleshy in order to store water. Plant succulence is certainly a fascinating method of survival. It is the result of specific environmental pressures exerted by hostile climates, but most people think this means that cacti are desert plants. A desert is usually defined as a place with less than 10" of rainfall a year. Extreme deserts often receive far less than this small amount, and even the most stubborn cacti cannot survive such conditions. ~~They are~~ better at the edge of the desert, on a dry but not necessarily waterless stretch of land sometimes known as the chaparral. Cacti also grow where other factors limit water supply. Some grow in trees, along the seashore, on grasslands, and on mountains. They survive because they have the ability to store sporadic or sparse water supplies and ~~consume~~ it at a very slow rate.

There are many different forms of succulence, and tens of thousands of plants have developed methods of storing water. Actually succulent plants can be divided into 2 groups, those that are stem succulents and those that are leaf succulents. Leaf succulents have thick, fleshy leaves usually growing in a closely packed cluster or rosette for protection from the sun and wind. These rely on the large interior volume of their leaves for water storage. Cacti are stem succulents.

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They have greatly enlarged stems, with their leaves either completely absent or temporary appendages discarded as the plant matures.

The "stem" of the cacti can either be globular or cylindrical, as both of these circular shapes allow the body of the plant the maximum internal volume for a minimum of surface area. Limiting the surface of a plant exposes as little as possible to the drying effects of sun and wind, but there are other aspects of cactus structure designed to conserve water. Everything about a cactus is influenced by water shortages and the need to endure them. However, at the same time, all plants do require a certain amount of surface area in order to absorb sunlight for photosynthesis, which sometimes accounts for the occasional temporary leaves of a few cacti. Others will grow special extensions to their stems, bunches, or knobs of growth in order to collect sunlight, while yet others develop ribs or fluting on their surfaces to balance their interest in the sun with minimum exposure. All cacti, though, tend to produce tightly-bunched growth whenever they vary from the single-stemmed mass.

As mentioned previously, cacti come from many different climates and have adapted to them in a number of ways. They are not all from the desert, and don't all need dry soil with blazing heat. Rather, each needs to be cultivated in a way which reflects its natural habitat.

CHAPARRAL CACTI:

On the edge of the true desert is an area called the chaparral which has very little rain and correspondingly sparse vegetation. The cacti here has usually managed to germinate in the shade of another plant that acts as an umbrella for the seedling during the first few years of its life. Although growing in a most inhospitable environment, cacti of the chaparral are very colorful. The flowers, though fleeting, are of every hue in the rainbow except blue. The spines are usually strong and dense for protection, and come in assorted shades with often 2 distinct spine colors on a single plant. The plants native to this region are many and range from the giant Saguaro to the barely noticeable Mammillarias. When grown at home, the chaparral cactus needs full sun, inside or outdoors. However, seedlings, as in their natural environment, need some shading, as do some of our plants here in the Las Vegas area as well where the summer sun could burn cacti not acclimatized to such heat.

MOUNTAINOUS CACTI:

High in the Andes of Peru, Bolivia and Argentina are cacti that spend winters covered completely with snow. The mountains seem to be a most unusual place for cacti, and yet they do flourish there, adapting to rugged conditions for survival. Mountain cacti are generally small plants which often offsets for protection from the cold climate. A small clumped plant is more successful in competing against the wind and drifting snows. This also protects cacti here conserving its body heat. Cacti growing in the mountainous terrain include Rebutia and Lobivia. With so much snow covering the mountain cacti, there is still not an abundance of water available as the snow melts, as usually the ground is frozen allowing no water to the roots. There is an excess of water in the warm months but these cacti have adapted their root systems to live in rocky, well-drained soil. To grow well in the house, mountainous cacti need a cool winter, the cooler the better, and with the cooler temperatures, the drier the soil must be kept to prevent the roots from rotting. Full sun is preferred.

RAIN FOREST CACTI:

There are cacti native to rain forests where moisture is abundant, even though it is hard for us to picture this. In the rain forest, competition for space is fierce; so over the years, cacti have adapted to living on tree limbs where the competition is not quite so intense. Developing in trees, their roots became confined to crotches of limbs. The stems of cacti living in trees send

out adventuring roots to collect moisture from the air, as although they are surrounded by moist air, these cacti do not get the full benefit of rains because of the small amounts of soil around their roots which dry out quickly. There are various forms of forest cacti, ranging from the pencil-thin *Rhipsalis* to the flattened stems of the Christmas Cactus. While the *Rhipsalis* is one of the hanging cacti found in clusters hanging several feet from the limbs of trees, the Christmas Cactus prefers to grow in loose mounds. Spectacular flowers are found on the cacti of the forest. Epiphyllums, or orchid cactus, have large showy flowers, while the small but numerous flowers of the *Rhipsalis* are also very attractive. None of the forest cacti can withstand full sun, certainly not in areas where the sarmest of summers prevail. In the wild, these cacti see the sun only as the trees sway to permit the rays through their canopies. If you grow such cacti, provide filtered shade outdoors in the summer and avoid a southern exposure for indoor growing.

GRASSLAND CACTI:

The grasslands of warm climates are too dry to support many trees, so they are composed almost completely of low-growing plants, including a number of cacti. Grassland cacti are rarely taller than the grasses among which they grow. These grasses act as a shading device for the cacti, protecting the plants from the burning rays of the hot sun. If you should try to grow such plants at home outdoors, provide some shade, gradually increasing exposure to full sun.

SEASHORE CACTI:

Seashore cacti enjoy heavy mists from the ocean. Generally, however, they are not found so close to the sea's edge as to have tides wash over them. There is no constant water supply to their roots because the sandy soil conditions promote rapid drainage. Some cacti found here include the *Opuntias*, the flat pads of which fall to the ground and root, forming large clumps. Seashore cacti can be cultivated in the home much like chaparral cacti, with limited amount of water. It is a misconception that seashore cacti need only misting, but never need water. In fact, you should water them, but being careful not to give them too much.

Cacti offer a variety of species which are great for the indoor cacti collector. Greenhouses are a great asset but not a necessity, as they can be grown under lights indoors, out on patios, screened areas and lots of other possibilities. That variety of possibilities of cacti include such species as *Astrophytums*, *Ferocactus*, *Echinocactus*, *Echinopsis*, *Echinocactus*, *Epiphyllum* hybrids, *Opuntias*, *Mammillarias*, *Chamaecereus* (peanut cactus), *Cereus peruvianus*, *Lobivias*, just to name a few. Isn't this a Wonderful World of Cacti!



Anyone can live with order----but to live with disorder, to wade through and progress and make contribution to life in spite of it----that is a challenge and this what life asks.

Countryside Living.

