

BOTANY

Flowers Have New Faces

Superior flowers are produced by mutations, drugs, controlled breeding. Radiance cosmos is judged top winner of All-American Selection trials.

By MARTHA G. MORROW

See Front Cover

► THOSE new types of cosmos and petunias, marigolds and snapdragons you or your neighbor planted this winter or early spring already have an exciting history. Some have just had their lovely faces changed a bit, others have been completely remodeled. But all have been many years in the making.

The ancestors of some new flower types, like many people today living in the United States and Canada, came from such distant places as the Netherlands, India and Japan. Others may have developed from types that for centuries have been growing on American soil, but only recently have been painstakingly crossed because of certain desirable characteristics.

Descendants of Freaks

Some are the descendants of natural freaks, called mutations, that gave new and desirable qualities to the flowers. Still others may have been treated with a poisonous drug, colchicine, to produce more hardy varieties.

Professional breeders today are working on new flowers that you will not see for another five or ten years. Those types that first became available this year have been carefully nurtured for a decade or more.

The big news in flowers today is the Radiance cosmos, a real bicolor cosmos. Its blossoms are deep rose, with a wide central zone of crimson surrounding the yellow central disk. This flower is top winner of the 1948 All-American Selection trials.

A number of new flower varieties each year are entered in this contest. They are planted at a number of locations representing various climatic regions of the United States and southern Canada. A committee of qualified judges in each region observes these plantings and rates each new flower on its merits. The new Radiance cosmos was found different from other cosmos varieties and superior to them.

The story of this new flower begins a dozen years ago when a rare new cosmos was brought from India to the United States. This plant was a natural freak or sport from the tropical Indian cosmos.

In this country the plant grew tall and bushy, it bloomed late and sometimes not at all, and its flowers were small. But the blossoms had a distinct touch of crimson at the center—it was the first true bicolor cosmos ever found.

The plant was crossed with an early and low-growing cosmos type. The first and succeeding generations of the cross were selected for earliness of blooming, great size of flower, erect growth, long cutting stems and, of course, the unique colored center. After over a decade of careful selection, the Radiance cosmos just placed on the market this year was developed by Bodger Seeds, Ltd.

The Pink Sensation petunia, another All-American winner for 1948, is a first-generation hybrid. To develop it, a single dwarf petunia which had excellent coloring but not too satisfactory plant habit was crossed with another single dwarf compact petunia which was especially desirable in this respect.

To prevent self-pollination, all of the male parts of the first petunia were removed and the plant was pollinated by hand, using special pollen taken from the second petunia. The "mother plant" was then covered with a cheesecloth cage to keep insects away and prevent chance pollination.

Offspring Like Parents

The first generation offspring from this cross turned out to possess the desirable color of one parent and the desirable plant habit of the other. In addition, being a first generation hybrid, the offspring possessed more extreme vigor than either of the parent plants. The plants could be counted on for uniform growth, the flowers were larger and the blooming season slightly longer.

As an experiment, seed from this first generation was planted. The second generation plants lacked many of the fine qualities of the first generation, and in the third generation had deteriorated even further. It thus became evident

that to maintain the exceptional vigor and uniformity of the plant, only first generation hybrid seed could be used.

Consequently, the seed of the Pink Sensation petunia developed by the W. Atlee Burpee Company is a true first-generation hybrid. Every seed on the market today is the result of hand pollination and this process must be repeated each year.

Plant selection undoubtedly began thousands of years ago, before human beings were aware of the great changes that can be brought about in a flower or vegetable. Bees and other insects made the first selections by pollinating some flowers, missing others.

History of Breeding

Our early ancestors probably were too busy obtaining the bare necessities of life to pay much attention to plants that had only beauty to recommend them. When man first began to grow flowers, he transplanted entire clumps from the woods to his yard. It was only natural for him to choose the loveliest.

Today the breeding process is man-directed. Seed experts select the parent varieties with the desired characteristics and make the cross by hand pollination. They prevent chance pollination by bees and other insects.

A flower breeder, reports Dr. S. L. Emsweller, in charge of the floricultural investigations of the U. S. Department of Agriculture, usually has more than one aim when selecting plants for cross-breeding.

He may want more and larger flowers on taller, sturdier plants than any now grown. He may desire new and interesting variations in color, shape and petal formation. He may seek to extend the flowering season with early and late blooming varieties. Disease resistance is often a major goal.

Snapdragons, carnations and lilies for use in tomorrow's gardens now are being produced at the nation's great agricultural research station, Beltsville, Md. Remodeling a flower is a tedious, painstaking task.

If a new model in chrysanthemums is desired, for instance, all the varieties now available are first collected, explains Dr. Emsweller. The various chrysanthemum types are grown and studied for



RADIANCE COSMOS—Top winner of 1948 contest, this superior cosmos has deep rose blossoms, with a wide central zone of crimson surrounding the yellow central disk.

outstanding qualities. Those showing promise are crossed. First the tiny disk florets in the chrysanthemum center are removed, as shown on the cover of this week's SCIENCE NEWS LETTER, then they are hand-pollinated.

At present 50 new chrysanthemum specimens show some promise, but much work remains to be done. Only three or four will eventually turn out to be good and beautify your home.

Controlled breeding is a tricky process. The first step is to transfer pollen from the anthers or pollen-bearing part of the flower to the stigma or pollen-catching member of that flower or of one with which it is to be crossed. In some plants the pollen is produced by the same flower as the seed or by another flower on the same plant; in some the pollen must come from another plant. A plant that is to be self-pollinated requires but little special attention. In most cases the plant or its flowers can be enclosed in some sort of cloth, cage or paper bag to protect them from all pollen except their own. Some plants merely need to be shaken several times a day to scatter the pollen. Bees or flies must be introduced into the bag of others to secure the best pollination.

When one flower is to be crossed with another, every precaution must be taken to safeguard the stigma from all pollen other than that of the desired type. The plant's own pollen-bearing parts usually are removed before pollen is shed.

The anthers may easily be removed from such flowers as morning-glory, gladiolus and phlox. In these the pollen-bearers are large and easily distinguished. With other flowers it is more difficult to cut out the anthers without injuring the stigma.

With zinnias, asters, cosmos and other composites, where the male parts are so tiny they can be seen only through a magnifying glass, the task is made easier by the fact that the tiny florets are not all alike. Those that stand out around the flower like sun rays usually have seed-bearing organs but do not bear pollen. The tiny florets crowded in the center bear both pollen and seed—these complete florets are removed. The remaining ray-florets bear seed when pollen from another flower is introduced. In producing the first Radiance cosmos, this task was attempted many times before a cross was successful.

Care must be taken in cross-pollinat-

ASTRONOMY

To Measure Stars' Light

➤ AMATEUR astronomers of the future will not be satisfied with just telescopes, even relatively large ones. They will consider an instrument for accurately measuring the brightness of a star as necessary equipment, if they act on the suggestion of Dr. John S. Hall of Amherst College Observatory.

Each month thousands of useful observations of variable stars are made by amateurs. The value of this work can be greatly increased by a little extra equipment, Dr. Hall suggested. A light-sensitive instrument would take the guesswork out of such observations.

The photoelectric photometer is used with striking results by professional astronomers. A form of this instrument suitable for accurate observation of stars with a small telescope has been greatly simplified by war-inspired advances.

Dr. Hall spoke to amateurs attending the meeting of the Northeast Region of the Astronomical League. They had assembled in New Haven at the invitation of Dr. Dirk Brouwer, director of Yale University Observatory.

"The day is at hand when the amateur astronomer can attach a photomultiplier—weighing with its container no more than a few pounds—to his telescope," Dr. Hall pointed out. "He can carry this instrument to his backyard or to a nearby hilltop and make observations good to 0.01 magnitude."

The amplifier, meter and associated

ing all flowers. The forceps or other tools used to cut away unwanted parts should be kept absolutely clean. They are often dipped into alcohol after each use so that no pollen will be carried from plant to plant. The camel's hair brush used in applying the pollen is also cleaned.

Science News Letter, April 10, 1948

Science Service Radio

➤ LISTEN in to a story of a Venezuelan expedition on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 17. Mr. Watson Davis, director of Science Service, will interview Dr. Dale Jenkins, member of a special technical mission connected with the Food and Agriculture Organization. Dr. Jenkins will tell about the vast untapped areas of palms from which edible oils could be commercially exploited.

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batteries could be enclosed in a carrying case not much larger or heavier than a portable radio. The star-enthusiast would set this equipment on the ground, find the variable star in which he is interested and one or two stars of known brightness with which to compare it. These observations would be several times more accurate than if he had attempted to estimate their brightness by just looking at them through his telescope.

Dr. Hall and John F. Jewett at present are developing at Amherst College Observatory a compact, rugged amplifier for field use.

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