

BOTANY

Corn Hybrid Resembles Ancestral Plant

► A MAN-MADE ancestor may shed some light on the evolution of cultivated corn, a grain described as "unique among the cereals" in its capacity to produce grain on a grand scale.

Prof. Paul C. Mangelsdorf of Harvard University's Botanical Museum, Cambridge, Mass., told scientists at the American Philosophical Society meeting in Philadelphia that a hybrid corn has been produced which has many of the characteristics of prehistoric corn.

Recent studies of fossil corn pollen and prehistoric corn cobs gave scientists some idea of what the ancestral cereal might have looked like. Pod corn, with its covered seeds, and pop corn, with its small ears and seeds, were bred. The resultant hybrid not only has "several of the principal characteristics found in prehistoric corn but it also exhibits other traits which are probably ancestral," Prof. Mangelsdorf said.

It is a many-stalked plant with the ears borne on the higher, more slender regions of the stalks. The ears have few husks and these often flare open at maturity, thus freeing the small, chaff-covered seeds. Ears and tassels have both male and female flowers.

Tripsacum, a wild relative of corn, also flowers the same way, pointing to another possible link in the evolution of corn. In today's cultivated corn, the staminate inflorescence or male flowering is the tassel alone and the ear carries the female flowering, the corn "silk."

Prof. Mangelsdorf traced five steps in the "evolution under domestication" of the cultivated corn plant of today. These are:

1. The many-stalked plant became single stalked.
2. The ear grew on the lower and stronger part of the stalk which can bear larger and heavier ears.
3. The ears bore only female flowers and produced only grain in their lower stalk position.
4. The ear had more husks and became completely enclosed by them.
5. The individual grains lost their covering.

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CHEMISTRY

Isolate Visible Amount of Element 97, Berkelium

► ISOLATION of berkelium, element 97, in quantities large enough to see and weigh was announced to the American Chemical Society meeting in San Francisco, by University of California scientists, Drs. B. B. Cunningham, Stanley Thompson and Glenn T. Seaborg.

This dinosaur of matter probably existed when the universe was born 5,000,000,000 years ago but like the other elements heavier than uranium died out through radioactive decay soon after creation.

Berkelium was recreated in 1949 in atom-

smashing bombardments in the University of California's 60-inch cyclotron. Only minute tracer quantities of the element have been available until now. Even the amount now isolated is barely on the borderline of visibility, approximately one hundred millionth of an ounce, or 0.3 micrograms.

Isolation was achieved by putting eight grams of plutonium into the high neutron flux of the materials testing reactor at Arco, Idaho, in 1952 and letting it cook for six years. During this time plutonium atoms were fattened up by neutrons until they became berkelium atoms. About two months ago the material was brought to Berkeley, and definite isolation was achieved on April 13.

The berkelium isotope isolated is 249, and it has a half life of 280 days.

The scientists said that probably only two more elements, 98 and 99, have isotopes with half lives long enough to sustain hope of their eventual isolation.

Dr. Cunningham is the scientist who first isolated plutonium, in 1942. His skill in working with submicroscopic amounts of materials played a big role in important phases of the atomic bomb project. In the isolation of berkelium it was a tiny Cunningham magnetic balance that weighed the element.

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MEDICINE

Folklore Provides Guide To Useful Medical Drugs

► A BACTERIA-KILLER from a rock garden plant is just one of the potential new drugs scientists are investigating, thanks to folklore.

Dr. E. H. Lucas, professor of horticulture at Michigan State University, East Lansing, reported finding a bactericidal substance in St. John's Wort, a large group of plants that includes herbs and small shrubs found in rock gardens.

Actually, Dr. Lucas said, folklore even points out the correct "recipe" or, in some cases, the medically useful flower parts. Folklore about St. John's Wort says to use only the petals and to discard the calyx. Today scientists find that only petal extracts inhibit bacterial growth.

Considering that the men who originated the folklore cures must have worked on a "trial and error basis with no scientific background to guide them, limited communication with other experimenters and only the plants in their own area to work with, it is a mystery that they learned so much," Dr. Lucas said.

He has investigated about 600 species of plants mentioned in folklore as therapeutic drugs. Approximately 90% of this folklore has some factual basis, Dr. Lucas believes.

If a researcher uses folklore as a guide, his chances of finding effective drugs are three times better, the MSU scientist estimates, than if he simply selects plants at random.

By fitting modern experimental procedures to the "origin of the lore"—investigating the human populations as well as the original plant—scientists can learn a great deal.

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IN SCIENCE

BIOCHEMISTRY

Amine Found in Human Tissue for First Time

► AN AMINE which may play an important role in the control of blood pressure and heart function has been found in human tissues for the first time.

The amine, or nitrogen-containing chemical, is called 3-methoxy norepinephrine. The chemical is of basic interest because it is derived from norepinephrine. Norepinephrine and closely related compounds are known to stimulate the heart and blood pressure. Also, brain norepinephrine, together with serotonin in the brain, is implicated in the central regulation of the autonomic nervous system.

The amine had been noticed in the urine of patients receiving norepinephrine injections to support falling blood pressure. Later, it was found in rat liver.

It was discovered in human tissue in adrenal gland tumors.

Dr. Albert Sjoerdsma, William King, Dr. Sidney Udenfriend and Lemuel Leeper, all of the National Heart Institute, Bethesda, Md., found the new amine.

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PSYCHOLOGY

English Students Like To Gamble for Big Prize

► CHILDREN like to gamble. They prefer to take a chance on a large prize rather than to accept a sure thing of lesser value.

But this tendency diminishes with increase in age.

This willingness of young children to gamble was shown in a study of English school children conducted by Drs. John Cohen and C.E.M. Hansel of the psychology department of the University of Manchester, England, and reported by them to *Nature* (April 19).

Three groups of school children were studied, aged 9, 12 and 15 years respectively. The children were offered a choice between a single package of candy, a one-in-five chance of winning five packets and a one-in-25 chance of winning 25 packages.

Of all the children, 81% preferred to take a chance on getting a bigger prize. Only seven out of 50 15-year-olds preferred the one-in-25 chance, however.

"In a true gambling situation," the psychologists conclude, "if one prize is certain, provided it is large enough in relation to the individual's scale of values, almost everyone will prefer it, however much larger the uncertain prize."

But if the certain prize is negligible, the uncertain but worthwhile prize will be preferred.

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CE FIELDS

TECHNOLOGY

Engraving Machine Rules Near-Perfect Grating

► THE WORLD'S most precise engraving machine is now producing the largest and most perfect diffraction gratings ever made.

It is electronically controlled by an extremely accurate source of light waves, a mercury arc. Diffraction gratings made by the machine are used for analyzing the light from stars and for studying the structures of atoms and atomic nuclei.

Dr. George R. Harrison of Massachusetts Institute of Technology reported development of the engraving machine to the American Philosophical Society meeting in Philadelphia. Diffraction gratings are made by marking very fine parallel lines on glass coated with a thin film of aluminum to produce a mirror.

The machine can rule 74,500 parallel grooves on a mirrored glass five inches wide and ten inches long. The grooves, each about one ten-thousandth of an inch deep, are equally spaced to within a fraction of a millionth of an inch.

When light shines on such a grating, it is broken into a rainbow-colored spectrum, from which scientists can tell much about the temperature and nature of the light source. Work on controlling the engraving machine by light waves began about ten years ago, Dr. Harrison said.

The ruling engine is sensitive to the slightest vibration, so its mechanical parts are immersed in a tank of oil enclosed in a large plastic box to keep out dust. Once the engraving process has started, it cannot be interrupted until the grating is complete and no one is allowed to enter the room during it. Progress of the engraving is monitored by remote control.

Dr. Sumner P. Davis, Neville Sturgis and Yohiko Yamada collaborated with Dr. Harrison in developing the precise engraving machine.

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RADIO ASTRONOMY

Foresee New Method of Transmitting Messages

► A NEW method of long-distance communications may use the trail of ionized air left by meteors, or "shooting stars," as they burn up in the earth's atmosphere.

Another possibility for transmitting messages over great distances is to reflect radio waves from earth satellites or from the ionized air in the wake of satellites, which have predictable times of passages. Most meteors on any given day appear at random, although many occur in reliable showers such as the Lyrid shower of April 22.

The maser, a new device still in the development stage, has already given radio astronomers the ability to detect objects

more than twice the distance previously possible. Steady improvements in the maser's operation, possible only at temperatures at absolute zero, are expected to double the distance again within a few months.

The meteor and satellite message-sending methods, and the maser, were discussed formally and informally at a conference on The Radio Noise Spectrum, meeting in Cambridge, Mass., sponsored by Harvard College Observatory and the U. S. Army Signal Corps.

High-frequency radio waves such as used in television, which usually travel only in straight lines, have been transmitted beyond the horizon by reflecting them from ionized air in meteor trails.

Further studies, some of which are underway at Stanford University in California, may show these transmissions are commercially useful for teletype systems. Messages would be stored on magnetic tape, then sent in a high-speed "squirt" whenever a meteor occurs in the right place.

The same kind of techniques can be applied to using satellites and their ionized trails as message relay stations, with the added convenience that their times of passages can be predicted.

One maser, the first known in operation, is being used with the Naval Research Laboratory's 50-foot antenna in Washington, D.C. Another such device, working at a wavelength of 21 centimeters, has been operated successfully in the laboratory by scientists at Harvard College Observatory. Masers promise a great expansion of the radio astronomer's horizon. (See SNL, April 12, p. 227.)

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PUBLIC SAFETY

After H-Bomb Blast, Stay in Shelter

► TRYING to escape on foot after an H-bomb blast may finish what the nuclear explosion started. You would best "stay put" if there is still shelter available.

This is the interpretation Dr. Thomas Haley places on animal experiments carried out at the Atomic Energy Project of the University of California at Los Angeles.

Muscle response, fatigability and work output of irradiated and unirradiated rats were compared. It was found rats subjected to large doses of radiation had very poor muscle response, tired rapidly with a slight amount of work. Irradiated rats that were exercised tended to die sooner than rats that were kept quiet.

Dr. Haley believes his experiments are a warning to avoid exercise following total body exposure to radiation. In the first place, he points out, one might not be physically capable of evacuation. In the second, the exercise of attempting to walk out of a bombed area might hasten death.

"If there is shelter, that is, some protection from 'hot debris', and food and water, one should probably remain there for several days," he says. "You may experience radiation sickness, but you may at least live to recover."

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TECHNOLOGY

Engineers Develop Solar Refrigerator

► A SUN-POWERED refrigerator has been developed by two Israeli engineers.

The refrigerator, which operates solely on power derived from the sun, is connected by a pipe to a radiation-collector installed on the roof of the owner's home.

A pilot model of the solar cooler is now undergoing final laboratory tests. It is the invention of Kurt Doron Ofer and J. Giladi of the faculty of chemical technology at the Technion-Israel Institute of Technology in Haifa.

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METEOROLOGY

Heaviest Rainfalls Ignore National Borders

► THE WORLD'S heaviest rainfalls have no regard for national boundaries, a report by the U.S. Weather Bureau shows.

Unionville, Md., holds the record for the world's greatest observed rainfall, 1.23 inches in one minute on July 4, 1956. In second place is Fussen, Bavaria, with 4.96 inches in eight minutes on May 25, 1920.

Plumb Point, Jamaica, comes next, having been deluged with 7.8 inches within 15 minutes on May 12, 1916. Exactly 12 inches fell in 42 minutes at Holt, Mo., on June 22, 1947.

When a full day is considered, Baguio in the Philippine Islands holds the record, 45.99 inches on July 14-15, 1911. The two-day record is held by Funkiko, Formosa, where 65.79 inches fell on July 18-20, 1913.

For periods of a week or longer, however, Cherrapunji, India, holds all the records, from 131.15 inches within the seven days starting on June 24, 1931, to 1,605.05 inches for the two-year period of 1860-1861.

To help answer the questions, "How hard can it rain?", "How much in an hour, a day, a week?", the Weather Bureau looks to the past to find out how hard it has rained. Even this is not an easily answered question.

Few stations have recorded rainfalls for more than 100 years, and networks of rain gauges are generally inadequate. If all the gauges in the U.S. were concentrated in one group, the total area covered would be about a six-thousandth of a square mile, which is less than that of a standard baseball diamond.

All the highest observed rainfalls in the United States, with one exception, were associated either with tropical disturbances or with temporarily intensified inland flow of moist air from the Gulf of Mexico. The one week and longer records held by Cherrapunji, India, were monsoonal rains.

Knowledge of the expected highest rains is necessary in designing dams for controlling run-off from large watersheds. It is also necessary in designing airfields, highway culverts and bridges, small dams, storm sewers, etc.

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