

AMERICA'S VANISHING PLANT RESOURCES

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The passenger pigeon is frequently mourned as the victim of man's greed. The same disregard for our American resources is depleting our stock of plant varieties, a heritage more valuable than the passenger pigeon or even the old herds of buffalo.

Case 14 in Hall 25 contains a collection of corn varieties commonly grown ten to thirty years ago. From year to year these ears become more valuable because the varieties shown are quite rare and may soon be lost. Actually, these varieties are at present in the same situation as the buffalo was a few decades ago. If prompt measures are taken to preserve them, they may still be saved from extinction.

When white men settled the Americas they found many kinds of cultivated and wild plants that were useful to the Indians. Some of these plants were immediately adopted by the new settlers. Others were neglected. Some of the plants that were neglected could not live unless planted and cared for by man. These plants were lost and, even if the same variety of plant was being grown in other regions, the stocks peculiar to any region in which the plant was abandoned were lost.

Many plants are highly variable. In corn this is readily apparent when red ears, white, and yellow, sweet grains, pop, and dents are compared. These are all variations of the main pattern of plants that we call corn, and there are many other variations. Sometimes the presence of a single variation will make a plant more valuable than plants that lack this character. Sweet corn, for example, would be of little use if it lost the single factor that increases the sweetness of the grains.

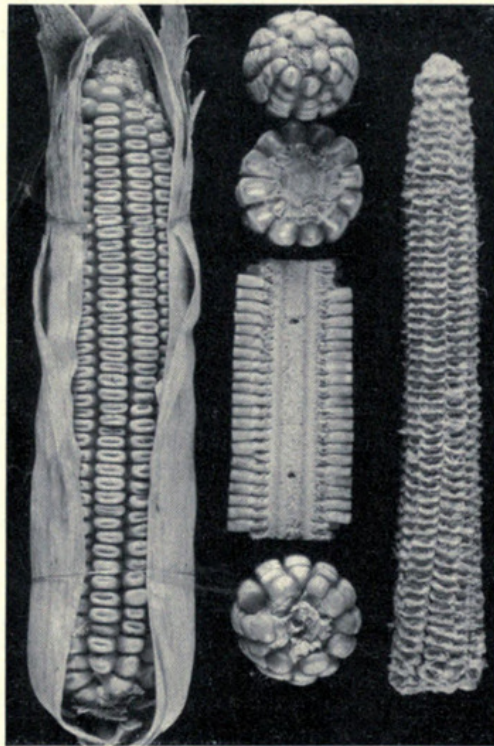
NEW SOURCE OF ADHESIVE

During the last war, when supplies of cassava for making vitally necessary adhesives could no longer be imported from the East Indies, scientists discovered that the type of corn called waxy had a composition that was suitable for the manufacture of adhesives. Previously, waxy corn had been grown by plant breeders only as suitable material for the study of inheritance. As the plants yielded much less grain than field corn, it was decided to transfer to a good field corn the single factor controlling the waxy grain character.

Generally, plants are composed of an almost random assortment of characters inherited from their parents. Thus in the progeny of crosses of waxy corn with commercial field corn, there could be expected some plants with the waxy character and many of the high yielding characters of the field corn. Actually, after careful breeding and selection a plant was produced that differed from field corn only by the waxy

factor. This factor, waxy, made corn a good source for an essential material. Later a similar waxy factor was found in sorghum, providing a sorghum plant source for adhesives in addition to that of waxy corn.

These factors that control the inheritance and expression of characters in plants and in animals are called genes. New genes are produced very seldom. When the characters controlled by new genes are outstanding, such changes are commonly called sports. However, the real term for such sudden changes is mutation. It is applied



GOLDEN BEAUTY DENT CORN
Grown in central Illinois in 1902.

not only to the very rare striking changes but also to many minute and scarcely noticeable ones which are more common. Since mutations appear so infrequently and breeders need new gene materials for their work, there have been many attempts to increase the rate at which mutations appear. X-rays, heat, cold, and chemicals have been tried with some success, but the mutation rate is still very low and most mutations are harmful. For practical purposes, we must still depend upon our natural reserves of variability in living wild and cultivated plants, as genes are parts of living plants.

MANY VARIETIES DISCARDED

When white men began to plant Indian maize, they first tried the varieties that had been grown by the Indians. Gradually they selected those which best fitted their needs and discarded the rest. Thus most of the flour corns were soon abandoned because the white invaders preferred wheat flour. The flint corns were discarded in most areas because the whites seldom used the parched corn which Indians relished. Brightly colored ears were of little value to Europeans

who did not share the Indian religious beliefs and superstitions concerning them.

Gradually white men selected a few types of pop and sweet corn. From the progeny of a mixture of southern dent corn and northern flints they produced a new type of dent corn. For a long time each farmer had his own particular corn. However it was found that certain farmers had corn that produced well and that was not too hard for animals to chew nor so soft that it spoiled easily. Some of the types developed at the end of this period are shown in Case 14 of Hall 25.

The most famous of the varieties selected by midwestern farmers was Reid's Yellow Dent. There was always enough variation in the plants and ears so that many characters were preserved. Most of the commercial hybrid seed is developed from selections of Reid's Yellow Dent.

Hybrid seed is a cross of highly selected but differing strains of corn. To produce the parents of the cross it is necessary to select corn and to breed each plant with itself or with a sister plant until any hidden deleterious characters are revealed and the plants are uniform. This breeding with close relatives or using the same plant as both male and female parent is called inbreeding, and the resulting plants are called inbreds. Two different inbred strains are then crossed to produce hybrid seed. This is known as a single cross. Since inbreds are weak plants and the seed is expensive to produce, most commercial hybrid seed is from double crosses. This is produced by crossing two single cross hybrid plants.

VARIATIONS NEARLY WIPED OUT

In the production of the inbred lines many variations were discarded and an attempt was made to secure maximum uniformity within the inbred strain. Thus we have nearly reached the end in our reckless pursuit of better crops. First we abandoned those Indian varieties that possessed a wealth of variability but did not suit our needs. Then we selected closely in the remaining varieties and discarded any others that did not suit the ideal of the moment or did not produce enough to satisfy the farmer. Now we have taken a small number of these selected ears and have inbred them so that a single plant may be the sole ancestor, the mother, father, grandparents, great-grandparents, of millions of other plants. Our once great stock of variation in corn has vanished.

Samples of some products made from corn are exhibited in Halls 25 and 28. Most of these are made from one kind, the commercial hybrid field corn. This serves as an all-purpose corn. With the advance of industry and agriculture it is likely to prove more economical to produce a variety of corn especially suited for the production of some particular material such as oil, wax,

fiber or cellulose. Hybrid corn would provide a very small store of variations from which the best materials for plant-breeding could then be chosen.

Corn is just one example of the destruction of our stockpile of breeding materials. When all the trees of one kind in any area are destroyed, or even when only the best are cut out, we lose some of the variations in that species that made it possible for the plant to live and to compete with other plants in that area. The same kind of tree from another region will not have all the same variations or the same combination of genes. If we want to reforest an area we may lack plants with characters that could increase the vigor of the tree, its rate of growth, or its resistance to disease, insects, and droughts. Growing inferior seedlings is slow and unprofitable.

RECORD SPECIMENS IN MUSEUM

The Museum is preserving a collection of the variations in plants. Some of these are shown in the exhibit cases and more are preserved in the study collections and the herbarium. These will serve as a record of the history of these plant species and as an index of their present or past variability.

The Museum cannot preserve living material either as plants or as seeds. Seeds must be considered as living material as long as they can still be made to germinate and grow. After a short time most seeds fail to germinate. In a few weeks elm seeds are no longer viable. Rubber tree seeds retain their life for only a few months. Under ordinary conditions even corn seeds are useless after eight or nine years. It is possible to prolong the life of seeds by keeping them in cold storage. Preservation in an atmosphere of inert gases also appears to help. Unfortunately we know very little about the best way to maintain our stock of plant resources and no large scale attempt to conserve our rapidly diminishing supply of variability has ever been made. This problem should really be studied by the government as part of its program to conserve our national heritage, and by industry as a safeguard to ensure the continued production of economically important raw materials.

Technical Publications Issued

The following technical publications were recently issued by Chicago Natural History Museum:

Fieldiana: Zoology, Vol. 31, No. 19. *A New Genus of Batflies from Guatemala (Diptera Acalypterae: Streblidae)*. By Henry S. Dybas and Rupert L. Wenzel. Aug. 19, 1947. 6 pages, 3 text figures. \$0.10.

Annual Report of the Director to the Board of Trustees. By Clifford C. Gregg. Aug. 27, 1947. 140 pages, 5 plates, 22 text figures. \$1.

Fieldiana: Zoology, Vol. 32, No. 4. *Catalogue of Type Specimens of Mammals in Chicago Natural History Museum*. By Colin Campbell Sanborn. Aug. 28, 1947. 88 pages, 1 halftone. \$1.

Fieldiana: Zoology, Vol. 31, No. 20. *The Distribution of Leuconathus. A Southern Appalachian Genus of Salamanders*. By Clifford H. Pope and Nelson G. Hairston. October 6, 1947. 8 pages, 2 text figures. \$0.10.

Fieldiana: Zoology, Vol. 31, No. 21. *The Subspecies of Aratinga Acuticaudata*. By Emmet R. Blake and Melvin A. Traylor, Jr. Oct. 20, 1947. 8 pages. \$0.10.

Botanical Series, Vol. 23, No. 5. *Studies of Central American Plants—VII*. By Paul C. Standley and Julian A. Steyermark. Oct. 22, 1947. 74 pages, 4 text figures. \$0.75.

Fieldiana: Zoology, Vol. 31, No. 22. *Malacological Notes—V*. By Fritz Haas. Oct. 27, 1947. 18 pages, 8 text figures. \$0.35.

LAST CALL FOR ENTRIES OF NATURE PHOTOS

All entries for the Third Chicago International Exhibition of Nature Photography must be received at the Museum on or before January 17. The contest is sponsored by the Nature Camera Club of Chicago. Entry forms are available by application either to the Museum or to Miss Louise K. Broman of the Camera Club, whose address is 6058 South Troy Street, Chicago 29.

The entries will be judged on January 24 and 25. The public exhibition of the entries selected is scheduled for February 1 to 28, inclusive, in Stanley Field Hall of the Museum.

For those interested in submitting prints (either black-and-white or color) or color transparencies, a summary of the principal conditions follows:

There will be two divisions, prints and transparencies; entry fee \$1 in each. No more than four entries may be submitted in either division.

There are three classifications in each division: (A) Animal Life—animals, birds, insects, tracks, nests, etc. (no domestic animals). (P) Plant Life—flowers (except formal arrangements), trees, shrubs, fungi, etc. (G) General—scenery, geological formations, etc.

Prints must be on 16" x 20" mounts. They may be any size up to that of the mounting. Each must be entirely the work of the individual contributor and must show, on the back, title, classification, and maker's name and address.

Color slides or transparencies should not exceed 3½" x 4" and must show title and maker's name and address. Each must be spotted in the lower left-hand corner.

Immediately after judging, notification of acceptances will be sent each contributor. A catalogue will be sent at the close of the exhibition. All accepted prints and slides will receive stickers. All contributors will receive the Exhibition Bulletin for a year. A number of accepted entries will be reproduced in the Museum BULLETIN, the P.S.A. Journal, and elsewhere. Permission for such reproduction is presumed.

Silver medals and ribbons will be awarded in the various print and slide classifications. All winners will receive the Museum BULLETIN for a year, and their names will be inscribed on the Myrtle R. Walgreen plaque. The Color Division of P.S.A. is awarding a silver medal to a slide outstanding in its illustration of complementary colors in nature and a second medal to a slide illustrating adjacent colors.

The exhibition will be conducted in accordance with the recommendations of the P.S.A.

GIFTS TO THE MUSEUM

Following is a list of some of the principal gifts received during the last month:

Department of Anthropology:

From: Miss Florence Dibell Bartlett, Chicago—3 Navaho blankets (late 19th century), Arizona and New Mexico; Aaron B. Mead (deceased)—26 dentalium shells used as medium of exchange, Puget Sound, Northwest Coast; Mrs. Chauncey McCormick, Chicago—2 amulets of animal gods (26th Dynasty or later), Egypt; Richard A. Doubleday, Morgan Park, Ill.—a boy's costume, Guatemala; Gracie Oakes, Chicago—about 500 archaeological specimens (Archaic and Woodland types probably ranging in time from A.D. 500 to 1600), Kentucky.

Department of Botany:

From: University of Texas, Austin—957 herbarium specimens, Mexico; Prof. M. M. Lacás, Monterrey, Mexico—125 herbarium specimens, Mexico.

Department of Geology:

From: Maurice Petit, St. Thomas, V. I.—20 Upper Cretaceous invertebrate fossils and 3 lithological samples, Virgin Islands; Dr. Dugald E. S. Brown, St. George's West, Bermuda—48 invertebrate fossils, Bermuda.

Department of Zoology:

From: Philip D. Sang, River Forest, Ill.—a Japanese long-tailed jungle fowl, Japan; Lincoln Park Zoo, Chicago—21 crabs, 9 lizards, 3 turtles, and an Indian otter; Harold Trapido, Panama City—a snake, 4 lizards, and 5 frogs, Puerto Rico; Henry S. Dybas, Chicago—1,508 insects and allies, United States and Palau Islands; W. E. Eigsti, Hastings, Neb.—60 ectoparasitic insects and allies, Nebraska; Dr. E. C. Williams, Chicago—37 ticks, Chicago; Leslie Hubricht, Battle Creek, Mich.—1,037 non-marine shells, Michigan; Major Robert Traub, Washington, D.C.—2 bats and 8 rodents, Mexico; William Brandt, Herrala, Finland—20 moths, including 3 paratypes, Europe and Iran; Delzie Demaree, Jonesboro, Ark.—100 fresh-water clams, Arkansas; New York Zoological Society, New York City—2 pouch young of water opossum; Miss Laura Brodie, Chicago—74 specimens of snakes, lizards, frogs, and salamanders, South Carolina, Virginia, and Texas; Henry Van der Schalie, Ann Arbor, Mich.—35 fresh-water clams, Kentucky.

Library:

From: B. Benesh, Downey, Ill.; Charles B. Cory, Homewood, Ill.; Modesto Chavez Franco, Guayaquil, Ecuador; John Francis Neylan, San Francisco; Karl P. Schmidt, Homewood, Ill.; Dr. Austin L. Rand, Chesterton, Ind.; and Harry Hoogstraal, Mrs. Thomas Temple Hoyne, Dr. W. L. McAtee, and Miss H. Elizabeth Story, all of Chicago.

Rear-Admiral Richard E. Byrd's expeditions to the south polar regions are represented in the Museum by a habitat group of emperor penguins (in Hall 20) and by a group of Weddell's seals (Hall N).



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