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DARWINISM

THE frequent statement of critics of the evolutionary hypothesis, that Darwinism is dead and that scientists are rejecting evolution wholesale, is sharply challenged by Professor T. H. Morgan, of Columbia University, one of the foremost of living biologists.

Writing in the April issue of the *Yale Review*, Professor Morgan states that this misconception apparently has arisen out of a confusion over the several distinct meanings that Darwinism has come to have. In its broad sense, as meaning evolution in general, the doctrine is becoming more firmly entrenched every year.

In its more strict sense, as meaning evolution caused by natural selection at work on small, fluctuating variations in a given plant or animal stock, Darwinism has come in for more or less criticism from scientists, though even this does not mean that it has been totally rejected. It merely means that scientists have recognized certain difficulties that were not clearly seen in Darwin's own day. Professor Morgan calls attention to one of these, which makes it difficult to derive one species from another. He says:

"If any particular character, such as size or color, is measured in a large number of individuals of a race or species, it is found to vary. Some of the individuals will be smaller or fainter in color; others, larger or darker; but the great majority will be average or middle class. If the smaller individuals are destroyed and the larger ones become the parents of the next generation, the resulting population will again show a wide range of variability, but the middle class will be a little taller than was that class in the parental population. Suppose again in the next generation, the smaller individuals are destroyed and only the larger ones left to breed. The same result follows, and the average may again be somewhat larger. Experience has shown, in fact, that the average population may in most cases be changed by eliminating consistently certain kinds of individuals through a few generations. But then the process slows down rather quickly and soon comes to an end. Further selection fails to produce further change. The upshot has been not to produce a new race in which all the individuals are taller than the tallest of the original race, but only a race in which the average individual has become taller. The tallest may be no taller than before. This fact was not known to Darwin, or at least, if vaguely known, it was not given due weight."

Professor Morgan is inclined to believe that the force which gets new species past the limits of the old is to be sought in the phenomenon of mutation, in which sudden and relatively large changes occur. When such changes are hereditary, as they frequently are, they provide material on which the process of natural selection can work in the manner postulated by Darwin. Students of evolution have concentrated too much attention on the "survival value" of visible body structures, such as claws and teeth, at the expense of less tangible but perhaps more important things, such as inherited ability to withstand cold or drought, or to run or fly fast, which are of obvious importance in the struggle for survival.

VITAMIN F

THE day when we will live on synthetic concentrated pills of food is yet far distant. Yet the latest attempts to raise laboratory animals on an artificially devised diet of pure foods have led to the discovery of the new vitamin F, recently announced by Dr. Herbert M. Evans, of the University of California.

When a diet of purified food elements consisting of casein and recrystallized cane sugar, certain necessary salts and the five recognized vitamins, A, B, C, D and E, were fed to rats in the laboratories of the department of anatomy, the animals failed to reach more than half size. Theoretically this diet contained all the elements necessary for the health and happiness of rats, but actually something else was necessary. Growth stopped altogether and the animals remained sexually immature. Natural food had to be resorted to, to supplement what might be called a chemically pure menu in order to reawaken their growth and convert them into healthy adult animals.

"Among the natural foods, lettuce and liver were the most potent," declared Dr. Evans, "and they, therefore, almost certainly contain a new sixth member of the vitamins, to which designation F will be given."

Lettuce when heated and dried failed to give the good results of the fresh product, the investigation showed.

Dr. Evans has to his credit also the discovery of vitamin E, at one time known as vitamin X, a lack of which brings about sterility. Oil from the germ of the wheat grain is thus far the most potent source of this necessary food factor.

DISEASES OF THE CALIFORNIA FIG CROP

WARFARE against a plant disease that threatens California's huge fig industry is being waged at Fresno by a unique scheme of campaign. It all centers around keeping a certain small insect, a little wasp no bigger than a gnat, aseptically clean. If the fig-wasp can be kept clean the figs will be saved.

This tiny wasp, called Blastophaga by scientists, looms so large in the fig business because she is the only creature that can pollinate the Smyrna fig, which is the most valuable variety raised in California. The Smyrna fig, being exclusively female, produces no pollen itself, and the wasp is depended on to transfer pollen to it from an exclusively male fig variety, known as the "caprifig," which produces inedible fruits, but plenty of good pollen.

The Blastophaga wasps breed only in the fruits of the caprifig, and emerge from them as adult insects covered with pollen. Fig growers fasten caprifig branches in their

Smyrna trees, and the wasps, attempting to enter the immature Smyrna figs, accomplish their fertilization. The resulting seeds in the Smyrna figs give them their special value and the medical properties which are claimed for them.

Thus for many years the little fig-wasp has been a vital factor in the prosperity of California fig growers. Now she threatens to be the agent of their ruin, because a serious outbreak of a brown-rot disease has occurred among the figs, and the fig-wasp has been shown to be the unwitting carrier of its germs. Every fig it pollinates it also infects with the virus of destruction, for the pollen-providing caprifigs are infected, and the wasp carries off the infection when it carries off the pollen.

To break this vicious circle a drastic and elaborate clean-up campaign has been necessary. Instead of letting the fig-wasp breed and over-winter in its natural way, the stock of insects that are to fertilize this year's crop has been concentrated in a newly built "insectary" near Fresno, and fig-growers have been required to ship every single caprifig fruit there. Millions of insects and tons of caprifigs, have been assembled.

The wasps are brought out of their over-wintering condition in special incubators, and are allowed access to the caprifig pollen only after the fruits containing it have been carefully sterilized to kill the brown-rot germs. Then the wasps are induced to enter special mailing tubes which are sent to the fig growers. Released in the orchards, the little pollen-carrying insects proceed to the Smyrna fig flowers and complete their fertilization.

State officers inspect all orchards to see that no caprifig fruits, containing possible infection, are left on the trees. If the clean-up campaign can be made 100 per cent. complete for a few years, it is believed that the disease will be completely stamped out.

LIVER FOR FISH FARMS

THE high cost of liver, due to recent medical discoveries of its high value in the human diet, puts the directors of fish hatcheries up against a new and stiff problem. Young fish like liver; it is probably better for them than any other kind of meat they can get. Hatcheries are increasing their facilities so that they can handle billions of fry and fingerlings instead of mere millions, and there is a tendency to hold the little fish until they are from four to ten inches long instead of turning them out into a rough and predatory world while they are still of mere minnow size, as formerly.

All this means a vastly increased demand for fish fodder, and fish men are looking the market over with considerable care and anxiety.

To ascertain the quantity, kinds and costs of fish foods used in the United States, the U. S. Bureau of Fisheries recently made a canvass covering about 200 private and state hatcheries in addition to the 44 federal hatcheries. The results of this survey indicate a consumption of about 3,500 tons of fish food, valued at $275,000 per annum.

The principal fish foods now used are sheep plucks, horse meat and other fresh meat, beef liver, beef lungs, pig liver, cereal products and fish, arranged in order of their importance.

Beef liver is generally recognized as one of the best fish foods, its use being limited by its high cost. Feeding tests conducted by the Bureau of Fisheries at their Holden, Vermont, station during 1927, reveal that much better results can be obtained from feeding brook trout beef heart for the first four or five weeks and then changing to a mixture of equal parts beef heart and beef liver than by using either alone. An unusually low mortality resulted from the use of this combination. Feeding tests in which clam meal was used gave very promising results.

THE STUDY OF BIRD MIGRATION

BIRD enthusiasts who want to help solve the problems of bird migration will have plenty of employment trying to get returns on the 270,000 birds that have been banded under the auspices of the U. S. Biological Survey. Returns on banded birds, according to Frederick C. Lincoln, in charge of this activity of the survey, now amount to 10,338 cases. Knowledge of the movements of the bird after its initial banding, gained from these return reports, enables ornithologists to get precise information concerning bird migration.

Ducks furnish the most returns, undoubtedly due to the fact that many banded waterfowl are taken by the millions of hunters in the field during the hunting season.

Prominent among the bird problems of economic interest which banding may be expected to solve, Mr. Lincoln pointed out, is the control of red-winged blackbirds that do much damage to the rice crop of the South and of California in late summer and early fall. Poison bait has proved ineffective in the rice fields, so that control measures must be undertaken at other times and other places.

"The question, therefore," Mr. Lincoln explained, "that confronts the economic ornithologist, which may be at least partially answered by banding red-winged blackbirds, is whether the individuals in the flocks that are so destructive in fall are the same as those that may be readily destroyed elsewhere at other seasons."

Observations made at one banding station have shown, he added, that the "budding" of fruit trees by purple finches has had no bad effects on their bearing, but might have been responsible for an actual increase in the yield of fruit.

THE ST. FRANCIS DAM

A SHORTAGE of water and electricity in the regions around Los Angeles, California, will be the chief effects of the breaking of the St. Francis dam. Since the dam drained into the ocean through a valley entirely separate from that in which Los Angeles was located, the city itself was in no danger from flood.

The dam was part of the Los Angeles municipal system and, while it was not used for hydroelectric power, one of the two largest of the city-owned power plants was in the San Francisquito canyon below it and was put out of business by the flood. As only a part of the city's power is obtained from these plants, a large amount being purchased from private companies, the loss in power could be taken care of.

About 1,655,000,000 cubic feet of water was impounded in the reservoir behind the St. Francis dam, before the

heavy rains burst it and emptied the water down the valley, to the Santa Clara River, and thence to the Pacific near the city of Ventura. Though not the country's largest dam, it was in the front rank as far as size was concerned. It was 205 feet high, as compared with 280 feet for the Roosevelt dam, in Arizona. The largest is the Exchequer dam, in northern California, which is 330 feet high. The St. Francis dam was 650 feet long, and 169 feet thick at the base.

PREHISTORIC SKULLS FROM FLORIDA

PREHISTORIC inhabitants of southern Florida may not have known the fountain of youth that the Spaniards sought in Florida, but they were an extraordinarily healthy lot, judging by bones which have been taken from a burial mound near Ft. Myers. Only one diseased bone was found in the mound, according to Henry B. Collins, Jr., anthropologist of the U. S. National Museum, who excavated at the site.

Mr. Collins has just returned to Washington with eighty skulls from this mound. The skulls are pronounced those of the famous Calusa Indians, the tribe which first greeted Ponce de Leon and routed the youth-seeking Spaniards with a shower of arrows. The Calusa had the reputation of being cannibals and fierce warriors, but they were among the first Indians to be wiped out by the white man, and by the time of the American Revolution they were practically extinct.

"Remains of these extinct Indians have been extremely rare, and very little has been known about them," said Mr. Collins, in describing his expedition. "The skulls show that the Calusa were not particularly large or powerfully built people, as were tribes of northern Florida."

A strange discovery from the mound was that only half a dozen of the eighty burials were children. Whether this means that these Indians were more successful than most tribes in raising their children, or whether babies who did not survive were disposed of in some other way, can not be determined.

No Indian possessions were found in the burial mound, with the exception of some fragments of pottery. These broken pieces of pots and jars had been stuck in the ground all around the heads of most of the Indians, probably with some magic rite.

The burial mound was outlined by a border of conch shells over two feet wide, the white shells making a sharp contrast against the black muck of the mangrove swamp. Further excavations were made in a number of large shell heaps, some of them 30 feet high, but these kitchen dumps of the Calusa revealed no traces of cannibalism or other unusual practices.

ITEMS

IN an endeavor to check the mosaic disease of sugarcane, which is one of the most destructive of tropical plant diseases, the State of Rio de Janeiro, Brazil, has offered a prize of approximately $1,200 to any scientist who, before the end of the current year, will ascertain its cause and determine an effective method for combatting it.

SALT mines that were operated on an extensive scale, with very "modern" shafts, tunnels and drifts, more than 500 years before Christ, have lately been explored near Hallstadt, Austria, by Dr. Adolph Mahr, of the Vienna State Museum. In addition to knowledge of the mining methods of these prehistoric men of the early Iron Age, the exploration yielded also numerous articles of leather and wood, well preserved against decay during the ages by their burial in salt. These finds included pick handles, torches, wedges, mine timbers, felt caps, shoes of wood, leather and felt, leather hand-protectors, and many other articles. The exploration was backed by two Americans, Professor F. W. Bade, of the University of California, and Major Gotshall.

BRITISH scientists have been at work to make palatable the famous roast beef of England that has to come in these days from Australia or South America. The freezing process necessary to carry the meat on its long journey dries up all the natural juices. It has been found, however, at the Low Temperature Research Station at Cambridge that when beef is frozen and thawed very slowly, practically no fluid is lost. In one experiment the time consumed in freezing and thawing took nearly 80 days at the end of which the meat was hardly distinguishable from fresh. If this method can be applied in industry, it may be of considerable commercial importance.

A NEW combination of chaulmoogra oil with benzocaine has enabled several lepers at the National Leprosarium, at Carville, Louisiana, to receive the benefits of the curative drug with a minimum of pain. The discomfort which accompanies the administration of chaulmoogra oil is a problem with which specialists in leprosy have struggled for years. Consequently the success which has attended the use of benzocaine-chaulmoogra oil by Dr. Frederick A. Johansen,, of the U. S. Public Health Service, on 24 lepers at the leprosarium may mark an important step forward in the treatment of this ancient disease. This preparation has the advantage of not causing pain, and of absorbing readily, thereby giving the patient a uniform amount of chaulmoogra oil over a definite period of time. Since the treatment was started 36 patients have been added, making a total of 60 who are taking the injections semi-weekly as routine treatment.

MARCH has the highest pneumonia death rate of any month in the year. Frequently more than one seventh of the annual pneumonia mortality occurs in this single month, according to statistics of the Metropolitan Life Insurance Company. The large number of pneumonia deaths have not been attributable to any single cause, such as latitude, altitude, extreme cold or heat, high or low humidity, age distribution of the population or occupation. A combination of factors is felt to be responsible for the high mortality of this disease. A cold climate where the average humidity is not high appears to operate in favor of low mortality, a condition illustrated by the very low pneumonia rate for the western provinces of Canada. Oregon and Washington, also, have fewer pneumonia deaths than the average while Pennsylvania, New York and New Jersey in approximately the same latitude consistently register some of the highest rates.