SCIENCE NEWS

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A GRAND CANYON OBSERVATORY

WITH the cooperation of French glass manufacturers, a huge observatory, dwarfing all present institutions, is planned for the best location in the vicinity of the Grand Canyon of the Colorado in Arizona. This announcement was made on July 18 to Science Service by Professor George W. Ritchey, famous American astronomer who has been working in Paris for the last five years.

Professor Ritchey first came to Paris in connection with the plans of a wealthy Hindu, the late Assan Dina, to build an observatory on Mont Saleve, in the French Alps, at a cost of $6,250,000. He had built the 60-inch reflector of the Mt. Wilson Observatory as well as the optical parts of the 100-inch reflector, still the world's largest telescope, so he was placed in charge of the research to develop methods of building still larger instruments.

About two years ago, Dina withdrew his support after the expenditure of about $40,000, but Professor Ritchey has continued his work at the Paris Observatory, with the aid of M. Delloye, head of the St. Gobain glass works, where the glass for most of the world's biggest telescopes has been made. The present plans include a great observatory at the Grand Canyon, Arizona, which Professor Ritchey believes to be one of the best astronomical sites in the world. The telescope is intended to be of a new type, in which a pair of mirrors reflect the star's light down to a huge concave mirror. There will be several of these mirrors, with different magnifying powers, and they can be changed at a moment's notice, to take advantage of short changes in atmospheric conditions. The mirrors will not be of solid glass, but built up in a fashion somewhat resembling a honeycomb, by a method that Professor Ritchey has developed. The curves to which they are ground will also be new, having been worked out by Professor Ritchey in conjunction with Professor Henri Chretien, a French astronomer. Tests of mirrors made according to these curves have demonstrated their superiority.

When asked what effect Dina's recent death would have on his plans, Professor Ritchey stated that he knew nothing of the future of the Dina project and that his own work was entirely independent. He has received no word from Mme. Dina, who, according to one report, expects to return to her late husband's original ideas and build the observatory on Mont Saleve.

FARM RELIEF AND THE CHEMIST

How the farmer can help the chemist by supplying him with cheaper material, and how the chemist at the same time can help the farmer by providing a new and profitable outlet for some of his materials that are now wasted, will be one of the subjects discussed at Northwestern University during the coming weeks. On July 23 the opening session was held at the university of the American Chemical Society Institute, which will continue for a month. Chemists from all parts of the United States, and leaders in their profession from numerous foreign countries will attend and tell of the latest accomplishments of chemical science.

The first week will be devoted to the general topic of agriculture, for the chemist believes that in his hands, and not those of the politician, lies real farm relief. Representatives of the U. S. Department of Agriculture, agricultural school officials, and other experts, will show how the farmer need no longer depend entirely upon the use of his products for food.

Catalysis and hydrogenation, two subjects which sound technical but which are really of vital importance to everybody, will be among the principal topics of the second week. "A catalyst," explained Dr. Frank C. Whitmore, director of the institute, "is simply some material which makes a process which we desire to go on take place more rapidly than it otherwise would. If it is really true that time is money, then a catalyst is one of the best forms of money, since it saves time. Hydrogenation means the changing of oils like peanut oil and cotton seed oil, which are not edible in their ordinary form, into solid fats resembling lard which can be used for a great variety of purposes. Those fats which are inedible are used for soap making."

The institute's third week, he stated, will include such subjects as petroleum, the preparation of the artificial resins and lacquers that now find a wide variety of uses under such trade names as bakelite and duco, chemistry and health and chemistry and life processes. During the fourth and concluding week problems of sanitation will be discussed from a chemical viewpoint. Other programs will be on meat packing, leather and ceramics, including the making of such useful products as electric light bulbs. Chemistry in warfare will be considered on the last day, but the meeting will close with a lecture on "Chemistry and Peace."

MOLDS IN THE MANUFACTURE OF ACIDS

How a common black mold, known as a spoiler of food, has been drafted for the manufacture of citric acid, long a monopoly of lemons and other sour citrus fruits, was told by H. T. Herrick, of the U. S. Department of Agriculture, speaking before the American Chemical Society Institute, at Evanston, Ill.

At least as far back as Noah's famous spree, Mr. Herrick reminded his audience, man has used fungi for the production of desired chemicals; for the yeasts that ferment sugar to alcohol are fungi. The molds, belonging to a different fungus family, have also served mankind in the making of such things as cheese, for the green streaks in prime Parmesan are really moldy spots. But it is only lately that molds have been deliberately set to work on sugar, and their possibilities as chemical servants are only beginning to be realized.

The principal industrial exploitation of the appetite of a mold for sugar at present is the manufacture of citric acid. This has received a special stimulus from the imposition of an export tax by Italy on its citrate product, derived at present wholly from lemon culls. Since the whole soft-drink industry depends on citric acid, and a great deal is used in flavoring extracts as well, the Italian export duty may have almost the same effect on the infant American acid-from-mold industry as a protective tariff.

At present the sugar from which the mold makes citric acid is the familiar cane sugar or sucrose. This is relatively expensive, and Mr. Herrick and his assistant, O. E. May, are now at work in the hope of producing citric acid from the action of mold on the cheaper corn sugar or glucose. Hitherto this has not been possible because of the impurities present in commercial glucose, but a product of high purity is now available.

Citric is not the only acid that can be produced by the action of molds on sugar. There are many different kinds of mold, and many varieties of sugar, and the combinations possible are almost infinite, according to Mr. Herrick. Such acids as oxalic, malic, lactic and succinic are now known to be produced by molds, and the investigation has not proceeded very far.

One acid, which has hitherto been so rare that it is listed at over $100 a pound, has been produced by Mr. Herrick and Mr. May in the government laboratories at about thirty-five cents a pound. This is gluconic acid, which is the result of the action of one species of mold on glucose. Very little is known of what gluconic acid may be good for, because its high price has hitherto practically prohibited experiments, but an investigation of its industrial possibilities may now be expected.

VITAMIN REQUIREMENTS OF INSECTS

WHILE new facts about the vitamins necessary for the health and happiness of the human race come to light nearly every day, entomologists have been endeavoring to find which, if any, vitamins are needed to keep up the health and morale of the insect world.

The subject of the investigation into insect vitamin lore selected by Dr. Charles H. Richardson, of the U. S. Bureau of Entomology, was the Mediterranean flour moth, a well-known pest of the flour mills that passes most of its existence gorging on flour. Since the wheat kernel from which flour is made is an important source of vitamins A and B it was thought that this would be a good type of insect with which to obtain a quantitative check-up on the proportion of vitamins necessary for insect welfare.

In whole wheat flour the larvae of the moths lived and flourished happily but in the same kind of flour from which a substance believed to be vitamin A was extracted by chloroform, relatively few larvae developed into full-grown moths. In highly milled flour, from which much of the growth-promoting vitamin B is removed by the processes of manufacture, the growth rate was also poor. With the addition, however, of small quantities of yeast, a rich source of vitamin B, the number of larvae that reached maturity increased.

According to these results obtained by Dr. Richardson, the reaction of the flour moth toward vitamins A and B checks very well with the requirements of laboratory animals and human beings. Further studies on this problem with other insects will be of great interest from the point of view of comparison of insect physiology with that of higher animals. Practically it will affect the control of insect pests since any factor that might render poisoned bait for harmful insects more attractive would assume great economic importance.

YELLOW FEVER IN BRAZIL

QUARANTINE officers in all ports south of Norfolk, Va., have just been instructed by the chief of the quarantine division of the U. S. Public Health Service to be on the alert for cases of yellow fever. An epidemic of this disease is under way in Brazil, where 87 cases and 29 deaths have been reported, according to figures received by the U. S. Public Health Service.

Of these, all the deaths and 79 cases are from Rio de Janeiro. Probably many more have occurred but have not been reported. Those that have been reported are all from seaports; conditions in the interior are still unknown.

The danger of yellow fever breaking out in the United States when there is an epidemic in Central or South America is always acute. The yellow fever mosquito, *Aedes egypti*, is still plentiful in the southern part of this country and just one bite of a yellow fever patient is all the mosquito needs to start an epidemic of the disease here.

Contrary to popular belief, yellow fever has not been eradicated. Although it has been kept out of the United States and Europe, it is still a very great menace. Two main centers of the disease exist; one is in Africa, where Noguchi and two associates recently died of the disease in the course of their investigations on it, and the other is in South America. A flare-up from either center is always possible, just as cholera and plague frequently spread to epidemic proportions from their centers in India.

Recent investigations point to a reservoir of yellow fewer in certain monkeys of Africa, and public health officials believe that a similar animal or mosquito or even human reservoir exists in South America. These reservoirs consist of subjects that have been infected and recovered, but that are capable of transmitting the disease to others.

THE EUROPEAN CORN BORER

THE European corn borer, which has become a scourge in America, is being guarded against in the Union of South Africa with all the vigilance that would be used to stop the coming of the black plague or an invading army. It has not yet succeeded in gaining a foothold in South Africa, and government scientists do not propose that it shall do so.

One bad alarm occurred in Johannesburg over a year ago, and entomologists are still watching the neighborhood of the threatened outbreak. In South Africa, as everywhere else, housewives need brooms, and broom factories exist to supply the demand. Broom-corn has to be imported from Europe and South America, because the locally raised crop is not sufficient. Inspections of baled European broom-corn have shown the presence of the borers in the stalks, just as they were in the stalks of European broom-corn imported into Canada and the United States some years ago, from which the present plague got its start.

In the yard of a Johannesburg broom factory a few chance stalks of broom-corn sprang up from stray seeds, and these were found to be infested with young borers. They were promptly obliterated, and every kitchen garden for blocks around was inspected by entomologists. So far as known at present, not a single borer escaped the search, but the watch will have to be kept up for several years to make sure that the clean-up was complete.

In the meantime, the Union has passed stringent inspection regulations for imported broom-corn. None may be brought in unless it has been freed of all stalks large enough to harbor a borer. In the factories the bales are stored in mothproof rooms kept rigidly under lock and key, and the few workmen who have access to them are put through the same elaborate ritual on leaving as employes of a mint.

South Africa already has one pest in its cornfields, which it considers more than sufficient. This is the stalk borer, a creature related to the European corn borer and having many of the same habits. Recommendations to the South African farmer for its control are reminiscent of those now being published in the American corn belt for the control of the European corn borer.

BURIAL CUSTOMS OF ANCIENT SWEDES

GRAVES fifteen centuries old recently unearthed at Tuna, in central Sweden, have shed a new light on the elaborate and loving care which ancient Swedes lavished upon their dead. The burial mounds, according to Dr. T. J. Arne, a government archeologist, are the richest and most remarkable found in Sweden for many years.

In one of the graves the skeleton of a man lay in the remains of a boat which was to carry him on his last long journey. Like the other graves, it was placed in true east to west direction, and the traveler had been well provided for. His horse, fully harnessed, and his dog had been placed in the stern of the ship and he had been given plenty of food for his journey. A round bronze buckle, evidently serving to fasten his mantle around his shoulders, was also found as well as several iron arrow heads, which showed he had been well armed. To keep his weapons sharp, he had a small whetstone fastened in a ring. A number of well-preserved earthenware pots were also discovered in the grave.

The next burial place contained a similar boat, in which a man and his wife had started their last journey together, each of them having a horse and a dog. The man had his sword and shield, and the woman had iron cooking implements and knives to enable her to prepare their food, and also a number of little female trinkets, including two combs of bone.

Under another mound the remains of a man was discovered, but he had been buried without a boat. By the side of the deceased lay a mighty iron sword, a dagger, a knife, a flint and tinder for making fire, a beautiful sword belt of bronze and gold, richly ornamented, and a large silver buckle, inlaid with garnets set in gold. All these articles were in a decorative design of striking character and probably were of southern Germanic origin.

ITEMS

OF course, everybody drinks more water during very hot weather, but if just a pinch of salt is added, it will help greatly toward enduring the heat. Scientists investigating conditions in hot coal mines and steel plants found that the workers who succumbed rapidly when working in a temperature of about 100 degrees, were able to stand it better when this small amount of salt was added to their drinking water. At high temperatures, especially when working hard, the body gives off large amounts of water in perspiration. This is nature's way of keeping us cool. But our bodies also lose much salt with the perspiration which is what causes a large part of the physical exhaustion felt when working in hot weather. To overcome this, add a pinch of salt to your drinking water.

THE feeling that English sparrows are disappearing in this country is without justification, according to the U. S. Bureau of Biological Survey. While there has been a decrease of these birds in the last few years, so that they are no longer the pest they were 40 or 50 years after their first importation, nature seems to be setting a balance in regard to them. In the West and Middle West they are still apparently on the increase. American songbirds are in no danger of extinction, like their relatives among the game birds. For the most part they are not in a precarious position, officials of the bureau report.

THE story popular in the tropics that the barracuda is very dangerous and will attack humans while in bathing has just been acclaimed by scientists as no fish story but actual fact. The barracuda, of all marine fish, is most dangerous to man, Dr. E. W. Gudger, of the American Museum of Natural History, and C. M. Breder, Jr., of the New York Aquarium, have just reported to the American Medical Association. For the first time, one of the many reported cases of barracuda bite was subjected to scientific study. A sailor, bitten while swimming in the Caribbean off the shore of Panama, was taken to the Colon Hospital for treatment at the time that Mr. Breder was also a patient there. Mr. Breder was able to recognize the wound definitely as that of a barracuda bite.