SCIENCE NEWS

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RUBBER EXPERIMENTS

THE U. S. Department of Agriculture is watching the Edison-Ford goldenrod rubber experiments with interest, but is not carrying on any similar work of its own. The work is still in the non-commercial stage, and farmers are not being encouraged to put in a crop of goldenrod instead of corn or cotton next spring.

That Mr. Edison is really in earnest about finding some native plant that may serve as a source of home-grown rubber, at least in emergencies, is evidenced by the fact that he had a well-known New York botanist look over a vast number of plants. Over 1,200 potential rubber-bearers were examined and identified by this worker before Mr. Edison settled on the one species of goldenrod that is now engaging his attention.

Of the eighty or so distinct species in the goldenrod genus, only one has been selected as being the most promising of results in rubber. It is known to botanists as *Solidago leavenworthii,* and its range is restricted to a comparatively limited area in the Southeast. It would probably grow well over a much larger territory, however, if it should prove profitable as a crop plant.

Mr. Edison has informed the Department of Agriculture that even within the limits of this one species there is a wide fluctuation in rubber content. One lot of plants may yield as little as one half of one per cent. on a dry weight basis, another as much as six per cent. The problem then becomes one of selecting the best strain and endeavoring to improve it by breeding.

If goldenrod cultivation becomes commercially profitable, its propagation will not offer any serious difficulties. Almost all the species are perennials, sprouting freely from slender underground runners, and these rootstocks can be cut up in pieces to plant, like potatoes. Seed need not be used at all. In case a specially desirable strain of goldenrod should be developed, this vegetative propagation would be an advantage, for propagation by seed would permit such a hybrid to revert to its lower-grade ancestral condition, whereas planting by cuttings would keep it up to grade.

EMPLOYMENT TESTS

AN important psychological project which will personally affect the careers of thousands of boys and girls in the schools of this country is very soon to be put into effect, according to a report by Dr. L. J. O'Rourke, director of research of the United States Civil Service Commission. Dr. O'Rourke addressed a group of directors of research representing school systems throughout the country.

The federal government has joined hands with public school officials and industrial concerns in an effort to improve selection and placement procedures, and to prevent boys and girls from making false starts in finding satisfactory employment, thus lessening the number of misfits and cutting down an enormous economic loss.

A first installment of employment tests, now being perfected, will be released to high schools and colleges of the country in a few months. These first tests deal with stenography, typing, spelling, grammar and judgment. The tests will be used to determine the standards of ability which boys and girls who plan to enter office work must expect to reach. Later, tests for other occupations will be released.

"Results of the tests," Dr. O'Rourke explained, "will tell the pupil, as long before graduation as desired, to what extent he is prepared to meet actual employment conditions in industry or government. A prospective stenographer may learn, for example, that her stenographic speed is superior to that of 75 per cent. of stenographers in actual employment, but that her ability to use English is below that of 80 per cent. of successful stenographers. Information concerning her standing is an incentive when it is received by the student six months before the completion of her course; it may be depressing when it is received, as at present, at the employment office or on the job.

"The use of the standardized tests will make it possible for school vocational directors to recommend students in terms that will be meaningful to employers. Instead of using the vague terms of recommendation that are most common at present, they can tell an employer definitely that a certain girl has greater proficiency than 80 per cent. of the typists already in his employ."

Almost fifty industrial concerns, employing thousands of office workers, have already offered their cooperation with the project, the first ever started to bring together all the people concerned in this great problem of employment. Committees made up of outstanding educators and industrial leaders will aid in furthering the project.

Within perhaps a year, students will be provided with a sheet known as a guidance card, which will enable them to check up their ratings on the tests with the requirements for a great variety of positions. The Civil Service Commission is especially interested in this phase of the project, which will bring to the government service a more select roster of candidates, eliminating many who can foresee for themselves that they would not be successful in meeting government requirements. The guidance card will also work to prevent promising young people from entering fields where there is too little chance for advancement for individuals with their capacities.

STANDARDIZED DYES FOR GERM DETECTION

THE brightly colored dyes with which dangerous disease germs are stained to make them visible are in need of standardization, and this important task is now going forward under the auspices of a special commission, the Commission on Standardization of Biological Stains. Reliability of the tests for identifying disease germs depends in many cases on the quality of the aniline dyes.

Describing the progress of the investigation and the significance of the dyes in diagnosing diseases, the commission explains the way in which dyes are used to detect the organism that causes typhoid fever.

No one cares to have his food handled by a person who carries living typhoid bacilli around with him, even though all clinical evidence of the disease in this individual may have been over months or years before. The detection of such "typhoid carriers" is assisted by certain aniline dyes. However, typhoid bacilli look almost exactly like certain other kinds of bacteria present in every one's intestines which have no relation to this disease. The similarity is so great that bacteriologists were at a loss until the use of dyes was discovered as a means of telling them apart. Several different dyes have been employed in this way, but the most interesting perhaps is the red dye, fuchsin.

If a jelly-like culture medium of the right consistency is prepared and this dye added to it just before use, the bacteriologist finds that only a few kinds of bacteria can grow on it, including the typhoid germ and one or two others. When the medium is properly prepared it is not red but a light straw color, for the dye in it has been reduced and is therefore decolorized. Now of the two kinds of bacteria most like the typhoid organism, one restores the color of the dye to a bright red, another to a light pink; while the typhoid organism itself does not restore the color. Therefore the places where the typhoid organism has grown on this medium are white; but the growth of the other organisms is colored. In this way the distinction can be made and it is possible by the use of this medium to tell whether a person is a typhoid carrier.

Unfortunately, however, not all fuchsins on the market work well in this test. Some do not allow the proper coloration of the ordinary intestinal bacteria; others are too red even before inoculation. Just why these different lots are at fault is a question that scientists have not completely answered. The manufacturer is unable, therefore, to furnish a uniformly satisfactory product, and the bacteriologist would be often inconvenienced in the matter except for the assistance of the Commission on Standardization of Biological Stains.

This commission is a private, non-commercial organization formed by certain scientists as representatives of various scientific societies. The commission has employed two different methods of standardizing the stains. The first is to determine the exact chemical nature of the dye satisfactory for any particular biological use and to furnish the manufacturer with such information. This is the ideal method and has been adopted whenever possible. In some cases a less satisfactory method of standardization has to be employed. The manufacturers have to submit samples that they think are all right, and members of the commission test them to see if they work. Approval is given only to those samples that are satisfactory and the manufacturer submits a new sample whenever it is necessary to make a new batch.

In this way it has proved possible to keep unsatisfactory lots of biological stains off the market. Now one can, for instance, buy a sample of fuchsin that has been approved by the Stain Commission, and be sure that it will work in the test above described for typhoid.

PROCESSES FOR MOULDING CLAY

PROCESSES of the oldest handicraft in the world, that of the moulder of clay, are being reversed to make from a useless earth paving slabs "more durable than concrete and cheaper than macadam," heat-insulated building walls, piling, sea walls, beams and foundations.

Through the centuries the potter has shaped his clay and then baked it. Professor Joseph B. Shaw, head of the ceramics department of Pennsylvania State College, bakes it first and then shapes it.

This new process which will employ vast deposits of formerly useless cyanite was described in a paper prepared by Professor Shaw and his son, Myril C. Shaw, and presented before the American Ceramic Society meeting in Toronto. But any clay now used in ceramics is adaptable to the process and will yield a superior product.

Professor Shaw has adapted the principles of processing steel to clays. He heats his clay to the point of vitrification, at which it will yield to shape under pressure. It it then rolled into the desired form or pressed into moulds and finally annealed at a lower temperature to permit the development of a strong crystalline structure.

Samples of reinforced blocks, the iron rods having been inserted after the clay was fired and before it was shaped, were shown. Other samples illustrated the reduction in size which takes place in the process, making a dense, tough article.

"The size of the article which may be made is limited only by the mechanical requirements. As far as I can see at present, eight by twenty feet is about the largest size practical now.

"This method," he continued, "has advantages over present processes in addition to opening the field to massive ceramic pieces impossible to make at present. It can be made entirely continuous, eliminating handling the material and utilizing mechanical equipment for complete handling from clay bank to the finished article in the stock shed. Fuels used are no more, probably much less, than used under present processes."

Warping and cracking which occur during drying and vitrification limit the size of articles that can be made by present methods. In the new process the article is not finally shaped until after drying and vitrification are completed.

Preheating is also the characteristic of the new process which makes possible the use of cyanite. Cyanite crumples to a powder when shaped and fired, but by being first fired and then shaped it can be handled like any other clay or shale. It is a pale sky-blue aluminum silicate and is found extensively all through the Allegheny Mountains.

THE TEETH OF ESKIMOS

ESKIMOS who have back of them countless generations of ancestors with strong jaws and perfect teeth are now, within two generations, undergoing radical dental changes, Henry B. Collins, Jr., of the Smithsonian Institution, has found.

Mr. Collins collected bones of ancient Eskimo dead and took physical measurements among the present living groups, this summer. He noted that Eskimo children and young adults around Nome and other white settlements showed much evidence of cavities in teeth, crowded teeth and sometimes extra teeth forcing their way into the dental curve. As he journeyed farther away from the white settlements and the handy grocery stores, he found that the tribes had more perfect teeth. The development of dental defects is attributed to the Eskimos' adoption of the white man's diet, in which cereal products and sweets are prominent. The Eskimos still eat some walrus meat, seal oil and whale blubber, but not enough to give their jaws strenuous exercise as in the old days, and they get much less of the proteins and fats and lime-containing foods than the strictly native diet contained. Teeth of elderly natives have not been affected by the change in diet, but suddenly the last two generations, which were born into homes using the mixed diet, are learning all about dental ills.

Whether the jaws of the Eskimos, long noted for their heavy development, are becoming smaller for lack of exercise and lime, which is bone-building material, is not yet clear.

Evidence that too much soft food and too little exercise for the teeth will affect a whole group of people is shown by Indian remains from the past. The Pueblos, who depended on corn as the basis of their food supply, had much more trouble with their teeth than had wandering plains tribes which hunted game for food.

ITEMS

CALIFORNIA fruit trees have escaped attacks of the Mediterranean fruit fly, but they are now menaced with danger of root rot, Dr. Karl F. Kellerman, of the U. S. Department of Agriculture, recently explained to the House Committee on Appropriations. This disease, which has hitherto been most damaging to cotton in Texas, has recently been discovered in the Department's experimental date garden at Indio, California. It apparently does not affect citrus fruit trees, but rots the roots of such trees as peach, almond and pistachio, and any of the deciduous fruit trees. California, which is on the verge of becoming an extensive cotton-growing state, is alarmed both on account of her fruit trees and her cotton. It is believed that nursery stock from Texas may have brought the root rot to the California experimental station, and government workers believe they can prevent its spread in California if they soak five acres of the experimental farm with disinfectant. The five-acre tract affected is now isolated from the rest of the farm with an earth and oil barrier. In Texas, where the fungus is wide-spread, no satisfactory method of treatment has yet been found which cotton growers can apply, though governmental and state agencies are constantly working on the problem.

A BILL to protect the American eagle has been reported to the Senate by the Agricultural Committee. According to the bill, killing, capturing, possessing, offering for sale or selling, purchasing or shipping this eagle, "the emblem of the United States," will be forbidden "except for scientific, propagating or exhibition purposes, or in defense of wild life or agricultural or other interests, as permitted by regulations of the Secretary of Agriculture." Any interference with the eagles' nests or eggs is also forbidden. The maximum penalty carried in the bill for crimes against the bald eagle is one hundred dollars fine or sixty days' imprisonment or both.

A GROUP of eleven American college students will undertake a large-scale search for Stone Age relics in the eastern part of Algeria, beginning early in February. The enterprise is known as the Beloit College-Logan Museum Expedition, and is under the direction of Dr. Alonzo Pond. The group will scatter itself over some 50 or 60 sites already located, and each man, with the aid of Arab workmen, will excavate his site until its cultural relationships to the whole are determined before moving on to the next. Half of the specimens collected will be sent to the state museum at Algiers. The other half will be the property of the Logan Museum at Beloit College and will be shipped to America.

TWINS, triplets, Siamese twins, quadruplets, all may get an especially cordial invitation to the Chicago World's Fair in 1933, if the plans of Dr. H. H. Newman, of the University of Chicago, are followed. Dr. Newman is a member of the biological committee which is planning science features for the exhibition. He believes that the fair offers a remarkable opportunity for science to get in touch with duplicate human beings. It is now realized that many problems of human physiology and behavior can be profitably attacked by study of human duplicates. Identical twins reared apart, for example, show in what ways environment does and does not alter an individual. Such separated twins are extremely rare. Dr. Newman advocates establishing a bureau of twin research, and he believes that if many twins and triplets come to the Chicago exhibit, they could be shown the importance of helping science with their cases.

DOUGLAS fir timbers, after 35 years of service, are not only equal to new timbers in strength, but are actually stronger, Professor E. H. McAlister, of the University of Oregon, found as a result of an investigation on material taken from Hayden Bridge, erected near Eugene in 1874, and recently replaced by a larger and more modern bridge. The timbers in the bridge were found to be in excellent state of preservation, and Professor McAlister's conclusion is that Douglas fir can be preserved in the sound structural condition for at least half a century by the simple expedient of keeping it covered from weather and providing for free circulation of air. More than 200 tests of the old timbers were made on machines which exert from 30,000 to 200,000 pounds pressure. For comparison, similar tests were made on both green and seasoned pieces of the same size.