SCIENCE NEWS

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THE BIOLOGICAL EFFECTS OF X-RAYS

To the fruit fly are due Thomas Hunt Morgan's discoveries in heredity, and scientists of the Institute of Cancer Research of Columbia University have used the eggs of this fly for some experiments on the biological effect of X-rays on different wave-lengths and intensity.

In X-ray treatment two kinds of X-rays are used, depending on the location of the disease. For treating conditions of the skin a long wave-length X-ray is employed. Such an X-ray does not penetrate much beyond the skin, but is absorbed by it. In treating internal disorders, however, the long wave-length X-ray, being absorbed by the skin, is valueless. An X-ray of short wave-length is resorted to, for short wave-length X-rays will penetrate the body.

The efficacy of X-ray treatment in combatting cancer lies in the power of the X-ray to kill the living cancer cell. It has long been a matter of debate as to whether the long wave-length X-ray was as deadly in its effect as the X-ray of short wave-length. By means of the fruit fly it has been proved in the Columbia research laboratories that the effect of X-rays depends, not on their wave-length, but on their intensity.

Fruit flies were chosen for the experiments because of their egg-laying propensities, for in her brief two weeks' existence the female averages 500 eggs. By using eggs for the experiments the effects of the X-rays could be watched without the possible interference of other factors. Under normal conditions fertilized eggs hatch. The only abnormal factor in the experiments was the X-ray. Therefore, it could be deduced, such eggs as did not hatch were killed by the X-rays. Also a fertilized egg resembles a cancer in that it starts as a single cell and during the process of growth divides and redivides into many cells. And, as an unlimited supply of eggs was needed in order to produce conclusive results, what more to the point than the fertile fruit fly?

Dr. Charles Packard, in charge of the experiments, used 50,000 eggs in deriving his conclusions. First he noticed that under normal conditions 97 per cent. of the eggs would hatch. Then he proved that eggs were killed by the X-ray according to its intensity rather than its wave-length. The same amount of a long wave-length X-ray, he found, would kill the same percentage of eggs as would a short wave-length X-ray of like intensity.

"These experiments show," he stated, "that the amount of biological effect of the X-ray is proportional to the intensity of the X-ray beam and wave-lengths of X-ray beams are not important."

Thus a use besides the detection of rotten fruit has been found for the little flies known to scientists as Drosophila, meaning literally fruit-lover.

GLASS TRANSMITS ULTRA-VIOLET RAYS

TUBERCULOSIS victims, rickety babies and other shut-ins can now enjoy the health-giving rays of sunlight indoors. The council on physical therapy of the American Medical Association has tried out the various glass substitutes on the market that have been designed to admit the ultra-violet rays cut out by ordinary window glass, and have found four that pass muster of both spectroscopic and biological tests.

Two of the samples tested are transparent to the visible rays of sunlight as ordinary window glass, though one can be supplied in an opaque form if desired. Both partake of the nature of true glasses but are more expensive. They will probably find considerable use ultimately, in solaria, nurseries, schools and playrooms.

The other two samples are of a less permanent character and did not rank quite so high in the tests as the first two in their power to admit anti-rachitic rays. One is composed of a wire-mesh screen filled with some sort of celluloidinous material while the other is a thin, fairly loosely woven cloth treated with a paraffin-like substance. These are opaque but more or less unbreakable and sell at a lower figure than window glass. They do not withstand weather so well as glass but are well adapted, the council suggested in their report, for windows in cow barns and chicken houses in which they can be placed in winter and removed in summer.

INERT SAND IN THE MISSISSIPPI DELTA

ABSOLUTELY inert sand, requiring from eight to ten years to be modified to a point where even grass will grow, is one of the tragedies facing farmers in certain sections flooded by the Mississippi.

A report from B. R. Coad, government entomologist in charge of cotton insect investigations at Tallulah, La., states that inert sand covers several miles of the finest and most beautifully developed farming land of the Mississippi Delta, in the Scott district. Other similar but smaller sand deposits have been noted at various points of the flooded parts.

According to H. H. Bennett, of the U. S. Bureau of Soils, such deposits of inert sand are made when the current of the rushing waters is slightly slowed down, as when it meets with a comparatively small obstruction. The sand is composed largely of quartz particles which, since they are rock fragments, are heavier than the fertile silt and clay content of the water. The sand content naturally separates itself first, while the silt and clay are carried along in the water and deposited when the current is farther slowed down. The sand, due to its quartz make-up, is infertile and consequently for years nothing can be grown in areas where it is deposited. To remove it would be too expensive a proposition.

EMERGENCY CROPS FOR FLOODED FARM LANDS

WHAT to do about the planting of several million acres of flooded improved farm land? This is the important question to be faced by the farmers of this area, as the

waters recede. The land must be replanted in some crop to prevent it from being overrun with weeds, and the sooner the better.

It will be impossible to replant in cotton the large amount of the flooded area hitherto devoted to this crop. June 10 to 15 is considered the latest date that cotton may be planted with any reasonable expectation of producing a fair crop in a normal season.

Other crops must be planted in part of the area formerly planted in cotton. These crops, according to the U. S. Department of Agriculture, should be ones that can be planted from June 10 to August 1 so that they will provide food as soon as possible for the family and for livestock, and bring in some cash as well.

Crops suitable for late planting in the flooded area, according to the Department of Agriculture, are certain late varieties of corn and forage sorghums, Sudan grass, German millet, velvet beans, Spanish peanuts, certain varieties of soy beans and cowpeas. Sweet potatoes can be planted quite late in the lower Mississippi Valley, but elsewhere farmers must depend upon the hill sections for plants and cuttings. Though it will be too late to plant most garden crops by the time the land is dry enough to work, it will be possible to get a crop of cabbages, collards, turnips, black-eye peas, Kentucky wonder beans, late tomatoes and snap beans and squashes if sufficient seeds can be procured.

VACATIONISTS AND TYPHOID

THE exodus into the great open spaces that begins about now has moved Assistant Surgeon-General W. F. Draper, of the U. S. Public Health Service, to urge vacationists to be on the safe side and have a typhoid inoculation before they set out. Typhoid follows in the wake of vacations, especially those taken *via* automobile, almost more than any other disease.

Therefore, if means have been devised to avoid the hazard of typhoid fever they should be consciously known and applied as guiding principles in our vacation plans. The germs that cause typhoid fever are usually conveyed through contaminated water, milk or food.

A safe rule to follow relating to water is to drink water only from known safe supplies. Most city supplies are safe, for chlorination of public water supplies is now almost universal. If you are out of reach of known safe water you should boil the water and make it safe. The only safe milk is pasteurized milk. If then you use only milk that has been effectively pasteurized you may be reasonably assured of safety from this source.

The epidemic of thousands of cases of typhoid fever that has raged all spring in Montreal has led to serious apprehension on the part of federal health officers in this country. Tourists and organizations contemplating sessions in that city are advised to be inoculated if, considering the danger involved, it is still absolutely necessary to include Montreal in their itineraries. For a time an embargo was placed on the shipment of milk into the United States from any point in the area included within a radius of 200 miles of Montreal, but this has been modified so that properly certified milk is accepted from Canada except that which has been transshipped or handled in the city of Montreal. Many of the cases during the early part of the epidemic are said to have had their origin from contact with typhoid carriers, people who have recovered from the disease but who are still capable of transmitting the contagion.

Children from ten to fourteen years old are the most susceptible, according to statistical studies on typhoid made by the Metropolitan Life Insurance Company. Adolescents in the succeeding years from fifteen to nineteen, though not so susceptible, show the highest death rate. The actual danger of a fatal termination in typhoid cases increases continuously with age, as might be expected, and is greatest in old age in the very period where liability to infection is the least.

AZTEC "JADE"

THE mystery of the source of the jade-like stone used by the Mayas and ancient Mexicans for making images and ornaments has been solved by the discovery of a mass of the rock at Zimapan in the State of Hidalgo. The discoverers are Professor Ramon Mena, chief of the department of archeology of the Mexican National Museum, and engineer De La Cerda.

The abundance of objects carved out of this stone, and the absence of any known deposits of jade in Mexico, was long taken as evidence of an Asiatic origin of the Indian tribes of that region, and of a long-continued trans-Pacific traffic. However, it has been known for some years that the stone is not a true oriental jade, but a mineral known technically as nephrite, belonging to the class of stones known as jadeite, resembling jade but not identical with it. The parent mass of this jadeite was not known, and the only unworked pieces so far brought in have been rounded pebbles found in water-courses. It was as a result of a search for the source of these pebbles that the two Mexican scientists came upon the jadeite deposit.

Jade and jadeite have been held in high veneration by many widely scattered primitive races. The earliest jade used was in the form of water-smoothed pebbles and these were rough and lacked the polish that made later jade ornaments so beautiful. The beauty of jade and similar stones was probably discovered with the coming of the New Stone Age, it is said, when polishing was applied generally to stone implements and ornaments used. Its toughness, its ability to take a very high polish and keep it, the beautiful coloring, and its peculiar "feel" when polished, probably gave it the popularity it has held for thousands of years among many races.

Although jadeite has hitherto never been found in place in Mexico many archeologists suspected that some day it would turn up, because many worked objects found in sepulchers or among other prehistoric remains showed that they were originally river pebbles. This is obvious from the shape as well as from portions of the rough surface that remains. In the Mexican National Museum there is

a large collection of jadeite bead necklaces obviously made from river pebbles.

The collection of ornaments, statuettes, earrings, pendants, plaques, breast ornaments, collars, amulets and other objects in the Museum of Mexico City is one of the most remarkable in the world. Recently a beautiful vase, a foot high, carved in the front to represent the Aztec flower god Tlaloc, from Tlauchititla in the State of Mexico, was added to the collection.

A TEACHER OF SCIENCE FOR CHILDREN

"WANTED—a scientist of the first order, if necessary of senior standing, but as young as possible, with a knowledge of the theory of science, to investigate and conduct the introduction of young children, four and one half to ten years, to science and scientific method."

This is not a peep into the note-book of a modern novelist planning another version of an ultra-scientific Utopia but an actual *bona fide* advertisement that has appeared in leading periodicals and newspapers of Great Britain. Through it prominent educators hope to hit a decisive blow on the head of the weak nail in the top-heavy structure of modern education.

Directors of the Malting House School at Cambridge are convinced that the active interest of early childhood loses its keen edge after a few years spent under instruction according to present educational methods. They believe that the emotional and intellectual drives, "usually grouped together in the term curiosity, exist in the early lives of most people, and that their striking loss in later years, rendering many born with good brains intellectually ineffective and tired of life, is due to some large extent to laming by early influences. The most consciously held aim of the educator should therefore be to avoid damaging these drives, and lest his life should pass in loading ships with ballast, to rank that aim before that of the installation of knowledge—particularly in the early years when relatively little knowledge can be instilled and great damage done."

Preliminary work with children of faculty members of Cambridge University at Malting House School has been sufficiently successful to encourage the directors to further its development.

"At present," they state, "there is no recognized, infallible or easily-applied technique for the preservation of curiosity during education, and it is not least for the investigation of this, one of the social problems of the age, that the directors hope to make of the appointment advertised the beginnings of a research institute. Nevertheless they believe that the learning of how to learn and a scientific scrutiny of familiar things, an attitude of critical curiosity and intellectual aggression to the unknown, requires to be preceded by the discovery of the idea of discovery."

To date replies have been received from 7 professors and university lecturers, 62 workers in other branches of science, 47 with other qualifications, and 39 without any qualifications. Sir Ernest Rutherford, former winner of the Nobel prize for physics and director of the Cavendish Laboratory of Physics at Cambridge, Professor Percy Nunn, well-known educational author, and J. B. S. Haldane, biologist and essayist, will assist in making the final selection of candidates.

ITEMS

THE decrease in the amount of mineral elements in the soil has been the object of close study by Dr. John S. Burd, of the University of California, who spoke before the First International Congress of Soil Science, in session in Washington. He has found that these elements, some of which are essential to the growth of plants, decrease progressively in concentration as the cropping season advances, and also that in fields continuously under cultivation they show a certain decrease from year to year. This decrease is not due entirely to the bodily removal of the minerals by the plants, but some part of them becomes bound in the soil so firmly that they can not be pressed out or extracted with water.

PECULIAR rock formations in the Big Bend country of Texas, recently proclaimed to be petrified trees, forming the largest forest of its kind in the world, are now stated not to be trees at all, by Dr. E. H. Sellards, of the Bureau of Economic Geology of Texas. Dr. Sellards states in a communication to Science Service that one of the discoverers of the supposed forest revisited the place after he had made his first report, and that the re-examination of the formations convinced him that the peculiar stones were not petrified trees at all. Another visit, by the Texas state land commissioner, confirmed this negative report. Samples of the rock brought out have proved upon investigation by specialists not to be petrified wood.

THE hotly debated question—How does participation in college athletics affect the longevity of the student?—is at last to be decided. Through cooperation with some 40 colleges and universities, the Metropolitan Life Insurance Company has secured the histories of over 9,000 "letter men" who were members of the class of 1905 and prior years. Statisticians who will work on this material expect to produce a study that will show the representative mortality of college athletes throughout the country. The results from this work will be of especial interest because little research has been done on the longevity of athletes. The sports to be covered are football, rowing, track, baseball, basketball, la crosse, cross-country and hockey.

OUT of the 357 smallpox death toll recorded by the Metropolitan Life Insurance Company for United States and Canada for the last year, 232 occurred in California. In spite of the fact that the number of cases in the two countries has been reduced from 37,616 in 1925 to 31,351 in 1926 there is little basis for optimism in the smallpox situation in this country. Only two states in the union, Vermont and Rhode Island, were entirely free from the disease, according to the figures compiled by the Health Section of the League of Nations. It is also pointed out that with respect to actual numbers the United States had more cases than any country outside of Asia, with England and Wales coming next.