SCIENCE NEWS

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SUNSHINE AND COD-LIVER OIL FOR THE PREVENTION OF CONVULSIONS

INFANT deaths in America due to convulsions would be reduced by half if all babies were given the doses of cod-liver oil and sunshine required for proper growth, Dr. Martha M. Eliot, director of the child hygiene division of the the Children's Bureau of the U. S. Department of Labor, is convinced from her research in the community control of rickets.

One kind of infantile convulsions, called tetany, is associated with severe cases of rickets, which is prevented by ultra-violet radiation of the sun and by cod-liver oil.

Practically no cases of rickets occur in Porto Rico, where there is an abundance of sun and the houses have no windows to keep the ultra-violet rays from shining on the babies. In northern sections of the United States where the sun does not shine brightly and children are kept indoors most of the time, rickets is frequent and serious, particularly among children whose forebears came from the sunny climes. Negroes and dark-skinned children of southern European descent suffer most severely from lack of sunlight.

An experiment conducted by Dr. Eliot, at New Haven, proved that entire communities in this northern region can be almost entirely freed from rickets, however, if babies are given sun treatments and cod-liver oil. For centuries cod-liver oil has been recognized as a good medicine for children, but only recently has it been known that it contains vitamin D, the same vitamin that is formed in the skin by the action of the sun's rays.

A mixed section of New Haven, including some Negro and southern European families, was selected for the study because of the susceptibility of dark-skinned babies to rickets. Whenever a baby was born, a nurse from the clinic visited the home and explained the treatment. The mothers were shown how to make their infants swallow the cod-liver oil, which should be taken daily after the child is five days old. When the babies were old enough for sun baths, the mothers were instructed how to give the child his dose of sunlight, out of doors if the weather were fine, or by an open window, during the winter.

Monthly examinations of the babies subject to this treatment over a period of three years indicated that only 27 out of the 480 babies born in the community during that time developed moderate or severe cases of rickets and in all 27 cases the mothers had failed to follow the nurse's instructions. X-ray pictures of the children's bones revealed that a greater number at one time or another had the beginnings of rickets, but that these were quickly outgrown and apparently had no harmful effects.

GERMS KILLED BY SOUND WAVES

AUDIBLE sound waves, high-pitched and intense, have been used to kill bacteria by Professor O. B. Williams, of the University of Texas, bacteriologist, and Professor Newton Gaines, of Texas Christian University, physicist.

Sound waves of much higher pitch, so high as to be wholly inaudible, have in the past been used with fatal effect on living things, the pioneer experiments in this field being performed at the private laboratory of Alfred L. Loomis, banker-scientist of Tuxedo Park, New York. But the Texas experiments were the first in which audible sound waves were shown to be effective.

Professor Williams and Professor Gaines produced their sounds by means of a nickel tube, caused to vibrate at the rate of about 8,800 oscillations per second by means of powerful electromagnetic coils wound about its lower end. The oscillating current was supplied through two 250-watt radiotron tubes, such as are used in radio broadcasting stations, carrying a plate voltage of about 2,000.

The upper end of the tube was set in an inverted bottle and surrounded with water. When the current was turned on, the vibration was so intense as to cause a little mound of water to rise a couple of inches above the surface.

A flask, containing the bacteria to be "rayed," was lowered into this turbulent water mound. The sound waves passed through the glass into the fluid containing the germs, causing a disturbance similar to that which was raised in the water.

Bacterial cultures "rayed" for 10-, 20-, 30-, 40-, 50- and 60-minute periods were compared for numbers of survivors. It was found that a definite mathematical relation exists between the time of exposure and the number of survivors. At the end of one hour in the field of the waves there were less than half of the initial number of bacteria left alive in the flask.

The waves have also been tried on red blood corpuscles and have been found to be destructive to them. This is in line with similar experiments performed at Tuxedo Park, where supersonic waves of ten to a hundred times the frequency were used.

NARCOTIC DRUGS

A CAMPAIGN to limit the use of narcotic drugs to legitimate medicinal needs has been launched by the organized medical profession of the country. The campaign has as its object the two-fold purpose of reducing the extent of drug addiction and of forestalling legislative restriction of the individual physician's use of narcotic drugs.

Beginning with the current issue, the American Medical Association will issue in its *Journal* articles dealing with various phases of the narcotic drug problem. The effect of such drugs on the body, methods of treating drug addiction, indispensable uses of narcotics in medicine and surgery, substitution of non-habit-forming drugs for ones with addiction properties, and progress of research for a non-habit-forming substitute for morphine are the subjects of the series planned.

The editor of the *Journal* states that "It is the purpose of this series of articles to indicate to the medical profession the relatively few instances demanding the administration of opium or cocaine derivatives and the many substitutes therefor that may be available.

"Something under 25 per cent. of narcotic addiction, it is estimated, results from the beginning of the habit through previous use of drugs in medical treatment. This is after all only an estimate, based largely on evidence derived from the addicts themselves, who are notoriously an unsafe source of evidence.

"Nevertheless the physician must strive to limit his prescribing of narcotics absolutely to those situations in which the narcotic may be considered indispensable. Thus he will avoid the possibility of unfavorable criticism."

In addition, the American Medical Association declares itself ready to aid in every possible way state medical licensing boards in their efforts to purge the medical profession of those who have any conscious part in the creation and maintenance of narcotic addiction. It states that "Their activities reflect unfavorably on a profession of high standing and it will not tolerate them in its midst."

THE DETECTION OF MUSTARD GAS

YPERITE, or mustard gas, is now being combated by the German chemist who, perhaps more than any one else, made chemical warfare an effective part of modern battle.

A touch of drama is added to the search of the International Red Cross for an effective means for detecting mustard gas in small atmospheric concentrations, by the presence on its jury of awards of Dr. Fritz Haber, of Berlin-Dahlem. A prize of 100,000 gold francs has been offered for the most efficient detector, and tests of about a score of entries will be made in Paris soon.

Associated with Dr. Haber will be a brilliant group of scientists representing nations formerly enemies of his own, as well as one neutral power. They are Sir William Jackson Pope, professor at the University of Cambridge, England; Professor M. F. Swarts, of the University of Ghent, Belgium; Professor M. G. Urbain, of the Sorbonne, Paris, and Professor H. Zangger, of the University of Zurich, Switzerland. Dr. L. Demolis, technical counsellor of the International Red Cross Committee, will act as secretary of the jury.

In the near future the International Red Cross Committee hopes to organize two similar competitions, one for the best anti-gas mask and the other for large-scale shelters against poison gas. The organization of competitions of this kind is in line with the campaign for the protection of civilians against chemical warfare which the International Red Cross Committee is conducting and in connection with which it has brought about the formation in a number of countries of mixed commissions composed of chemists, doctors, technicians, representatives of the government and of the Red Cross, to work out methods of defense.

Yperite has been termed the "most formidable weapon of aggression" because of its unusual characteristics of permanence and insidiousness. Mere contact with the soil or contaminated objects as much as two or three days after the attack is sufficient for a good case of being gassed. An odor of mustard is all that, at first, tells the tale. It is only after four to six hours that the victim begins to feel the effects—temporary blindness, suffocation, burning and blistering from the gas that penetrates all ordinary clothing. This retarded action is due to the fact that yperite is projected not in a gaseous state but as droplets.

To date yperite has eluded all attempts at mastery. The gas mask had, by 1918, been perfected to the point of protecting the wearer against all chemical warfare gases. Yperite, however, requires special protective clothing as well as a gas mask. Although many detectors were used during the war, none was completely successful in finding the whereabouts of the elusive mustard gas. The ideal detector is still being sought. It must be sensitive enough to signal even a feeble trace of the gas; and function rapidly enough to give time for self-protection. It must be easily handled and sufficiently inconspicuous for placement in front of the lines if necessary. Finally, it should be able to detect all the various gases used in chemical warfare.

ACIDITY OF SOILS

THE higher the sourer seems to be the rule regarding soil reactions. Confirming by researches in the richest forest region in eastern North America the observations of other investigators in various parts of the world, Dr. Stanley A. Cain, of Butler University, has collected a considerable series of data from the Great Smoky Mountains region in Tennessee and North Carolina, which is to be developed as the greatest of the U. S. National Parks in the East.

Starting with a moderate degree of acidity in the valleys, Dr. Cain found that the soil became more and more sour as he climbed the mountains, reaching the summits and the highest acid concentrations at the same time. The soil reaction was correlated with different types of vegetation: beech and oak-chestnut forests in the lowlands, laurel "slicks" and other heath types, together with pine woods on the middle slopes, and at the higher elevations thick growths of spruce trees standing in a deep carpet of sphagnum moss. The most acid soil was found beneath the "heath balds" that crown some of the mountains.

Many factors conspire to make acid soil in the Great Smokies region. The underlying rocks are geologically very old, of types that weather into non-alkaline soil. There is a great deal of rain and low evaporation rates, which tends to keep the ground wet all the time. The growth of dense vegetation is favored by a mild climate, yet the temperature is low enough so that fallen leaves and dead moss decay very slowly. All these factors tend to have a cumulative effect, producing a highly developed, beautiful but botanically very peculiar type of vegetation.

SPRING WEATHER

SPRING will arrive early in the eastern United States, Professor Charles F. Brooks, of Clark University, pre-

dicts on the the basis of a recently discovered relationship between winter temperatures in Winnipeg, Canada, and spring temperatures in the eastern states.

Fred Groissmayr, a meteorologist of Passau, Germany, last year published in *The Monthly Weather Review*, the official publication of the U. S. Weather Bureau, data showing that March and April temperature in the eastern United States is usually indicated by the January-February temperature at Winnipeg.

Professor Brooks has compiled the daily maximum and minimum temperatures at Winnipeg from daily weather maps and finds that the temperature was 14.2 degrees Fahrenheit above normal in January and 19.0 degrees above normal in February, an average of 16.6 degrees above normal for these two months of 1931. In only one year in the period of record has Winnipeg had a warmer January and February combined.

Fifty years of weather records show that by multiplying this excess over normal temperature at Winnipeg by the factor 0.227, the expected departure from normal temperatures in a group of eastern U. S. cities can be obtained. This computation carried out indicates that the March-April temperatures will be 3.8 degrees above normal. Dr. Brooks therefore expects a warm March and April and an early spring.

Mr. Groissmayr, the German meteorologist, explains this correspondence between winter Winnipeg temperatures and spring eastern U. S. temperatures as being due to the lack of chilling of air passing over the Lake States during a mild winter. Reports indicate that this winter has been the most open season on the Great Lakes ever recorded. Winds passing eastward are therefore likely to be warm as there is no great area of ice to chill them.

ITEMS

RADIO reception has been noticeably impaired coincidentally with the appearance of plentiful spots on the sun, Dr. Harlan T. Stetson, director of the Perkins Observatory, Ohio Wesleyan University, has observed. Previous to the recent rise in sun-spots, radio reception was the strongest recorded in several years of research undertaken by Dr. Stetson and his colleagues. The recent rise in sun-spots reported by Mount Wilson Observatory in California was anticipated by Dr. Stetson on the basis of the 15-month cycle in spots that he recently discovered. The increase arrived exactly on schedule. Dr. Stetson expects the sun-spots to decrease after about April 1 and then radio reception will become as good or better than it was before the present sun-spot outbreak.

BERLIN visitors passing through the Natural History Museum in Berlin will have an opportunity to see a huge dinosaur skeleton from Africa, which has just been set up. It represents a beast similar to the American dinosaurian genus Diplodocus, though it is not quite so large. As the skeleton stands in the museum, it measures about 41 feet in length and just under 10 feet to the highest part of its arched back. It is known as Dicraeosaurus. The skeleton was collected by a recent German expedition to the Tendagugu region in East Africa.

THE U. S. Geological Survey has been informed that the first commercial shaft ever sunk in the United States for potash has now reached a depth of a thousand feet, and potash minerals are ready to ship. The shaft has been sunk by a firm formed to develop the great potash fields in Texas, recently explored by the survey. After government investigators had put down about twenty test holes the company drilled an equal number, and then began sinking its shaft. This has now passed through several workable beds of potash minerals, the best of which consists of a salt known as silvite.

WHEN optical lenses must be ground accurately to within five or six millionths of an inch, the temperature in the work-room should not be shifting from 70 to 85 degrees, or down the scale to 65. Vibrations make a great deal of difference, too, and dust flying about can wreck havoc with one of those millionths. However, for ten years opticians at the U. S. Bureau of Standards have had to do their work in the industrial building, where dust, noises, vibrations and temperature changes have been frequent. Dr. C. A. Skinner, chief of the optics division, recently announced that early in 1931 the new underground optical laboratory will be ready for use. Dr. Skinner explains that the layman can perhaps understand the importance of tiny, accurate measurements, when he realizes that a first-class telescope lens must concentrate every beam of light from a distant source, such as a star, within an area so small that even when magnified 500 times or more the eye can perceive nothing but a point. Moreover, the final figuring in grinding optical lenses has to be done by hand, for machinery is incapable of such fine work.

LIVER extract is a fairly good source of the anti-pellagric vitamin G, and consequently would be of value in large quantities in the treatment of pellagra, the U. S. Public Health Service has reported. This finding was the result of investigations on dogs who suffer from a disease similar to pellagra in humans. The study was begun under the direction of Dr. Joseph Goldberger before his death and was carried out by Dr. W. H. Sebrell, of the service. The liver extract used was developed by Dr. George R. Minot, of Harvard University, who with Dr. George H. Whipple, of the University of Rochester, recently was awarded a $10,000 prize for achievement in the solution of the problems of simple and pernicious anemia.

IT doesn't seem to make much difference to an insect which way its heart beats. Its heart is a reversible organ, sending the blood backward as readily as it propels it forward. Professor John H. Gerould, of Dartmouth, has been watching the hearts of craneflies, those long-legged creatures we sometimes mistake for over-size mosquitoes. Describing his observations before the meeting of the American Society of Zoologists he said that on the average a cranefly heart would beat in the forward direction 63 times, then backward 36 times.