SCIENCE NEWS

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THE MEDICAL USE OF MUSTARD GAS

MUSTARD gas, dreaded weapon of the world war, has been reported as possibly preventing and curing a number of diseases. The latest peace-time development of this gas is the announcement by the British Empire cancer campaign that it may prevent cancer in areas of the skin which have been painted with tars that ordinarily produce cancers. This does not in any way mean that mustard gas will cure cancer. Even its preventive action is extremely limited. But recent investigations may lead to a more general preventive method.

The starting point for the experiments leading to this discovery may have been the reported British observation that none of the British soldiers who were exposed to mustard gas in the war ever developed cancer. German experiments along similar lines have also been reported. Previously mustard gas had been heralded as a cure for locomotor ataxia, and other war gases were tried as cures for colds, tuberculosis and various respiratory diseases.

Mustard gas is a sulfur compound, dichlordiethyl sulfide. Recently Dr. Frederick S. Hammett, of Philadelphia, suggested that control of cancer might be gained by means of another sort of sulfur compound. He did not claim to have found any cure for the disease. However, he did state that transplantable tumorous growths in mice had been made to diminish and in at least one case to disappear altogether by the application of an organic compound containing partially oxidized sulfur.

PLANTS POISONOUS TO INSECTS

POISONING the water to catch fish is illegal in almost all civilized countries, as well as in many of the lands of the sun that have become the "white man's burden"; yet the leading governments of the world are now engaged in a zealous search for the most efficacious of the plants used as fish poisons by savage peoples. In a bulletin of the Royal Botanic Gardens at Kew, F. N. Howes, the well-known British botanist, summarizes the knowledge so far obtained. These fish-poisoning plants are desired not for poisoning fish, but for fighting insect pests. The artless savage takes insects for granted, but the more advanced nations of Europe, Asia and the Americas, dependent for their food on the highest efficiency of agriculture, fight the devouring hordes with every weapon at their command. A chief dependence has been arsenical sprays. These are very effective, but some insect pests have developed resistant strains that swallow considerable quantities of arsenic without suffering harm. Hence the search for new kinds of poisons. Fish poisons made from plants have been found highly efficient substitutes. Dilutions of one part in a million or more of water are fatal to insects, usually on mere contact. Derris, an East Indian plant, or rather group of plants, is already in considerable use. It is proposed to spray for several seasons with arsenicals, then for several with derris or one of its relatives, thus catching the arsenic-immune strains that may have evolved with something to which they are not immune. Most of the fish-poison plants thus far experimented with are of tropical origin. One of the most promising recent additions is the South American "cube," pronounced "koo-beh." Both derris and cube, together with the majority of other fish-poisoning plants, are members of the legume family, relatives of clover and peas. It is proposed to grow them as fertilizer crops in rubber groves and other tropical plantations, thus obtaining two paying crops off the same land with the same labor and enriching the soil at the same time. But many other fish-poisoning plants belong to other plant families. One formerly used in southern Europe is the common mullein, which is now thoroughly naturalized in America as well. Fish-poisoning used to be carried on extensively in Greece and Spain, and in parts of Spanish America the method of catching fish by poisoning them is still called "barbasco," from "verbascum," the old Latin name of mullein. If mullein turns out to be an efficient insecticide, its cultivation should present no particular problem, for it is the rankest kind of a weed.

YEAST FOR COWS

YEAST which has been exposed to ultra-violet rays is better than cod-liver oil for increasing the rickets-preventing properties of cows' milk, according to Dr. Harry Steenbock, Flora Hanning and E. B. Hart, of the Wisconsin Agricultural Experiment Station at Madison.

These investigators have been trying for some time to find a way of increasing the antirachitic property of cows' milk. The majority of infants fed on it get rickets. Earlier observations showed that summer-time milk had slightly more vitamin D, the rickets preventive, than milk produced in winter. Experiments showed, however, that it was not because the cows were getting more ultra-violet light in summer that their milk had more vitamin D in it.

Next experiments with the cows' diet were made. Cod-liver oil which prevents rickets in man was not satisfactory when fed to the cows. Fed in large amounts, it lowered the secretion of butter fat. Fed in small amounts it produced little, if any, effect of an antirachitic nature. Excellent results were, however, obtained from irradiated yeast. Two hundred grams fed daily to cows producing from thirty to forty pounds of milk increased the vitamin D content of the milk many fold. Even fifty grams furnished enough vitamin D to make the milk highly antirachitic.

Apparently by the use of irradiated yeast one of the most outstanding deficiencies of cows' milk can be corrected in a practical way. With the present cost of yeast production, it should be possible to give milk all

the vitamin D required for normal nutrition at a cost of a fraction of a cent per quart.

The use of yeast has a further advantage in that the amount of vitamin in the milk can be controlled by the feeding of a standardized yeast preparation in amounts adjusted to the milk production. The applicability of the use of irradiated yeast for the enrichment of human milk still remains to be worked out.

AMERICAN DIALECTS

THE dry New England manner of speech, the Southern drawl, Pennsylvania Dutch rising inflections, the Western twang—we pick them out by ear as we hear Americans talk. But now, two professors at Columbia University are collecting American dialects and making a careful scientific analysis of subtle differences. The New Englander of the sea-coast, for example, has a different way of using tongue and lips in his speech from the New Englander of the hills.

More than 200 phonograph records, including fifty speeches by famous people, have been collected by Professor Harry M. Ayres and Professor W. Cabell Greet. Their library contains what would appear to be a strange collection of literature, 150 copies of the same story, "Grip the Rat," but every copy of the story is spoken by a different American voice. They have been aided in collecting varieties of American speech by the fact that the 14,000 summer-school students at the university have a convenient custom of gathering beneath trees named for their states. Here, on the campus, can be picked out and sorted plenty of dialects, pure and mixed.

In a progress report to the journal, *American Speech,* the two professors point out that education does not completely eradicate local speech peculiarities. Students reproduce local traits to a surprising degree, they have found. The terror of the microphone proves an aid in scaring artificial mannerisms out of most students who have added their voices to the collection.

The report goes into detail regarding differences in specific vowels and consonants in various parts of the United States and Canada. The typical New Englander of the coast speaks with a sharp attack and brisk utterance. The vowel *a,* which is one of the letters that has a vivid and changeable personality on the American tongue, is most typically New England in "asked," "aunt," and "can't" where the tone is placed far in front. In "barn," the *a* is located slightly farther back, and the professors explain that in no case is this sound as far back as in the ordinary American pronunciation of father.

The mountain New Englander has "a slow elegiac cast in his speech tune, a certain doubt as to the advisability of proceeding, coupled with a resigned acceptance of the necessity of doing so," the report graphically explains. The *a* sound in this region is shorter than in the speech of the sea-coast.

This example of contrast indicates the analytic method of the study, which goes into much detail and uses many technical terms such as fronting, cupping and vowel gliding, to describe the sounds Americans make when they talk.

Records of the various speech types of a single community—Williamsburg, Virginia—were this summer gathered under the direction of Professor Greet and should yield interesting results, Professor Ayres stated.

TOOTH DECAY

TOOTH-DECAY can not be averted by the regular use of antiseptic mouth-washes and tooth-pastes, if you continue to eat too much sugar. Dr. Russell W. Bunting, professor of dental histology and pathology at the University of Michigan, has based this conclusion on crucial experiments which he has carried out on a large number of school children.

Dr. Bunting and his associates selected three groups of children. To one group they prescribed an antiseptic mouth-wash twice daily without putting them on a special diet, and to the two other groups they prescribed in addition to the mouth-wash a well-balanced diet, in which sugar was eliminated except as it was used in cooking to make foods palatable. These children had no sugar on cereals, in beverages, very little sweetened preserves and pastry, and little or no candy.

The results of these experiments, which lasted for nine months, were striking. Two thirds of the children who used the mouth-wash only developed extensive dental caries, whereas in the children kept on a relatively sugar-free diet not a single vestige of active caries appeared during the year, and cavities already present did not increase in size.

Dr. Bunting's experiments constitute the first successful attempt to eliminate tooth-decay in a large group of children. They show that little or nothing can be accomplished by pastes or mouth-washes without proper diet.

The importance of diet in the hygiene of teeth is further demonstrated by recent experiments of Mrs. May Mellanby, of London. She has shown that puppies developed extremely poor teeth if vitamin D, the rickets-preventing vitamin, was excluded from the diet. But since typical caries does not occur in dogs, the relation between vitamin D and this disease can only be determined in man. Experiments dealing with vitamins as possible causes of human tooth-decay are now being carried out by Mrs. Mellanby in England.

ARID-LAND FARMING

PRESENT-DAY irrigation and dry farming constitute, in a way, a return to the ways of our earliest civilized forebears. Civilization originated in the semi-arid lands of the world, and only after the lapse of centuries did farming leave such places as the valleys of the Nile and the Euphrates and reach its greatest development in the moister, cooler lands of the temperate regions. Now we are again paying attention to the lands of little water, using methods that are basically the same as those of the earliest farmers but with the advantages and improvements that can be derived from modern science.

This is one of the points brought out in a review of principles and methods of soil utilization, presented at

the Second International Soil Science Congress, meeting in Leningrad, by Sir John Russell, head of the great agricultural experiment station at Rothamsted, England, the oldest institution of its kind in the world.

The two principal means of gaining a profit from warm lands of little rainfall, Sir John pointed out, differ radically in their methods and in their results. The first, which dispenses with artificial watering, devotes itself mainly to the support of grass crops, either as grazing lands producing principally wool, or as dry-farming areas producing cereals. The second, which uses irrigation, is too expensive for staple food production except in such lands as Egypt where the object is more to keep the population alive than to realize profits. Elsewhere irrigated lands are given over primarily to specialized, high-price crops, such as fruits.

The soil problems of dry-farmed land are quite different from those of the more humid regions. In ordinary farm lands organic matter in the soil is counted indispensable; it is not found so in dry-farmed lands. More than 25 per cent. of clay in a moist region condemns land as untillable and consigns it to the category of permanent pastures. In arid regions the clay content may run as high as 50 per cent. without destroying the tillability of the soil. Nitrogenous fertilizers are not so necessary on dry as they are on moist lands, but sulfur and sulfates are often effective.

"Considerable success has already been achieved on these soils," said Sir John. "Much of the world's wheat and wool is now grown on them, and there is distinct promise for the future."

NEW DISEASE

DISCOVERY of a new occupational disease among railway train dispatchers in America is reported by the Industrial Health Conservancy Laboratories of Cincinnati. Of a group of 165 dispatchers from seventeen different railroads examined, two thirds were afflicted with an involuntary to-and-fro shifting of the eyes which is the characteristic symptom of nystagmus, as the new disease is called.

Until the present time, America has been regarded as free of this occupational menace, which has taken a great toll of mine workers in England since its discovery there. Its exact cause is not definitely known, some authorities attributing the disease to deficient illumination and others to the eye strain resulting from constant motion of the eyes following objects in motion, as the eye of a miner follows the point of his pick or the sewing machine operator watches her needle. Explaining the appearance of the optical ailment among train dispatchers, the fatigue theory has been forwarded as more logical and continued use of a train sheet blamed for the eye strain.

Reports from the U. S. Public Health Service of Washington state that previous to this time practically no evidence of nystagmus has been discovered in this country. The Illinois commission examined 500 pick men in the mines of that state but did not find a single victim. From this it was assumed that superior hygienic working conditions in the United States rendered the American laborer immune from the disease that was cutting into the ranks of English workmen, often incapacitating them for work in the prime of life.

Naturally strong eyes appear to be no guarantee against the inroads of nystagmus. Dr. J. W. Tudor Thomas, of the Cardiff Royal Infirmary, found from a study of five hundred cases of nystagmus among miners, that as many workers originally blest with normal vision had been afflicted with the disease as had workmen with defective eyesight. Neurotic tendencies, alcoholism and anemia are thought to be factors increasing the hazard of nystagmus. That workers in coal mines are the most frequent sufferers further suggests that the absence of colors may in some mysterious way react unfavorably on the eyes.

ITEMS

TEN pounds of flake ice will melt twelve and a half times as fast as a 10-pound block, Crosby Field told the American Institute of Chemical Engineers at their recent Detroit meeting. Thus it will cool a chemical reaction generating heat much faster than other forms of ice. "The new ice looks very much like broken peanut brittle except for color," Mr. Field said. "A 300-pound standard cake of ice has a surface area of 20.7 square feet, whereas 300 pounds of one-eighth-inch thick flake ice has 1,000 square feet of surface, an area nearly fifty times as great. But the effective ratio of surface area in use is far greater than that indicated by these figures because the surface of the flakes remains practically unchanged as they melt while the area of a block gets much smaller."

DRY cleaning fluid, to work properly, should be clear enough to read ordinary newsprint through 11½ inches of it, should have a sweet odor, should be light in color and free from moisture, fatty acids and alkali. These are some of a series of 11 tests for the use of dry cleaners to determine when their cleaning fluid is exhausted. At the meeting of the American Chemical Society in Cincinnati, Ralph A. Morgen and Frank Fair described these tests. In order to give satisfactory results, they stated, it is not necessary that the fluid be maintained at the same specifications as the original, but it should be maintained at a sufficiently high quality to give good cleaning.

THE clinometer, a simple device which enables one man to determine quickly the aviator's "ceiling" at night, has been designed recently by Dr. C. F. Marvin, chief of the U. S. Weather Bureau, and is being put in use at army and navy flying fields. It is used in connection with a searchlight focused vertically on the clouds. At a certain distance from the light, often 1,000 feet, the observer sights the clinometer on the white spot on the clouds and measures the angle of sight with a pendant which hangs on a scale attached to the instrument. Then with the ground distance and angle of sight known, the vertical height of the clouds can be readily calculated as the leg of a right triangle.