SCIENCE NEWS

Science Service, Washington, D. C.

DANGERS CONNECTED WITH THE HANDLING OF METALS

A GRAPHIC description of the dangers connected with the handling of metals in American industry and the suggestion of an eight-point program to eliminate them were made by Dr. Robert A. Kehoe, of the University of Cincinnati College of Medicine, at the New Haven meeting on Industrial Health and Medicine in Wartime in the Yale School of Medicine.

"In a large measure this is a war of metals," said Dr. Kehoe, "and metals are being used increasingly for the weapons of war, the machinery to make those weapons and in chemicals for certain purposes. The toxicity of metals is not always well understood, but it is at least clear that some metals combine with the essential components of protoplasm, thus interfering with the workings of body cells. Some metals are poisonous because they form volatile chemical compounds which can be inhaled in high concentrations, notably arsine from arsenic. Others are poisonous because they are readily soluble in watery liquids and dissolve readily in the intestinal juices, becoming easily absorbed in the bloodstream. Again, a metal often occurs in combination with a more toxic substance and may be less hazardous than its partner—for examples, lead arsenate."

It was pointed out that once metals are inside the system, they are redistributed throughout the body in certain organs. Among these the liver is preeminent and in the case of more prolonged storage, the bony skeleton may become the most important storage depot. How long metals remain stored depends on a number of factors, including rates of breakdown of chemical compounds, rate of metabolic renewal of the tissue involved, and the form in which the poison occurs. Variations in the poisonous effect of metals depend on abnormally high concentrations, marked individual differences among men and the type of compound in which the metal occurs.

Dr. Kehoe outlined means of measuring the degree of exposures in terms of the toxic metal concentration, correlating these measurements with physiological effects and finding the established limits of safety. He said that exposure can be controlled with the following eight practices: (1) plant design to segregate more hazardous operations; (2) enclosed operations and properly designed equipment; (3) adequate ventilation with air-conditioning wherever possible; (4) housekeeping and maintenance; (5) protective equipment and sanitation; (6) instruction and regulations; (7) supervision of work and workmen; (8) general hygienic instruction of workmen.

DEHYDRATED FOODS

STRIDES in the dehydrated food industry were described recently by Dr. Samuel C. Prescott, dean emeritus of Massachusetts Institute of Technology, at the school conducted for operators, foremen, and plant managers by the Department of Agriculture at the Western Regional Research Laboratory.

"The War Department," he said, "has already purchased or contracted for nearly a hundred million pounds of dehydrated vegetables. Not only is this tremendous increase in the dehydration of foods a part of the war effort, but it is potentially a great and useful industry which will continue after the war."

The story of the development of dehydrating foods has been a history of emergencies. Dehydrated vegetables were first used in the Civil War when soup mixtures were given the troops to prevent scurvy. In 1886 a small plant to dehydrate vegetables was started in Australia to supply miners and explorers. About ten years later there was some interest in dehydrated foods in this country because of the needs of the miners in the Klondike gold rush.

During the Spanish-American War dehydrated potatoes were bought in considerable quantity for the navy. Soon after this the battleship *Oregon*, similarly supplied, made a trip around the world. "I saw some of the potatoes that went on that trip," Dr. Prescott said, "they were the color of a good brown derby."

In the Boer War troops sent to South Africa were supplied with dehydrated vegetables for soup mixtures. Some of these, packed in paraffined barrels, were kept until the World War and served to the British troops nearly fifteen years later.

In 1910 the United States had only a few kitchen-size dehydration plants. The World War gave a great impetus to the industry. The Navy, remembering the experience of the *Oregon*, refused to buy any considerable quantity of dehydrated vegetables, but the Army ordered many thousand tons. The products varied greatly in quality; some were good, others were "case-hardened," some scorched, and some not thoroughly dried. However the need was great and all were sent to France. This poor quality caused a prejudice against all dehydrated foods which retarded the further development of the industry. But some products were excellent even in 1919. At a dinner that year, served to 200 members of the American Society of Bacteriologists, no one was aware that the whole meal—with the exception of the roast, the rolls, and the ice cream—was prepared from dehydrated food.

In Germany the development far exceeded our own. Beginning with one small plant in 1898, we find 199 in 1909, and 1,900 in 1917 in which the total quantity of dried potatoes alone was equal to three times our annual crop.

During recent years and especially since 1940 under the stimulus of the Government Dehydration Committee, there has been a great increase in knowledge and interest. The best products—which include numerous varieties of vegetables—are practically equal to fresh ones in flavor, texture and nutrition.

The government hopes that by means of large scale inspection of plants, and by schools such as the Western Regional Research Laboratory, our fighting forces will be

supplied with the "best food they ever got in their lives" and also that a permanent industry will be established which will extend to and be of great value to all our people.

A NUTRITIOUS SOUP

THE latest addition to large-scale, low cost, high nourishment feeding is a three-cent soup mix announced by Dr. Robert S. Harris, of the Massachusetts Institute of Technology, at the Detroit meeting of the American Dietetic Association.

Made of skim milk powder, peanut flour, soya flour and peas, the soup mixture is inherently rich in good protein and in vitamins of the B complex. It will be possible to supplement it with minerals and with natural and synthetic vitamins so that each ounce can supply the full day's allowance of these diet essentials. A full day's portion can be supplied at a cost of two to three cents.

The mixture is ready to serve, so it is not subjected to the destructive effects of cooking. All the materials are available in large quantities which will make it possible for the soup to be used on a national or international scale. Used as a stock to which meat and vegetables may be added, it provides the possibility of great variety in a school-lunch menu.

A field study conducted in six schools in small communities in Michigan showed that the soup was palatable as 426 children consumed it daily for three months and showed no evidence of tiring of it. There were significant improvements in the group to which the soup was given in comparison with the control group who ate the usual school lunch. These improvements included a better ascorbic acid (vitamin C) and iron status and some improvement in weight and riboflavin status. The study showed that the hot school lunch previously supplied was not properly supplementing the home dietary.

SCARLET FEVER

THE most important factor in the making of a scarlet fever epidemic in any community is the condition of the environment and specifically the number of persons in the community carrying scarlet fever germs, according to a report made by Dr. Francis F. Schwentker and Dr. John H. Janney, of the Rockefeller Foundation, New York, to the St. Louis meeting of the American Public Health Association.

Over the world all the twenty-six serological types of germs belonging to the group A streptococci family have been isolated from patients with scarlet fever. In any single community, however, the sporadic cases are due to only a few types, and epidemic cases to only one type.

Strains capable of causing scarlet fever, called scarlatinogenic, are present sometimes in communities free from the disease, which raises the question, what causes an epidemic to start? The question is answered as follows:

"For scarlet fever to occur in a community, a scarlatinogenic strain of streptococcus must be present or introduced. The number of cases of infection which follow depends on the distribution factor as measured by the carrier rate. Low carrier rates mean only sporadic cases; high rates accompany epidemics.

"A part of the population are never reached by the streptococcus. These naturally remain well. Of the others who become infected, some have antibacterial immunity; they either eliminate the organism immediately or become healthy carriers.

"Those without antibacterial immunity become ill; the kind of illness is determined by the antitoxic immunity. If immune, the patient develops streptococcic tonsillitis; if not, scarlet fever. Other diseases such as erysipelas and puerperal fever may result with portals of entry other than the throat."

ITEMS

U. S. DEPARTMENT of Agriculture entomologists have discovered three ways to destroy the dog flies that menaced soldiers and construction workers at army camps in coastal areas. The methods are: spraying marine grass with dilute creosite oil; dipping celery waste, and burying peanut litter. The shoal and turtle grass on the shores of bays and sounds, the litter left after baling peanut vines for hay and the dump piles of waste strippings from celery washing plants all had previously been "fly factories." Dog flies do not carry disease to man, but their painful, stinging bites are enough of a nuisance to reduce efficiency 20 or 25 per cent., according to a statement made by the U. S. Department of Agriculture. Since the fly population has been reduced, contractors report increased efficiency of workers and estimate a savings at two camps alone of about $500,000. The dog fly is a serious pest to cattle. In 1939 owners of livestock in one coastal area reported that one fifth of their cattle died from loss of blood, hunger and weakness resulting from annoyance by this pest. In efforts to escape the flies, cattle rush into the mud and water of swamps, and become mired so that they are often unable to free themselves.

THE source of the petroleum from which industrial solvents, such as benzin, gasoline and solvent naphtha, are obtained plays a part in determining the possible injurious action of these chemicals on those who work with them. This is one part of the "lesson" Dr. W. F. Von Oettingen, principal industrial toxicologist for the U. S. Public Health Service, gave a group of fifty Connecticut physicians attending the opening class of the new course on "Industrial Health and Medicine in War Time" given at the Yale School of Medicine. The increasing use of hydrocarbons in war industries is creating new health hazards. The appraisal of these hydrocarbons offers considerable difficulties because most of these solvents represent mixtures, sometimes of heterogeneous nature, and because their composition is often only incompletely known. Certain solvents such as benzin, gasoline and solvent naphtha, may vary with regard to their chemical composition according to the source of the petroleum from which they are obtained and therefore vary also with respect to their injurious action. Dr. Von Oettingen suggested that the older method of describing these substances in terms of their physical properties failed adequately to indicate their potential injurious effects. Therefore, he suggests that appropriate chemical analysis be made in order to detect possible noxious components.