

red rays instead of the ages-honored oven heat. U. S. patent 2,340,354 has just been granted on this device, to Franklin H. Wells of Hackensack, N. J.

Individual pans containing the dough are slowly carried on an endless chain past batteries of adjustable reflector-equipped lamps of the type already in common use in paint-drying and enamel-baking machines. Since infra-red rays are more penetrating than ordinary heat, baking begins in the heart of the loaf practically as quickly as it does on the surface, and the process proceeds more evenly throughout. Savings of from 20% to 30% over customary baking times are claimed by the inventor. Smoother crust is another advantageous feature, he states.

Rights in the patent have been assigned to the American Machine and Foundry Company.

Science News Letter, February 12, 1944

MILITARY SCIENCE

Mountain Fighting Calls Hooves Back to Service

See Front Cover

► WARFARE of the future will be entirely mechanized, all experts prophesied in the mid-'thirties. Everything was to move on wheels or tractor treads; gone forever were the picturesque army mule and the dashing cavalry horse.

But when the imagined future became the grim and stony present, military men began to discover that hooves could still go where not even a jeep could quite make it. In the rugged terrains of Tunisia, Sicily, South Italy, it was found necessary to improvise cavalry for a good deal of patrol work, and to purchase pack animals for getting heavy weapons, ammunition and supplies up to the otherwise inaccessible fighting fronts. Fortunately for us, Sicily has long been one of Europe's chief mule-breeding centers, so that a fairly good supply of animals could be purchased.

The front cover picture of this SCIENCE NEWS LETTER was taken by an Army Signal Corps photographer "somewhere in Italy." The mule in the foreground is carrying one of the most formidable weapons of the "front-line artillery," an 81-millimeter mortar. Evidently mules are mules in any language, to judge from the amount of persuasion it takes to keep these newly acquired allies of ours moving.

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MEDICINE

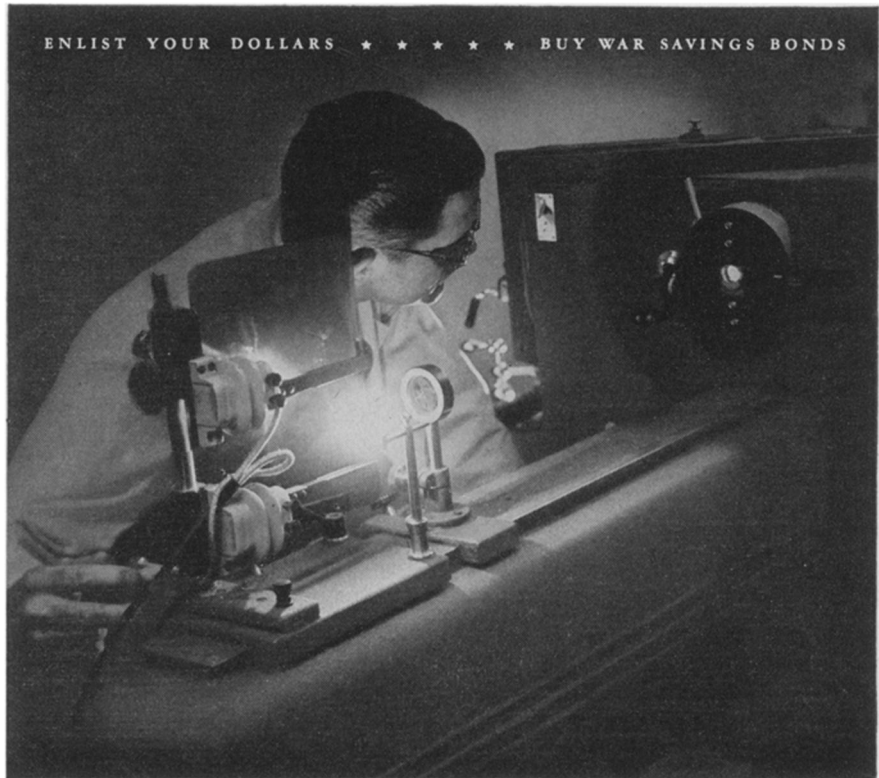
Speedy TB Diagnosis

► SPEEDY diagnosis of tuberculosis, within 12 to 24 hours, is possible with a new tuberculin test developed by Dr. H. J. Corper, head of the research department of the National Jewish Hospital in Denver, an announcement from the hospital states.

Use of a transparent adhesive for applying the tuberculin to the skin makes it possible for the physician to watch the

reaction. This transparent adhesive also eliminates the danger of apparent "positive" reactions due to sensitivity to adhesive rather than to tuberculin.

The tuberculin used in the test is described as a pure simple tuberculin called "autolytic." It is uncontaminated by the medium on which the tubercle bacilli are grown and in which all live bacilli are killed by toluene and removed.



The Spark that Lights the Flame of Victory



A pinpoint of fighting metal placed in the arc of the spectrograph writes its own signature on a photographic plate. Inside the instrument, the light from that flame is broken up by a prism as a prism breaks up sunlight. Each element identifies itself by a series of characteristic lines, always the same for the same basic element. It reveals to the spectrographer each constituent, what impurities are present and in what quantities.

Thus spectrography helps in control and inspection. It keeps tough fighting steels tough, helps in development of new fighting metals. Spectrography is used, too, in other fields to speed research and

analysis... chemicals, foodstuffs, vitamins.

Because Bausch & Lomb had long experience with such precision optical equipment, it was ready for quantity production of gunfire control instruments, binoculars and aerial photographic lenses. When the last gun is fired, Bausch & Lomb will devote its enlarged experience to peacetime optical production.

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As a result, this tuberculin developed by Dr. Corper is said for the first time to eliminate all danger that a patient's reaction to foreign elements in the tuberculin might mistakenly be diagnosed as indicating tuberculosis. Danger of the patient suffering any local or general reaction to the tuberculin is also removed.

The test, Dr. Corper points out, should not be considered an exclusive test for the disease, but an inclusive one to verify medical findings. He believes it ranks among the best biologic diagnostic tests developed. It has been used successfully for the past several years at the Fitzsimmons General Hospital, Denver, and the University of Colorado School of Medicine, as well as at the National Jewish Hospital.

Science News Letter, February 12, 1944

BIOCHEMISTRY

Germ-Killing Substances Found in Onion Oils

► APPARENT support for an old folk-belief that onions, garlic and their strong-scented kin-vegetables are "good for what ails you" is offered by the reported discovery, by Prof. B. P. Tokin of the University of Tomsk, USSR, that their essential oils contain substances that kill bacteria, protozoa and even larger organisms like yeast cells and the eggs of certain lower animals. The report is contained in a bulletin of the USSR Society for Cultural Relations with Foreign Countries, which has just been received in the United States.

Prof. Tokin has given the name "phytoncides" to the substances he has isolated. Experimental use in hospitals is now being made of these compounds, particularly in the treatment of suppurative wounds.

Science News Letter, February 12, 1944

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Hidden Furrows

► PLOWING in the traditional pattern, with long, straight furrows of cleanly-turned soil lying dark in the sun, is under challenge. Newer methods of preparing the soil, that loosen it enough for seeding but leave stubble and litter on the surface, are being strongly advocated as better for water conservation and for erosion prevention.

Critical tests of these new methods are being made at the Iowa Experiment Station at Ames, Iowa, and at the demonstration area of the U. S. Soil Conservation Service near Clarinda. These tests measure values in terms of costs per bushel in man-hours and horsepower-hours put in by the farmer and his tractor, as well as the conventional bushels-per-acre reckoning commonly used. First results are summarized, in some detail, in the professional journal, *Agricultural Engineering* (January), by a three-man research team: Prof. E. V. Collins of Iowa Agricultural Experiment Station, and R. A. Norton and G. M. Browning of the U. S. Soil Conservation Service. They also summarize earlier investigations by themselves and other workers. (See *SNL*, Nov. 7, 1942)

Three principal types of tillage implements have been used by experimental-minded farmers who are trying to get away from the moldboard plow. One is the disk harrow, advocated especially by Edward J. Faulkner in his recent book, *Plowman's Folly*. This is already familiar, although its use as an exclusive means of tilling the soil seems radical to most farmers.

A second implement is the subsoil lister, which is a type of plow that lifts and loosens the soil, but lets it drop into place again without turning it com-

pletely over as a moldboard plow does. The third implement, called sometimes a subsoil tiller, sometimes a sweep, is a widely V-shaped blade that is drawn along entirely below the surface. It stirs the soil underneath but disturbs the surface, with its cover of stubble and litter, even less than the lister does.

Tests of all three of these implements, on three different soil types, have been run, principally with corn, though soybeans and other field crops were also tried to some extent. In general, fields prepared for planting by the new methods yielded as much, or nearly as much, per acre as comparable fields plowed in the conventional way. Differences were greatest in heavier soil, especially when wet. In lighter, drier soil the difference was sometimes in favor of the newer tillage method, especially where contour rather than straight-row cultivation was carried out.

In all cases, the newer methods required materially lower costs in man-hours and tractor power (and hence fuel and oil), so that lower yields per acre were at least partly offset. Moreover, the usually unreckoned but nevertheless serious costs in water loss through runoff and soil loss through erosion were far less, especially on rolling land where contouring or terracing was used, in the case of the newer tillage methods.

Objection has been raised to tillage methods that leave the surface relatively undisturbed, on the score that it would encourage weediness. The three researchers feel that further evidence on this point is needed before a positive verdict can be rendered. In at least one instance, plots that had been subsurface-tilled for corn the previous year and then plowed and planted to soybeans in 1943 were less weedy than similar plots that had been prepared for both crops by plowing. This, however, was an accidental discovery, and further investigation of this problem is considered necessary.

Akin to the weed problem is the insect pest problem. The area of European corn-borer infestation has now reached central Iowa. Corn-borer larvae live through the winter largely in corn stubble. Other insect pests also shelter in surface litter. Clean plowing in the spring has been considered the best method of control. If clean plowing is to be given up in favor of any of the newer tillage methods, this also is something that calls for further research.

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