

ficient in the diets of a large part of the Chinese population, Dr. Adolph indicated. Unable because of the crowded condition of the populated areas in China to obtain animal proteins such as meat, cheese and eggs, the Chinese rely heavily on a cereal diet, which is overbalanced in the direction of carbohydrates. Chinese nutritionists realize this, and are striving to overcome the difficulty, though as a practical matter they stay within the framework of a vegetarian diet. They are also trying to get their countrymen to use more fresh vegetables, placing special emphasis on Chinese celery cabbage.

In some districts in North China, it

has been discovered, a rather well-balanced ration, practically altogether vegetable, was worked out by the peasants ages ago, and they stick to it today because, as they say, it "stays with you." The cereal mixtures used in this diet differ from locality to locality, but the net results are good for any given blend of foods.

Millions of people in North China never taste rice; they use wheat and millet as their mainstays. For these people a great benefit seems to be in sight, in a recently bred variety of millet that contains 14% or 15% of protein instead of the usual 9%.

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UNDER THE SUN—As a preliminary operation in steel plate production, this workman is turning a slab broadside preparatory to further rolling on a sheared plate mill of the U. S. Steel Corp.

CHEMISTRY-MEDICINE

Penicillin for Public

Enough to treat all urgent civilian cases should be available in the near future, Agriculture expert predicts at chemistry meeting.

➤ ENOUGH penicillin to treat all urgent civilian cases is expected to be available in the near future, Robert D. Coghill, chief of the fermentation division of the U. S. Department of Agriculture's northern regional research laboratory, told the American Chemical Society meeting in Cleveland.

The discovery by Dr. A. J. Moyer in this laboratory of the action of corn steeping liquor on the growth of the mold, penicillium, was "possibly the greatest single factor in making the commercial production of penicillin feasible," Mr. Coghill declared.

That production reached an estimated 40,000 million units of penicillin in March of this year, contrasted with a total of 400 million units for the period of January to May, inclusive, last year.

The cost of the penicillin for treating a severe case of blood poisoning would be \$35, Mr. Coghill estimated, on the basis of using about 1,000,000 units at the present cost of \$3.25 per 100,000 units. A case of sulfa-drug-resistant gonorrhea could be treated for less than \$5, Mr. Coghill said. The first price quoted for penicillin, and acknowledged to be less than cost, was \$20 per 100,000 units. The present price will undoubtedly go much lower and penicillin, in Mr. Coghill's opinion, will be within the reach of everybody.

The chemistry of penicillin, he stated, is considered of enough importance to be a military secret. He gave the following answer, however, to the question

of whether chemists have succeeded in synthesizing penicillin, that is, in creating the mold chemical without benefit of the mold:

"We are not thinking of scrapping our fermentation plants yet."

There are now 21 of these penicillin-producing fermentation plants being erected in this country and Canada at a total cost of \$20,000,000.

In contrast to the size and cost of the plants and their equipment, when they

reach a 200,000,000,000 unit per month production, their output by weight will be only about nine pounds of pure penicillin per day.

Fantastic as this seems, Mr. Coghill pointed out that this amount will treat approximately 250,000 serious cases per month and for our fighting men will mean the saving of thousands of lives, to say nothing of arms and legs.

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CHEMISTRY

Fuel From Plants

Gasoline, lubricating oil and coal can be made faster by man than by nature from many common plants, including even wayside weeds.

➤ GASOLINE to run the world's automobiles, coal to fuel its industries, oil to keep them all moving smoothly, can be made from potatoes, sugar-cane, sawdust, even wayside weeds, after the present reserves in the ground have been used up, Prof. E. Berl of the Carnegie Institute of Technology announced at the Cleveland meeting of the American Chemical Society.

Man can now duplicate in hours the products which slow nature took millions of years to form, through processes which he has developed, involving the use of pressure and temperature, Prof. Berl de-

clared. There is no need to anticipate a fuel famine so long as the sun shines and makes plants grow, he added.

The Pittsburgh researcher was interested at first only in the "pure science" aspects of the fuel problem. He wanted to find out whether oil and coal were formed in nature from the cellulose part of plant materials or from the lignin. His investigations satisfied him that cellulose was the original material. In the meantime, however, the laboratory techniques he used were beginning to turn out substances that were pretty good synthetic reproductions of the natural

fuels. He was also able to up-grade some low-grade natural fuels, for example converting non-coking lignites and sandy bituminous coals into coking coals.

The process, which Prof. Berl calls "incoalification," involves the use of alkalis derived from limestone, dolomite or zeolites. He believes that crude petroleum was formed from carbohydrates in nature if "during the first steps of the carbohydrates conversion a larger amount of alkali produced by limestone, dolomite or zeolites, etc., was present. By a rather complicated conversion process, finally, asphalts were formed which upon cracking or hydrogenation at low temperatures were transformed into crude oil."

Production of motor fuel from starchy or fiber crops grown year by year would

not place an undue tax on American agricultural capacity, according to Dr. Berl's figures. In 1941, for example, America's 32,000,000 automobiles used 55,600,000 tons of liquid fuel. To make that same amount of fuel from sugar-cane, "4% of the cropland harvested in the United States (320,000,000 acres) and 2.1% of the land available for crops (570,000,000 acres) would be necessary."

If the world ever goes wholly on a fuel-from-plants economy, the nations with large cultivable areas in the tropics will enjoy a tremendous advantage. Starchy plants grow at terrific rates in the tropics, and it is there that sun-power could be converted into engine-power most abundantly.

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RESEARCH

Reckless Drafting

► LABORATORY heads and industrial executives attending the Cleveland meetings of the American Chemical Society have been going into anxious little huddles, between the scientific sessions, exchanging worries over what the speeded-

up under-26 draft is doing to their research staffs who have been working on war problems.

In many places, draft boards have been pulling men out of their research jobs in apparent reckless disregard of

consequences. They seem to have a fixed idea that the quota of prospective infantrymen must be met, even if it involves robbing the ground troops of overhead protection through slow-down of aviation fuel production, or leaving the wounded without adequate medical treatment through diminished penicillin production. They just don't think that far.

Official instructions have been to leave young men on the chemical job, if it can be conclusively demonstrated that that job is immediately and directly connected with war production. But these instructions seem to have been disregarded, or at any rate given an extreme interpretation, by some draft officials.

If a man is working on a less immediately war-connected problem, if he is doing fundamental research that will not bear industrial fruit until day after tomorrow, he is not given a chance to go on with his potential contribution to the greatness of post-war America; into the ranks he goes.

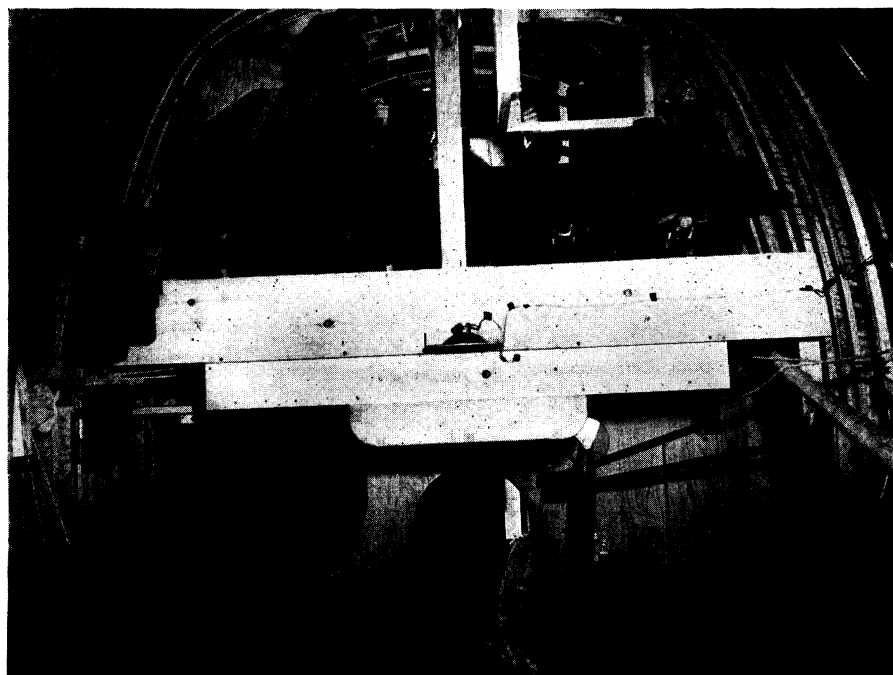
This can have very serious consequences, for other nations, notably Russia and Britain, are conserving their research scientists and seeing to it that they continue their training. They are our Allies today, but they will be our competitors in the business and industrial world of tomorrow, and they do not intend to throw away the best assets they have—the brains of tomorrow's scientists.

Dr. Charles L. Parsons, secretary of the American Chemical Society, put the situation into forceful words:

"Even victory will be fruitless if the scientist is sabotaged. I wish definitely to go on record that if some of the undisclosed discoveries and others that appear imminent do not come to fruition, the American people must hold those directing the combat army responsible, not the scientists of this country.

"England, Russia and Germany are protecting brains in order that brawn may function more efficiently. American brains are equal to any, and if permitted, stand ready to continue to function."

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MOCK-UP VERSION—The Martin JRM-1, production version of the 70-ton Mars, will be even larger and more efficient than the prototype now in service in the Pacific. As a cargo carrier the JRM-1 will have ample space for seven jeeps and even greater numbers of field guns or aircraft engines, for it has been designed to fly at weights up to 72½ tons. Twenty of these huge aerial freighters will be built for the Naval Air Transport Service by the Glenn L. Martin Co. of Baltimore. The two men "upstairs" in this picture are in the pilots' seats of the wooden model of the plane.

CHEMISTRY

Three Prizes of \$1,000 Given Outstanding Chemists

► THE AMERICAN Chemical Society's \$1,000 award in pure chemistry for 1944 has been voted to Dr. Arthur C. Cope, associate professor of chemistry at Columbia University, it was announced at the Cleveland meeting. Dr.