

States. The United States has more than 60 times as much iron ore per person as Japan, for instance, and nearly 200 times as much coal.

The average breadwinner in Germany before World War II could buy only half as many of the necessities and luxuries of life for his family as a worker in the United States. Germany's reserves of iron ore per person were less than one-fourth as large as ours. Her reserves of coal per capita were about one-sixth as great as ours. There were about three times as many people for each square mile of arable land in Germany as here in the United States.

Before inflation took over in China and raised the price of everything sky-high, each week the average breadwinner could buy only as much as \$1.40 would purchase here in America. But one-fifth of the people in the world live in China while only one-eighteenth of the earth's population resides in the United States where a breadwinner has an average income of \$28 a week—about 20 times as great.

In India one out of four dies on or before his second birthday. Feed India enough to keep her babies from dying and within 100 years there would be 12,000,000,000 Indians or more. That is five times the number of people on the earth today.

Growth Throughout World

This suicidal increase in population is not occurring just in so-called backward countries, but also in those that have been industrialized. In these the length of life is ever increasing while the number of children brought into the world continues to be large.

The USSR and tiny Puerto Rico head the list of countries throughout the world as far as population increase is concerned. With birth rates far surpassing death rates, these two countries could double their populations about every 30 years.

There are nearly 12 times as many people for each square mile in Puerto Rico as there are in the United States, yet there the birth rate is twice as high. It has changed little since the island came under the American flag, yet the death rate has been cut in half.

Our fellow American citizens in Puerto Rico, tiny island bursting at the seams with people, eat less than one-third as much meat, eggs, milk, cheese, vegetables and other protective foods as the average white person in the

United States. They get only about one-half as much to eat as Negroes in our Southern cities.

"If Puerto Rico explodes in population, it may cause little disturbance in world politics. Only the inhabitants of that island may suffer. But if Russia's already huge population explodes into a program of territorial expansion," Mr. Burch says, "this would shake world civilization to its foundations."

Today there are urgent appeals for famine relief for China's 450,000,000 people, for India's 400,000,000, for Europe's 500,000,000. Other countries like the Philippines, the Dutch East Indies, parts of Africa and the Near East cry for food.

But the crisis has only in part been brought about by the destructive war. The world is chronically hungry. Every year around 20,000,000 more people are added to the world's population—20,000,000 more to feed, yet few additional natural resources are being discovered to add to the earth's dwindling supply. Famine will eternally endanger a majority of the earth's people unless the number stops growing so enormously each year.

World Must Be Educated

The world must be educated to conserve human resources as well as natural resources. Mr. Burch's studies show that the people of the world cannot be freed from want and war by programs of industrialization and technology unless accompanied by a humane world program for limiting the number of people on this earth.

This is the basic world problem as Mr. Burch sees it. If science lowers the death rate without a corresponding decrease in the birth rate, millions of babies each year will be born only to starve. A program of population limitation must be realistically studied by the society of nations. Some means for educating the world toward this end must be adopted before there can ever be hope for enough food to give each individual a life-sustaining share.

Science News Letter, August 17, 1946

AERONAUTICS

NACA and Army Design XS-1

► MAN'S FIRST attempt at flight faster than sound will be made soon in a Bell Aircraft-Army XS-1, a plane that follows design knowledge developed by the

National Advisory Committee for Aeronautics, it has been revealed.

The XS-1 has been built by the Bell Aircraft Corporation under contract with the Army Air Forces. It is based on high-speed design principles provided by the NACA, with specifications worked out by the NACA, the Army and Bell in cooperation.

The airplane incorporates the latest supersonic knowledge. It is the result of studies made on models conducted in NACA wind tunnels, from the early stability tests in seven- by ten-foot tunnels and a spin tunnel to the later transonic investigation in an eight-foot high-speed tunnel.

Drag and thrust information through the upper transonic range was furnished chiefly by studies of free-falling test bodies released from high altitudes. These streamlined bombs exceed the speed of sound, and have furnished the most accurate knowledge of drag at sonic speed and the thrust required to overcome it.

Just how fast the rocket-powered XS-1 will be able to fly will probably depend on how the controls react near the speed of sound, NACA officials state. This, rather than the drag and thrust that can be calculated, constitutes the real unknown. The "transonic" region, from roughly 500 to 900 miles per hour, is difficult to duplicate in a wind tunnel due to shock waves that "choke" the tunnel. NACA wind tunnels have provided accurate information up to 96% the speed of sound, and this indicates that the XS-1 will include rapid and severe changes in control characteristics.

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Do You Know?

Many of the 150,000 *cancer deaths* each year in this country are unnecessary.

The strength of a *scar* following the healing of a wound is dependent upon the amount of vitamin C in the diet.

Vinegar added during the canning process helps retain the bright red color of fresh beets.

Colchicine, the drug used to develop new varieties of plants, is being successfully used in the treatment of gout.

The output of *iron ore* in Italy last year was only 5% of what it was before the war.

Surplus and undergrade *potatoes* fed to livestock every year in the United States amount to about 5% of the total crop.

Like snakes and turtles, *lizards* are reptiles and are hatched as miniature adults rather than developing from a larval stage.

Heating *flour* in the oven at about 170 degrees Fahrenheit for half an hour will kill any flour weevils present, no matter what stage of development.

Cows grazing on weed-infested pastures are almost certain to give off-flavored, low-quality milk; dairy specialists recommend taking the cows off grass two or three hours before milking.

One of the many *enemies* encountered in mahogany logging is the marine borer teredo; once it starts to work it can completely riddle the rafted logs within a few weeks.

Long-keeping *rye bread* was baked in Germany during the war in an oven placed inside a steam boiler from which some of the steam entered the oven; the bread had no crust.

Insect repellent, developed by the Naval Medical Research Institute and known as Repellent 448, will keep flies, mosquitoes and other pests away for 36 hours in temperate climates; it can be used on clothing and animals.

The XS-1 has already been tested in the air about a dozen times but without its own power. It was taken aloft by bombers and released to glide and dive downward. Controls are reported to function satisfactorily in these tests. When its rocket engines are installed and the plane is ready to fly under its own power, it will be tested in the air by the Army at gradually increasing speeds until its airworthiness is established. Then the attempt will be made, at very high altitude where the air is rare and resist-

ance is less, to beat the speed of sound, approximately 760 miles an hour at sea level.

In all, three models of the XS-1 will be built. One will be flown by the Army, one retained by Bell Aircraft for experiments, and one retained by the NACA. Rockets have travelled much faster than sound, but the XS-1 is the first American pilot-carrying plane designed for sonic and supersonic speeds. Other nations are trying, but none has yet succeeded.

Science News Letter, August 17, 1946

CHEMISTRY

Famine as a Weapon

Chemicals developed during the war which might be used to promote famine in the event of another war are being put to excellent peacetime use.

► FAMINE WILL join with atomic bombs and man-made pestilence to make World War III an apocalyptic horror, if mankind becomes so mad as to start fighting again. And while it may be possible to protect factories, and even dwellings, against atom bombs by hiding them underground, famine cannot be escaped in that way because crops have to be up on the surface in the sunlight.

Visions of famine as a weapon are proved to be realizable at will even now, by publication of details of biological warfare experiments carried on in the deepest of wartime secrecy at Camp Detrick, Md. Dr. A. J. Norman of Iowa State College, who was in general charge of the work, joins with a group of colleagues in presenting results of the researches in the Chicago University's *Botanical Gazette* (June).

The chemicals that can be used to spread famine by ruining an enemy's crops are complex organic compounds. One of them has already come into general use as a weed-killer under the convenience-designation of 2,4-D. The Camp Detrick experimenters tested the effects of about 1,100 of these, and found that some of them are even more toxic to plants than their prototype.

It would not be necessary to kill all the plants in a field to make the crop a failure, the experiments showed. One drop of a very dilute solution of some of the chemicals falling on a leaf would cause the stem to twist and often also to develop lumpy, tumor-like galls. The plant might survive, but it would live

on only as a twisted, stunted cripple, unable to produce its full quota of food. Spraying tops can seriously affect underground parts, too; in some of the experiments potato tubers were badly damaged by chemicals used on the vines above them.

Contact with the chemical does not need to be prolonged to work a great deal of mischief. In some cases the plant begins to become sick and crippled in as little time as an hour after the fatal drop has fallen on a leaf. And if the chemical is dissolved in oil instead of water it will stick to the leaf and do its poisonous work, even if a heavy rain comes up immediately after the oil-drop has fallen and stuck.

A considerable number of food plants was used in the experiments—enough to indicate pretty thoroughly that no crop can be considered safe. Among them were corn, wheat, barley, oats, potatoes, tomatoes, soybeans, kidney beans, cabbages and turnips. Had either Germany or Japan launched a biological warfare drive against us (and it was known that both had ideas of doing so) a counter-attack against their crops would have followed very quickly.

Now that these compounds are not needed for the grim business of war they can be used for purposes of peace. One of them, 2,4-D, is already on the job as a weed killer, where others may presently join it. Others may be employed in lighter doses to stimulate plants rather than kill them. Among possible uses along this line are (*Turn to page 110*)