

GENERAL SCIENCE

What's Ahead for 1943

Science, of course, will contribute to more effective military weapons. It will also be devising new materials and processes for peace.

By WATSON DAVIS

► TO A WORLD at war, science in 1943 gives promise of new and more effective military weapons as well as new materials and processes that will serve both in war and in the days of peace to come.

In all likelihood new weapons fashioned by scientific research and development will be announced to the enemy in action before those on the home front know of their existence.

For the duration and for some time after, the details of any new devices of warfare developed by the methods of science will undoubtedly be kept secret just as at the present time many facts about many military devices are closely guarded.

For two years now there has been an intensive program of development of war weapons by Uncle Sam's special agencies created to do this job. Well over 125,000 inventions and suggestions for war use have been received by the National Inventors Council from the public. The new Office of Production Research and Development within the War Production Board is just getting underway and during the year 1943 will tackle some of the important and troublesome war-born problems of production, such as whether we need for war purposes to develop new processes for making aluminum from clay, or iron from low-grade ores. Just as production for war is hitting its stride, so scientific research for war may be expected to be setting a speedy pace behind the scenes of our military effort.

Protection Against Epidemics

In our war against disease, which must be fought more intensively now than ever before, new methods of protection against epidemics are being developed. Most important has been the great extension of protective vaccines and serums and their use upon great masses of men in the armed services. Tetanus and yellow fever have joined smallpox and the typhoids as diseases that cannot make headway among our troops, thanks

principally to such protective measures.

The public, through donation of blood to the Red Cross for use as the dried plasma for treating shock in battle casualties, has been able to play its part in keeping our forces fit to fight. Researches under way may result in coming months in use of substances from animal blood for such life-saving, but at present human blood is needed in increasing quantities.

If epidemics of influenza or other airborne diseases threaten during 1943, there will be extensive trials of new methods of air sterilization. These include spraying into the air a fine mist of propylene glycol or irradiating with ultraviolet light. If influenza or some other respiratory disease plagues us, there is greater chance that the after effects or the illness itself can be treated successfully with some of the sulfa drugs which have had such extensive and striking use on the pneumonias.

Cures from Evil

From the earth itself have come new chemicals, manufactured by the teeming billions of bacteria in the soil, that surpass even the sulfa drugs in their conquests over disease germs. Watch particularly penicillin and gramicidin, two of these soil chemicals. From clinical studies now well along it seems that they will prove as useful in the treatment of chronic infections, such as the common sinus troubles, as have the sulfa drugs in controlling acute infections.

Urea is likely to come into greater use in the dressing of wounds, and you may expect to see an extension of the use of dicoumarol, obtained from sweet clover, in the treatment of diseases of which a manifestation is undesirable clotting of the blood.

The stress of war is likely to affect the mental health of both our fighting men and the civilian population. Psychiatrists expect to see more neuroses and psychoses precipitated by the conditions of 1943.

Many more women will take up the work of industries during the coming year. Because many of these women are

the mothers of small children who need care while they work there will be more nursery schools and day nurseries established. This will give a new impetus to the study of child development, particularly under what conditions children get the best chance to grow up into useful citizens. This new social and economic status for women will persist after the war and our culture will become still more technological, emphasizing the importance of knowing about the best conditions for early child development.

Dehydrated Foods

Dehydration of food will be practiced on an increasing scale both because of the shipping space saved in sending food overseas and because of the shortage of steel and tin for the canning industry. As more kinds of foods are rationed in order that all may have what they need, there will be increased attention given to the enrichment of food with synthetic products and the production of such products.

The most powerful X-rays man has ever created, generated by means of a new electron generator whirling electrons up to 100,000,000 volts, will give science a new tool for inspecting large metal castings and also experimenting with radiation that approaches the power of the cosmic rays.

The new electron microscopes now available for industrial and medical laboratories may be expected to give new and perhaps startling results during the year.

Because of the accelerating tempo of the war, the construction of airplanes and their equipment may be the greatest industry in the United States in 1943, both as to manpower and expense. We shall undoubtedly have reports from the fighting fronts of the use of bombers of longer range and greater bomb capacity. Fighters will mount cannon for use in low level attacks against tanks, locomotives and other ground objectives. There will be an increasing and vitally important volume of freight transported overseas by air. In the structure of airplanes, magnesium metal will be employed as welded sheets and shapes.

In man's study of the heavens, astronomers will continue to solve some of the puzzles of the universe. There will be new theories and interpretations

of the development of the spiral galaxies, those great universes of stars far outside our own galaxy. Further progress is foreseen in the study of stellar evolution, which is undergoing a revival, and there will be interpretations of those peculiar variable stars whose varying light does not follow the usual patterns. On Feb. 4 there will be a total eclipse of the sun that will extend over the far-flung battle zones of the area north of Japan, the Aleutians and Alaska. Although totality lasts for eight-tenths of a minute at Anchorage, Alaska, near sunset, it is unlikely that there will be any extensive expeditions to observe it.

Anthropologists and archaeologists can do little or no field work these days in digging up past civilizations or studying strange peoples in various parts of the world. But they are hard at work summarizing for war purposes all that is

known about our enemies in order that this information may be used in fighting the war. It is particularly important to do this for the Japanese, although data on the Germans as well will be useful in the post-war years when the United Nations forces will need the greatest possible amount of factual help in setting the world to order and in handling the problems of peoples whose minds and feelings have been indoctrinated with false science and ideals.

The shape of the future after our military victory is won will gradually emerge during the year. Scientists will find themselves particularly concerned with the major problems of raw materials, regarding peoples and commerce that must be solved to keep the world free, peaceful and contented, as well as fed, clothed and housed.

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NUTRITION

Tests for Coffee

► SIMPLE TESTS for telling whether the coffee you brought home on your precious number 27 coupon has been adulterated are given by C. E. Shepard, chemist of the Connecticut Agricultural Experiment Station.

Examination of coffee samples recently submitted to the station showed one of them to be almost 50% impure. A flat taste or lack of kick may be, as coffee drinkers often suspect, signs of adulteration.

Chicory is the most common adulterant of coffee, Mr. Shepard stated. One test for detecting chicory in ground coffee is made by placing a good pinch of the material on a piece of white paper. Examine the individual particles with a hand lens, though you can tell the difference between coffee and chicory without this aid. Coffee grounds are usually light brown and granular, while those of chicory, being made from a root, are fibrous and darker in color.

The "water test" shows up the difference even more distinctly. Half a teaspoonful of coffee is placed in a glass a quarter full of water. Most of the true coffee will stay on top for a time, but grains of chicory or other fibrous vegetable material quickly become waterlogged and sink to the bottom, often coloring the water brownish. After allowing the material to soak for ten minutes, the water is drained off, and the grains spread out in a dish or on a

piece of white paper. If, on prodding with a match stick or tweezers, a granule appears hard and resistant and "jumps away", it most likely is coffee. But if it is plastic, almost like gelatin in consistency, it is a foreign substance, probably chicory.

Chicory is made from the root of a perennial vegetable grown in the Northeast. Addition of chicory or any other harmless vegetable material to coffee is not considered illegal, Mr. Shepard points out, so long as its presence is plainly indicated on the package label. Some people prefer coffee that contains a little chicory and even add it themselves. Most consumers, however, want only pure coffee, and a mixture of coffee and other materials should be sold for what it is.

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ENGINEERING

Ship Models Are Tested For Wartime Research

► SMALL TOY-LIKE ships and naval equipment are being built in increasing numbers by the nation's gigantic shipyards.

They're expensive luxuries, thought some of the old-time shipbuilders. But marine engineers find them a quick and economical way to discover how our sea-going vessels may be improved, reports



NOT JUST FUN—This little boat is a model being tested at the forty-foot model basin of the Newport News Shipbuilding and Dry Dock Company. Such tests result in the improvement of sea-going vessels. The photograph is from the U. S. Maritime Commission.

S. B. Besse, model engineer, of Newport News, Va.

Engineers are shown testing a model in the official photograph from the U. S. Maritime Commission shown on this page.

Arrangement models help determine the best possible location of compartments and equipment. Government contracts often require machinery room models before actual construction of large naval craft.

Development of intricate structures that are hard to visualize from plans, is aided by design models.

Planning models are used in general yard work, where heavy and bulky equipment must be handled, as well as for construction purposes.

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Nylon brushes, resembling over-sized bottle brushes, are used to clean Navy guns.