

TECHNOLOGY

Aerosols Do Chores

Jet-propelled "beer cans" now used to package scores of useful materials from leg paint to whipped cream. DDT bombs started new push-button, spray era.

► JET-PROPELLED aerosols, in "A-bombs" you can buy at the corner store, are commandeering a significant part of today's household chores.

Merely by waving science's newest gadget, you will be able to apply leg paint, extrude whipped cream, squirt shaving lather, waft a perfume, distribute insect killers, spread automobile wax, put plastic film on silver teapots, give a "new-car smell" to a musty jalopy, create a liquid hairnet, blitz moths chemically, and fill the waffle iron. More than 25,000,000 "beer can" were sold in the past year. For a device invented less than 10 years ago and introduced upon U. S. counters only in 1946, the aerosol "bomb" with the push-button spray is making chemical, cosmetics and food companies sit up and take notice.

A nation-wide survey last August by dealer and consumer polltakers showed: 1. Nearly half of all housewives have already bought at least one aerosol bomb for killing insects or other jobs around the home; 2. Eight out of ten stores which stock aerosols consider them to be the most efficient way yet found to dispense a mushrooming list of everyday household materials.

Were Considered Fad

Many manufacturers once considered the aerosols merely a passing fad. These same prophets are now busily stuffing their products into pressure packages. The crowd they have to eat is not such a bad dish, seasoned with booming sales figures.

Aerosols are no fad. Teamed with DDT, wonder chemical of World War II, they were credited with saving thousands of American lives in far corners of the world. They kept foxholes free of mosquitoes and uniforms free of lice.

Death rates from disease, which in all previous wars marched shoulder-to-shoulder with enemy weapons, were the lowest in history. All told more than 35,000,000 of the new "bug bombs" were made and delivered to the armed forces from 1943 to 1945.

Chiefly responsible for the development of the insect-killing bombs was a group of hard-working, little-known chemists of the U. S. Department of Agriculture. Only a few scientists had known or interested themselves in aerosol sprays until these government workers began tinkering with them in 1941 at Beltsville, Md.

The word "aerosol" means a suspension of tiny particles of liquid or solid in the

air. A cloud and rolling fog bank are water aerosols. So is the spray from a sneeze.

In older household spray guns or the farmer's crop or tree sprayers, the chemical droplets produced are too large to remain hanging in the air. They are directed instead at a surface or the leaves of a plant, and the target is wet by the spray.

In the new pressure bombs, on the other hand, the air is filled with drops so small that gravity has a slow effect upon them.

The drops are self-propelled from the bomb. They are shot through a tiny orifice or jet by the force of a neutral propellant liquid which boils at a very low temperature. When the aerosol is used at room temperature, this propellant vaporizes, expanding instantly to about 260 times its original volume.

The man who touched off the aerosol industry is a 47-year-old petroleum chemist, Dr. Lyle D. Goodhue. In 1941, as an insecticide specialist for the Department of

Agriculture, he wrote a scientific paper describing the efficiency of aerosols for killing insects in a greenhouse.

Snatched for Battlefield Use

Top medical men in both the Army and Navy saw quickly that the same principle could be used on the battlefield. Disease-bearing insects could be stopped cold with small hand bombs that fighting men would carry with them.

The Surgeon Generals' offices worked with Westinghouse Electric Corporation engineers in developing the first aerosol bombs. By late 1943, they were in mass production. The propellant was "Freon," a liquid with low boiling point which has been used for 19 years in refrigerators.

Military "bug bombs" carry high pressures, from 80 to 100 pounds per square inch. These necessitated metal "bottles" with walls heavy enough to prevent explosions.

When the aerosols were first introduced to civilian life in 1946, they were sold in the same heavy, relatively-costly bomb-shaped bottles. Manufacturers quickly saw short-comings. Housewives were reluctant to pay \$3 to \$4 for a "bomb," a large slice of which went for the container. It was



GRAND VARIETY—Aerosol bombs for dozens of products are available as demonstrated by this display in the Beltsville, Md., Laboratories of the U. S. Department of Agriculture (where it all started). Dr. R. A. Fulton and Mrs. Marjorie Parvin look over various kinds of aerosol "beer cans" and wonder what's next.

inconvenient to have to send the container back to the company for recharging.

In late 1946 the government authorized lower pressures for the spray bombs, and opened the way for light "beer can" containers which could be thrown away when empty. The aerosol industry was on its way.

New mixtures of "Freon," and other chemicals for special uses were developed which could deliver pressures ranging anywhere from one to 70 pounds per square inch. Companies could pick their own pressure, depending upon the material to be sprayed. The usual low-pressure bomb uses 35 to 40 pounds.

There are three main types of bombs today. One is the space spray, producing the tiniest of droplets. Insecticides and room deodorants, designed to fill a given space with a chemical fog, make up about 95% of all aerosols sold in the last few years.

Residual sprays, which coat a surface with a liquid, a plastic film or a paint, are the second type.

The third is the foam or lather bomb, delivering anything from whipped cream to shaving soap and shampoo.

Drug and cosmetic manufacturers are just beginning to scratch the surface of

potential uses. In 1951, however, you may be able to get windshield antifreeze, home permanent waves, mildew-proofing for your clothing, dyes or poison ivy lotions in pressure cans.

Aerosol-sprayed paint has already proven practical. With a wave of one of these wondrous cans, you can now paint a wicker chair in a matter of minutes. The chore by paint-brush can make a home handyman tear out his hair at the end of a tedious, frustrating day's work.

You can apply shampoo to your hair, cold cream to your face, tannic acid to a burn on your hand, sunburn lotion to your legs, and "tired shopper's" salve to your feet with spray cans.

Car owners can apply a "no-rub" wax as an aerosol; for ignition systems, there is a spray-on plastic which waterproofs electrical wires; for fires, a handy push-button extinguisher.

From sales managers of aerosol companies, you may hear something like this: "Anything that must now be brushed on, squeezed on, sprayed on, or dispersed in the air—we can put in an aerosol can!"

All the housewife has to do is press the button.

Science News Letter, April 7, 1951

GENERAL SCIENCE

Military Experience Credit

► DRAFTEES and others in the Armed Forces can get credit in high school and college for their educational experience while in service. Even basic training is worth something.

The American Council on Education has recommended to schools and colleges a revised method of giving credit for what the serviceman has learned. This was first done after World War II when the council successfully evaluated Armed Forces experiences.

Now that thousands of young men will once more have their education interrupted, the council has brought its methods of evaluation up to date. Most schools and colleges are expected to accept them.

High schools and colleges are advised to give academic credit for basic or recruit training in lieu of mandatory requirements

for physical education, health or military training courses.

At the high school level, young servicemen may get their diplomas if they pass a group of five high school general educational development tests. However, the council recommends that state departments of education do not grant diplomas merely on the basis of tests before the ages of 20 or 21. This is to encourage younger men to return to high school where they may get the benefit of systematic education.

The council also recommends that college credits may be given on the passing of tougher general educational development tests in five broad subject areas of learning.

In addition, credits have been worked out for most United States Armed Forces Institute, Marine Corps Institute and Coast Guard Institute courses. Service school training, too, has been evaluated.

No system has been worked out for giving school credits for combat service.

Science News Letter, April 7, 1951

On This Week's Cover

► AMERICA'S first airliner of the turbo-prop type, the kind powered by a gas turbine engine operating conventional propellers, is shown on the cover of this week's SCIENCE NEWS LETTER in a shakedown test flight near San Diego, Calif. This type of propulsion is expected to be widely used in the near future.

PHYSICS

Pressure and Cold Freeze Helium 3 for First Time

► A RARE form of the element helium—one that can not be frozen simply by cooling it to a low temperature, has finally been solidified for the first time. Pressure plus a low temperature of 457 degrees below zero Fahrenheit did the job of solidifying helium 3. D. W. Osborne, B. M. Abraham and B. Weinstock of the Atomic Energy Commission's Argonne National Laboratory, Chicago, reported this achievement to the Symposium on Low Temperature held in Washington, D. C.

The helium 3 was put under a pressure of 600 pounds per square inch before it solidified at the low temperature. Small quantities of the material were frozen in a tubing about the thickness of a human hair. The helium 3 is available as a decay product of radioactive hydrogen, or tritium, one of the materials mentioned for the H-bomb. Research on helium 3 is handicapped because of its scarcity in nature, where it exists as only one part in a million of ordinary helium.

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