

## TECHNOLOGY

# X-Rays Test Airplane Parts

► AS MANY as 3,000 X-ray photos are made daily in the plant of the Boeing Airplane Company at Seattle, Wash., in testing metal parts before they are assembled into an aircraft.

Magnetic tests are also used, and sound waves, too high in pitch to be heard by the human ear, are employed to detect hidden flaws deep inside metals.

All raw materials, parts and assemblies received from suppliers and subcontractors are subjected to various tests before they are used in an airplane. This assures that they reach the high specifications required in the construction of a sturdy plane. Important among them is the long-used, so-called Rockwell test to determine if the metals in the manufactured parts have the proper hardness.

When X-rays are shot through a piece of metal, any flaws within will show up on a photograph. Similar results are obtained with the reflectoscope which directs ultrasonic sound waves into the metal and receives them back reflected from the opposite surface.

Magnetism is used to discover minute surface and other imperfections in steel castings and forgings. The piece under test is put in a machine called the magnaflux which magnetizes the part. A liquid containing iron oxide is forced to flow over

the part. If there are any invisible cracks or breaks in the surface, the iron oxide collects at them since opposite magnetic poles are set up on their edges by the magnetic field.

Detection of flaws in non-ferrous castings is made with the help of an oil-base fluid of low surface tension and high capillary attraction. When castings are soaked in the fluid for sufficient time, the cracks become filled with it. Washing removes the coating of the fluid but not that in the cracks. Joined by a developer of inert powder in another fluid, the material in the cracks reveals all imperfections with clarity when placed under ultraviolet light.

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## SURGERY

## Extra Ribs More Common in Females

► AN EXTRA rib near the neck, which occurs twice as often in females as in males, may be the cause of shoulder and arm pains, Dr. Alfred W. Adson of the Mayo Clinic reported at the U. S. Chapter of the International College of Surgeons meeting in Chicago.

The extra rib near the neck, called a cervical rib, is found in six of every 1,000

patients, he said. In more than half the cases they are discovered accidentally in routine X-ray examinations for other complaints.

When the extra rib causes pain by pressure on an artery or nerve, a muscle cutting operation, sometimes combined with partial removal of the extra rib, gives relief. Complete relief of all symptoms followed this operation in about 60% of the patients, Dr. Adson reported, with great improvement in another third who could return to their vocations with annoying twinges of pain only during certain movements.

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## CHEMISTRY

## Chemistry Gives Substitute For War-Scarce Materials

► CHEMISTRY IS providing substitutes for some of the war-scarce materials that are creating industrial shortages.

More than two million pounds of metallic copper annually are being saved by the substitution of organic chemical compounds, the dithiocarbamates, for copper used as an insecticide in orchards, Dr. John C. Dunegan of the U. S. Department of Agriculture at Beltsville, Md., told the Twelfth International Congress of Pure and Applied Chemistry in New York.

The same chemicals are also saving four to seven pounds of sulfur for every 100 gallons of insecticidal spray.

One of the oldest minerals known, gypsum or alabaster, used for making plaster from the days of the ancients, is now yielding sulfur in countries that do not have resources of elemental sulfur or pyrites, Dr. G. I. Higson of Imperial Chemical Industries, Ltd., of Durham, England, told the chemists. Calcium sulfate in these deposits is being turned into sulfuric acid and ammonium sulfate for fertilizer use in several European factories and one plant in India.

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## INVENTION

## Flame Melts Snow To Clear Streets

► SNOW PLOWS and snow loaders now have a rival in a snow melting device which utilizes a flame to melt the snow and ice on city streets. The equipment is mounted at the front of a truck or other vehicles, with the fuel tank on the vehicle. Combustion takes place in the so-called flame-throwing unit which extends across the front of the truck and shoots out hot flames into the snow.

Inventor is Benjamin S. Wilson, Akron, Ohio. Patent 2,566,473 was awarded to him. Flame can be regulated, and the flame-throwing unit can be raised or lowered relative to the ground. Preheated fuel is fed to it under pressure.

Science News Letter, September 22, 1951



**MAGNAFLUX TEST**—A Boeing Airplane Company technician here examines a machined casting which shows a crack under magnaflux test. The crack is outlined on flat portion extending at right angles from the two small studs in the center of the piece.