



**X-RAY MACHINES COMPARED**—Miss Lois Mellquist (right), a nurse at Argonne National Laboratory is showing the newly-developed portable X-ray unit to Miss Betty Van Dolah, a medical technologist. Size of the inexpensive unit can be compared with the equipment shown.

## PHYSICS

## Small Portable X-Ray

► A SMALL and portable X-ray unit with potential uses in medicine and industry has been developed at the Argonne National Laboratory of the Atomic Energy Commission, Lemont, Ill.

The active component of the instrument is a tiny particle of thulium, made radioactive in the heavy water nuclear reactor at Argonne. Thulium is an extremely rare material that heretofore has found little practical application.

In order that X-ray photographs may be made, the thulium is mounted in a holder and shield equipped with a shutter mechanism, which is operated by a standard photographic cable release.

The unit, now being tested diagnostically, was developed under the direction of Samuel Untermyer. It is expected to meet the long-time need for simple, cheap and portable equipment for making X-ray photographs. Although the entire unit weighs less than ten pounds, the radioactive thulium provides rays that are comparable in energy to a 100,000 volt X-ray machine.

The instrument does not require an electrical power supply as does conventional X-ray equipment.

The use of thulium as an X-ray source was first suggested by British scientists who have developed a similar but less powerful instrument.

For diagnostic purposes, equipment of

this type will be of greatest value in isolated locations such as Army field hospitals, naval vessels and isolated construction projects. Industrially, it has potential use as a device to determine the levels and densities of liquids in closed systems.

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## INVENTION

## Titanium Treatment Gives Tough Surface

► A METHOD of giving titanium a hard outer "skin" has won a patent for Peter P. Alexander of Beverly, Mass.

Titanium is considered one of the "wonder" metals for jet planes. It is light and strong under high temperatures that weaken other metals used in airplanes.

With the treatment worked out by Mr. Alexander, titanium alloys can be given a tough surface comparable to case-hardened steel. Powdered tungsten carbide, titanium carbide, chromium carbide, tantalum carbide, zirconium carbide and nitrides of the corresponding metals can be washed over the titanium article in a slurry of molten titanium or zirconium alloys. They are then heat-treated. Mr. Alexander assigned his patent, No. 2,674,542, to Metal Hydrides Inc., of Beverly.

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## ASTROPHYSICS

## Solar H-Bomb Blasts Source of Fast Particles

► SOLAR EXPLOSIONS similar to recent H-bomb blasts on earth have been suggested by three Australian scientists as the source of the very speedy particles they have found being thrown off by the sun.

With receivers that tune in on radio waves, they have detected particles being ejected from the sun with speeds up to one-fifth that of light, or 37,000 miles a second.

One explanation for such fast motions, the three scientists state in *Nature* (March 20), is "an explosion involving thermonuclear or chain reactions between nuclei of light elements," the resulting products being hurled out of the sun with one-fifth light's velocity. Their statement also describes the hydrogen bomb reaction of recent Pacific tests.

Speed of the solar particles borders on the cosmic-ray range. The discovery, by J. P. Wild, J. A. Roberts and J. D. Murray of the Commonwealth Scientific and Industrial Research Organization, Sydney, Australia, was announced in this country in the *SCIENCE NEWS LETTER* (Jan. 23). The H-bomb blast explanation, however, is now being suggested for the first time.

Other explanations for the great speeds of the particles also suggested by the three scientists are:

A sudden accelerating process involving large-scale electric and magnetic fields.

A disturbance that gives rise to a combination of the fast particle ejection and a shock wave.

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## PSYCHOLOGY

## Music Interpretation Might Spot Mentally Ill

► MISINTERPRETATION OF the emotion expressed by operatic music might be used as a test to spot the mentally ill or those with deviant personality.

This was suggested by a report to a meeting of the Eastern Psychological Association in New York by Dr. Julius Segal of Johns Hopkins University, Baltimore.

In Dr. Segal's experiment, conducted at Fordham University, 20 operatic arias were recorded as sung in French, German, Italian and Russian. They were played to a group of 112 men students, none of whom was familiar either with the operas used or the languages.

Those who obtained the highest scores in identifying the emotions expressed were found by test to be the most stable emotionally.

"This suggests," Dr. Segal and his associate said, "that the ability to correctly identify the emotional cues in musical stimuli is hampered by psychological disturbance."

In general, the musical expression of joy is most readily identified by the listener.

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