

Do You Know?

Almond hulls are a fairly good source of *tannin* for leather making.

Crude *petroleums* from no two fields in the world are exactly alike.

Infants need three to four times as much food *protein* per pound of body weight as adults, it is claimed.

Eggs are likely to absorb odors, so should be stored away from strong-smelling foods.

"*Pickling*" as used in the steel industry consists of giving the semi-finished steel a bath in sulfuric acid to remove tiny surface scales.

Corn is still America's most important agricultural crop; the amount raised has a value equal to the total of the principal small-grain crops.

If the bottoms of utensils used in *picnic cooking* over open fires are rubbed with soap before using, the soot is removed easily.

Aluminum *paint* is satisfactory on radiators in the home because the heat of the radiator will not cause it to chip as it does to certain other paints.

Storms that cause static near a radio transmitting station do not affect distant receiving sets; the static does not ride in on the same wave that brings the program.

Although the *sun* is some 3,000,000 miles farther away from the earth in July than it is in January, the weather is hotter in the northern hemisphere because the sun is more nearly overhead.

Sugar beet seed for American crops, prior to and during World War I, was obtained from abroad; the seed is now raised in this country, and quantities were exported to the Allies during World War II.

Economic life in the far-flung *Pacific Marshall Islands*, which America will now supervise, is based largely on coconut, breadfruit, pandanus and fishing; as a result of the war, the natives now want American canned foods to give variety to their diet.

PHYSICS

X-Rays Disguise Jewels

New tube gives stones colors that make them look more valuable. Sunlight brings back the original color, giving a way to detect fraud.

► JEWEL THIEVES and dishonest gem dealers may turn a new scientific development into a new way to cheat the public.

The scientific development is a new X-ray tube. It can be used to give gem stones a more valuable color. The buyer of diamonds treated with X-rays from the new tube might find the stones turning yellow. Some other gems given the X-ray treatment would fade in color or revert to a cheaper hue.

Developed by Machlett Laboratories, Springdale, Conn., the new X-ray tube has a beryllium window. This permits longer wavelength rays to get through than more conventional tube windows.

When gems are exposed to the rays, some of them take on new colors. Cheaper, yellowish diamonds look like more valuable stones.

Color Lasts in Dark

The color changes seem to last indefinitely in the dark at room temperature. But heat or sunlight will bring the gems back to their normal color.

Dishonest gem dealers could keep X-rayed stones out of the light until selling them. Only after the buyer had exposed the gems to sunlight or heat would the fraud become evident.

Reporting on X-ray treatment of gems with the new tube, Dr. Frederick H. Pough of the American Museum of Natural History in New York and T. H. Rogers of Machlett Laboratories warn against commercial hoaxes.

They suggest a fading treatment, exposing the gems to sunlight or heat, as the best way to detect X-ray jewel swindles.

The effect of X-rays or radium on gems has been known for some time, but the new tube makes the treatment quicker and more effective. Curiously enough, X-rays also are used by gem dealers to prevent one common type of fraud. X-rays can be used to show up fake diamonds and other imitation gems.

Writing in the *American Mineralogist*, Dr. Pough and Mr. Rogers report on a number of different stones treated with X-rays. Here are some of the color

changes in common gems which can be produced with X-rays:

White or pinkish sapphires become a brilliant amber color.

White topaz turns to brown-purple.

Pinked topaz changes to orange-brown.

Aquamarine beryl, normally pale blue, is made light green.

Dark green tourmaline takes on a dark rose-purple color.

Lilac kunzite is turned to green.

Not all gems changed color under X-rays in the experiments. Emerald beryl is still green after an hour's treatment, while opals show no color change after several hours of X-rays. Time required to alter the color of the stones which did change hues varied with the different kinds of gems.

The way X-rays change the color of gem stones is believed to be by knocking off negatively charged particles called electrons from the atoms or ions making up the crystal structure of the stone. All crystals are made up of rows of atoms or ions regularly spaced, but there may be some nooks or crannies in this construction.

When X-rays strike the gem, they may free electrons. The loose particles may slip into these crannies and give the stone a new color.

Heat and sunlight are believed to release the electrons again and send them back into their normal positions, bringing back the original color to the stone.

Science News Letter, August 23, 1947

AERONAUTICS

Flying Freight-Car

► ANOTHER flying freight-car is the subject of patent 2,425,498, assigned by its designer, Michael Watter of Philadelphia, to the Budd Company. The rear third of the fuselage cants upward to permit the approach of trucks. A trap-door-like ramp lets down to the rear, to permit them to drive up and in, if desired. When the plane is used in war, the ramp can be opened a crack in flight, functioning then as platform for one or more tail guns.

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