

be felt here in America. Accompanying the rising conviction that America must protect the Western hemisphere from political, economic and even actual invasion by dictator-led nations, there will be recognized the necessity of guarding anew the universal and world-wide character of science, art, literature, and ethics. If the torch of reason and knowledge is smothered by intolerance and obscurantism in some blighted areas, it must be kept kindled where the mind

and spirit are still free.

How to check the epidemic without becoming infected is perhaps the major problem of the intellectual world today. Fire used to fight fire often is turned upon us by the wind of emotions. Defensive war is no more kind to creative science and other intellectual pursuits than aggressive war. Here is a major problem for all who consider themselves intellectually civilized.

Science News Letter, November 19, 1938

PHYSICS

\$4,000 Diamond Helps Determine Basic Constant

Flawless Gem Has One Large Surface Ground Smooth To About One Five-Hundred-Thousandth of an Inch

By ROBERT POTTER

See Front Cover

DEEP down in a tiny, sub-basement laboratory at the Johns Hopkins University, scientists are using a large diamond slab—that would cost you \$4,000 on the open market—to probe the fundamental constants of the physical world.

Did you ever hold a flawless \$4,000 diamond in your hand knowing that if you dropped it to the floor it might chip or shatter? Probably not. But you can realize that you don't hold it, you clutch it.

And yet clutching is difficult, for the Johns Hopkins diamond has a slippery surface because it is ground smoother than ever a diamond has been ground. One surface is plane to within a tenth of the length of a green ray of light; or about one five-hundred-thousandth of an inch.

"Here it is," said young Prof. J. A. Bearden, Hopkins' X-ray expert, as he handed me a test tube filled with a brownish fluid.

And there, floating in the fluid, was a shimmering three-carat diamond slab as big as the nail on a man's little finger. Yes, the diamond was floating.

"You see," explained Prof. Bearden, "we have to know the density of this diamond. One way to determine the density is to make up a special solution just as dense as the diamond so that it will neither float nor rise in the tube.

"So delicate is the balance that if I place my hand on the test tube, and

warm the solution slightly, the diamond starts to sink. The heat of my hand expands the liquid, makes it less dense and so the diamond starts to sink because it is relatively more dense.

"If I want to make the diamond rise again I reverse the process, immerse the liquid in cold water, make the liquid more dense so that the diamond becomes relatively lighter than the liquid and rises."

Using a little hook, Prof. Bearden snared the diamond and lifted it out of its brownish bath, washed it out and put it in my hand. Its surface seemed slippery because of its smoothness.

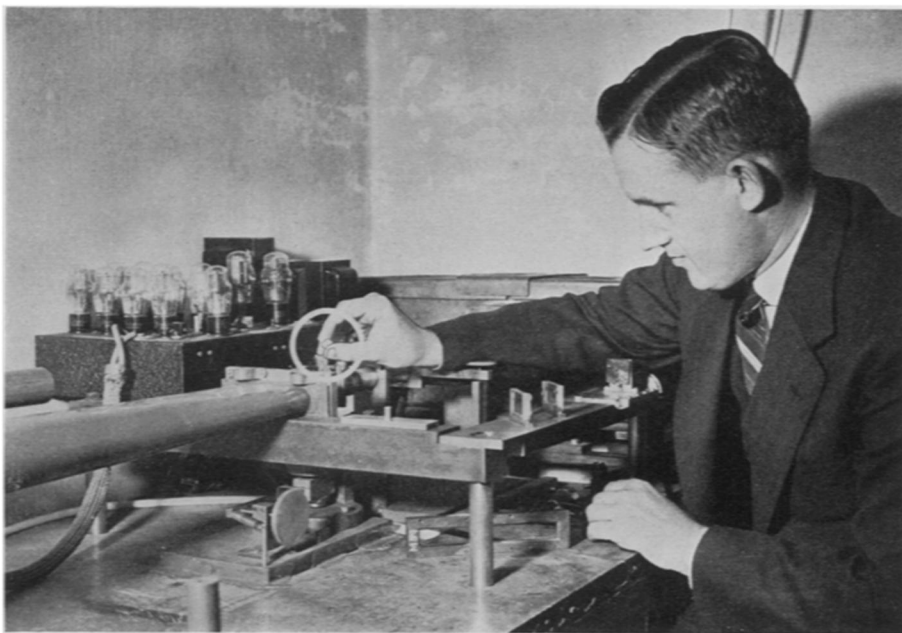
Gingerly I held it up and saw the brilliant gleaming colors of refraction in the flawless gem. And then quickly I laid it down on a convenient black cloth.

One corner of the diamond is used as a tiny prism to bend, or refract, X-rays. By knowing the amount of refraction of the X-rays—and a lot of other details too—Prof. Bearden is able to calculate the value of the very important physical constant known as "e over m": "e" stands for the charge on the electron and "m" for the mass of the electron. As the physicists write it, "e/m," appears again and again in the equations of atomic physics.

So important is the constant that scientists are ever searching for different ways of determining its value. In fact they seek to check measures made by one method against those made by another to get the most exact determination possible.

Prof. Bearden uses the X-ray refraction method to provide a new and more accurate determination. His scientific report, describing his discoveries, appears in the *Physical Review* (Nov. 1).

And you might as well know Prof. Bearden's little secret. Through a research grant from the American Acad-



UTILITARIAN

This three-carat \$4,000 stone is not for ornament. Here it is placed in the X-ray diffraction apparatus by Dr. J. A. Bearden. For experimental purposes, one surface has been ground flatter than any other diamond known.

emy of Science he obtained the diamond slab from a New York diamond cutter for \$400, which is a new high—or low—in professional discounts.

The illustration on the cover of this week's SCIENCE NEWS LETTER shows the diamond resting on top of a cork.

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ARCHAEOLOGY

Vandals Blamed For Loss Of Indian Rock Pictures

AMERICA is losing its outdoor art galleries of Indian paintings. Vandals are mainly responsible.

This is the verdict of A. T. Jackson, field archaeologist for the University of Texas, author of a report on "The Picture-Writing of Texas Indians."

Texas is one of the states that can boast thousands of picture-writings, as the Indian paintings and engravings on rocks are generally called. The pictures decorate boulders and cliffsides with primitive figures of fighters, tipis, wild game, trees, and other objects. They are fascinating, not only to the archaeologists, who find them full of information about Indian life and customs, but also to any hiker or other member of the public who happens along.

Unfortunately, many who see the pictures fail entirely to think of them as antiquities, to be protected.

The result:

Visitors, young and old, scribble their names and dates over the Indians' work.

Hunters have been known to take a painted Indian as a target and riddle it with bullets, spoiling a fine example of ancient art.

And vandalism goes farther, Mr. Jackson reports: "It frequently happens that a group of youngsters—and sometimes elders—will carry a can of barn paint for miles across rugged mountains to paint pictures beside, or over, the prehistoric ones. Usually these frauds are easily detected, but often they ruin important primitive pictures."

Even photographers, meaning no harm to the pictures, often chalk the outlines to make them stand out. And this, according to more than one archaeologist, damages the Indian paint or distorts original outlines.

Weather and commercial activities do their share toward the general destruction, but not so much, in Mr. Jackson's opinion, as thoughtless visitors.

One remedy is to include picture rock areas—a few of the larger ones, at least—in national and state parks. Another is to treat carvings with preservatives.

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PHYSIOLOGY

Find Unrecognized Hormone That Speeds Metabolism

Produced by Middle Part of Pituitary, It Acts Independently of the Thyroid; Neutralizes Insulin

AN UNRECOGNIZED hormone, called "the specific metabolic principle" and produced by the middle part of the pituitary gland, has been chemically dissected from the tiny "master gland" by a research team from McGill University, headed by Prof. J. B. Collip. Associated with Prof. Collip were Drs. D. K. O'Donovan, E. F. Denstedt, A. H. Neufeld and L. W. Billingsley.

The new hormone speeds up the rate at which the body converts food, fuel or energy. This vital process is known as metabolism.

The new hormone stimulates metabolism quite independently of the thyroid gland, Prof. Collip and his associates have found. It does not work by first stimulating the thyroid, as does another pituitary hormone called the thyrotropic hormone. Doses of the hormone injected into rats, rabbit and guinea pigs from which the thyroid glands had been removed increased the metabolic rate

markedly within four hours.

The new hormone has other striking effects. It neutralizes to some extent the effect of insulin, diabetes remedy. Insulin ordinarily lowers the amount of sugar in the blood, but when the new hormone is given, the usual dose of insulin has a diminished effect on the blood sugar. Large doses of insulin, however, are not neutralized.

The new pituitary hormone also exercises some control over the adrenal glands, judging from its effect when given with adrenalin, one product of these glands. Adrenalin's effect on blood pressure is not affected by the new hormone, but the effect on blood sugar is. The amount of sugar in the blood goes up, instead of down, when adrenalin is given.

Prof. Collip described the hormone at the Third International Goiter Conference in Washington, D. C.

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PHYSIOLOGY

Chemical Found in Plants Has Effects Like Sex Hormone

Weak Solutions of Trimethylamine Produce Mating Behavior Out of Season in Amphibians; Is Poisonous

A WIDELY found organic compound known to chemists as trimethylamine, present in many plants and animals, has been shown to have physiological action like that of a sex hormone by Prof. Laszlo Havas of the University of Brussels. (*Nature*, Oct. 22)

The chemical is highly active, producing marked results in dilutions as weak as one part in 25,000, or even one part in 60,000. Injected into the stems of young tomato plants, half an ounce or so of the solution produced an increase by 22 per cent. in number of flowers.

Frogs placed in a trimethylamine so-

lution moulted their skins and prepared for mating activities, even though the mating season was three months past. Other amphibians similarly treated also showed signs of having their mating instincts roused.

The substance is somewhat poisonous, however, and the treatment had to be discontinued after a few days lest the animals be harmed. The solution also stimulated the growth of plant tumors in tomato stems that were first inoculated with the bacteria that cause plant cancers, and then treated with the 1:60,000 concentration.

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