

REAL DIAMONDS MADE  
BY GREAT PRESSURE AND HEAT

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SCHENECTADY, N.Y., Feb. -- Real diamonds have been made artificially by a once-discredited process, extremely high pressure and heat.

Success in manufacturing diamond crystals so hard that they scratch other diamonds was demonstrated here today by research scientists of the General Electric Co., Drs. Francis P. Bundy, H. Tracy Hall, Herbert M. Strong and Robert Wentorf.

Combining enormous pressure, 800,000 pounds or 400 tons per square inch, with a reaction chamber which can be heated to more than 5,000 degrees Fahrenheit, the G.E. scientists have so mastered the conditions under which diamonds form that they have been able to produce these, the hardest crystals in nature, in more than one way.

Diamonds have been made every time, in more than 100 runs. This success contradicts earlier researchers who believed, after a number of failures, that increase of heat and/or pressure would never yield the crystalline form of carbon.

But the new man-made crystals pass the same X-ray test that is used to assay natural diamonds. Their hardness is greater than that of any other material. Some of the new crystals have been burned to carbon dioxide, to prove that they are really crystalline carbon. They easily scratched sapphire, silicon carbide and boron carbide as well as natural diamonds.

Earlier attempts to make diamonds in the laboratory have usually started with the element carbon in the form of graphite. The French chemist, Henri Moissan, who created great excitement by his claim to have made diamonds in 1894, used carbon in solution in molten iron. Scientists at the General Electric laboratories start with carbonaceous compounds. They have produced crystals of various colors, such as are found in the jewels produced in nature. The man-made crystals are up to 1/16th inch in length.

Jewelers would not scorn some of the artificially produced diamonds. They would pronounce them genuine. However, laboratory-made diamonds are not expected to invade the jewelry market. Industrial diamonds, the so-called "black diamonds," offer a more useful outlet if the General Electric Company should wish to put its diamond-making technique on a production basis. Cutting with diamond-studded drills

and polishing with diamond dust are technical processes always in need of the super-hard carbon crystals.

The first artificial diamonds were made "late last year." Discovery that diamonds actually were made came when the core of super-hard matter from the pressure chamber wore away the polishing wheel.

There is some doubt whether extreme heat must always be used with the high pressure to make diamonds. All previous experiments with high heat, although with less pressure, gave graphite instead of diamond. Measurements of free energy changes in carbon had suggested that intense cold such as found in outer space might aid in bringing about the change from graphite to diamond.

The giant press used in diamond production is capable of 1,500,000 pounds per square inch pressure, which is roughly equivalent to the squeeze computed for points 240 miles beneath the earth's surface. This equipment makes small diamonds in a matter of minutes.

The G.E. scientists bowed to Dr. Percy Bridgman of Harvard University whose discoveries in measuring extreme pressures were used in the diamond production.

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