GE-ers Mark National Engineers' Week (See Page 5)

GE-ers Participate In E-B Day (See Page 5)

SCHENECTADY NEWS

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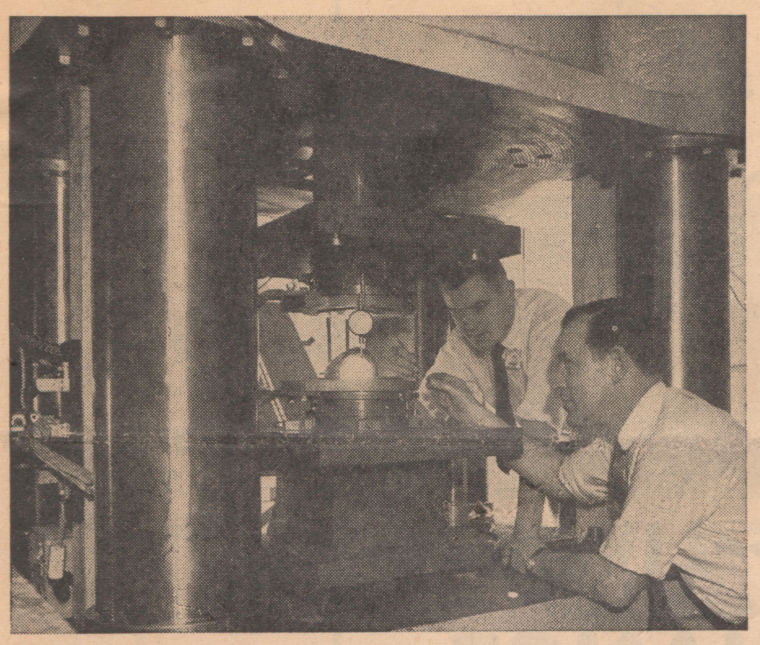
Dept. Bowling Tourneys Planned (See Page 12)

World Acclaims GE's Diamond Achievement

SEE BELOW

CSF Gives $5000 to Sch'dy County Heart Committee

SEE PAGE 9



GE's Diamond Mine—Dr. Herbert Strong, right, and J. E. Cheney are at the business end of GE's new 1000-ton press, capable now of delivering pressures greater than 100,000 atmospheres, or 1.6 million pounds per square inch on an area of approximately one square inch. The press was instrumental in the production of the first man-made diamonds here.

First Diamond produced in the Research Laboratory is presented to Pres. Ralph J. Cordiner, second from right, by Dr. C. Guy Suits, GE vice president and director of research for the Company. Flanking the two GE executives are Anthony J. Nerad, left, manager of the Mechanical Investigations Section and Dr. A. L. Marshall, manager of the Chemistry Department. In the back row are the men instrumental in the fabrication of the GE diamonds: H. P. Bovenkerk, J. E. Cheney, Drs. Francis P. Bundy, Robert H. Wentorf, Jr., H. Tracy Hall, and Herbert M. Strong.

'A New and Exciting Frontier in Science'

"A new and exciting frontier in science," were the words Dr. C. Guy Suits, GE vice president and director of research for the Company, used this week in describing the Research Laboratory's tremendously significant achievement in fabricating artificial diamonds for the first time in history.

Reviewing the work that went into development of the GE diamonds, which duplicated in minutes diamonds that nature may need a million years to fashion, GE President R. J. Cordiner called it, "more evidence that progress is our most important product. By making progress GE makes more job security for its 210,000 employees and for millions of Americans outside of GE."

By producing man-made diamonds, GE scientists reached a goal toward which man has worked more than a century. The nation and the world acclaimed the unique development with varied reactions.

On the New York Stock Exchange the price of GE stock jumped $4 a share while in London there was the reverse response as De Beers Consolidated Mines, Ltd., shares broke sharply. De Beers is the largest producer of diamonds in the world.

"Why had General Electric ventured into the production of diamonds?" was one of the most interesting and intriguing questions asked last Tuesday when the announcement was first made.

Research Laboratory spokesmen countered with the explanation that our scientists are constantly attempting to develop harder cutting materials in order to be able to work our increasingly harder metals. With rapid strides being made in tougher and harder metals, there is need for correspondingly harder polishing, cutting, and grinding materials.

In development for the past four years, GE's laboratory diamonds are the first man-made substance to scratch other diamonds.

Was this the first time man had ever successfully fabricated diamonds in the laboratory? Although claims had been made in the past about the manufacture of diamonds by artificial means, no sure method of repeatedly making diamonds has ever been announced before this week, according to Dr. A. L. Marshall, manager of the Laboratory's Chemistry Department.

In order to conclusively substantiate their work in the eyes of the world, scientists of the Research Laboratory conducted a series of exhaustive tests to prove beyond any doubt that these were "real" diamonds.

These tests included X-ray examinations, chemical analyses, scratch tests, optical properties examinations, and repeatability tests. GE's diamond came through all of the tests without a single reservation, and without any doubt that these were the bonafide stones.

The research team responsible for the climax to more than 125 years of effort in duplicating nature's hardest and most glamorous stony material included Drs. Francis P. Bundy, Herbert M. Strong, H. Tracy Hall, Robert H. Wentorf, Jr., and Anthony J. Nerad and J. E. Cheney.

Industrial diamonds are currently priced at $7000 per pound. Research Laboratory scientists believe that if and when this cost can be brought down substantially, it will open up new avenues and new uses for industrial diamonds, and conceivably cause an "industrial revolution."

Still another question raised following the announcement was "will the diamond market dwindle or grow if artificial diamonds are produced in quantity?"

Dr. Suits declared that this was a speculative question but submitted the example of rubies and sapphires which have been made artificially for several years and yet their value and demand are at a constant high level.

(*Continued on page 4*)

The Result of a Four-year Project — Diamonds!

These Are the Men . . .

These four scientists of the Research Laboratory played a vital role in the production of the first man-made diamonds.

Francis P. Bundy

Dr. Bundy was born in Columbus, Ohio, on September 1, 1910. He was educated at Lancaster, Ohio; Otterbein College; and Ohio State University. His fields of specialization are physics, mechanics, optics, radiation and heat transfer. Dr. Bundy's hobbies are camping, canoeing, gliding and soaring, gardening, volunteer fire company, and school committee.

Currently a research associate in the Mechanical Investigations Section, Dr. Bundy joined the Research Lab in January of 1946.

H. Tracy Hall

Born in Ogden, Utah, on Oct. 20, 1919, Dr. Hall received his education at Weber College; University of Utah; Bowdoin College, MIT, and Purdue University. He specializes in physical chemistry, co-ordination compounds, rate theory, high polymers, ultra-high pressure, high temperatures, and is the author of many technical publications within his fields of specialization.

Gardening is listed as Dr. Hall's hobby.

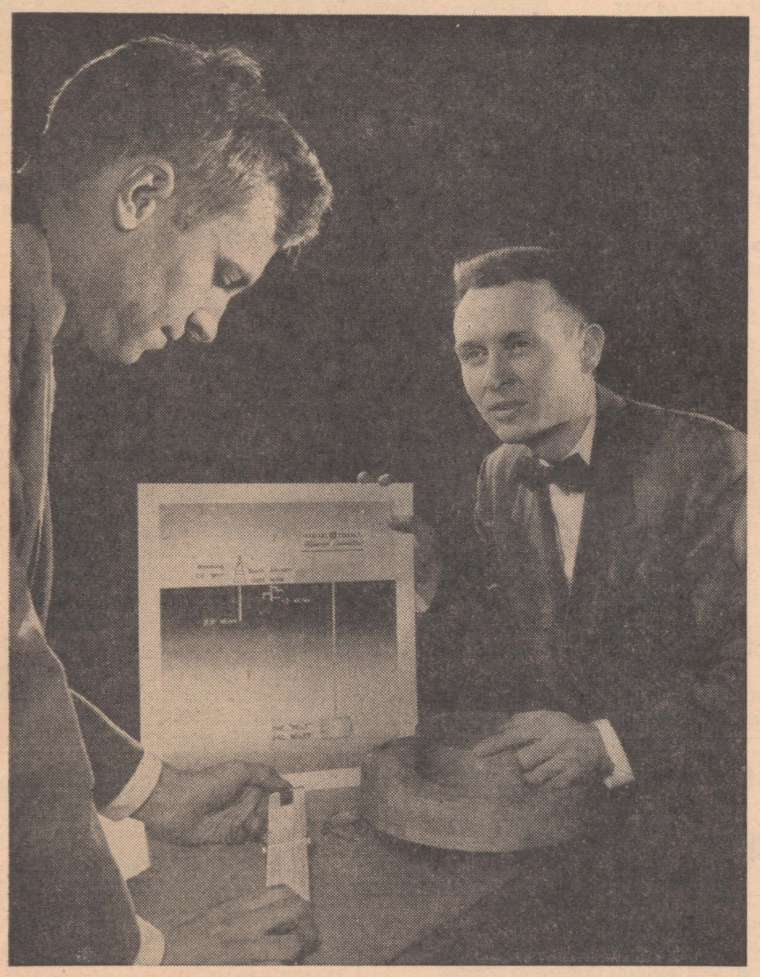
Herbert M. Strong

Dr. Strong joined the Research Laboratory in October of 1946, was educated at Toledo University and Ohio State University, and is the author or joint author of many scientific reports in technical journals and of chapters in two books on the measurement of velocity, pressure, and temperature in complex flames.

A member of the Adirondack Mountain Club, his hobbies include skate sailing, skiing, wood working, and archeology of the Bible lands.

Robert H. Wentorf, Jr.

Currently a research associate in the Mechanical Investigations Section, Dr. Wentorf first came with GE in December, 1951. He was born in West Bend, Wisconsin, on May 28, 1926, and received his education at Northwestern Military and Naval Academy, and from the University of Wisconsin. His field of specialization is physical chemistry and his hobbies are skiing, geology and automobiles.



EXTREMISTS—Dr. H. Tracy Hall, physical chemist, right, and Dr. Robert H. Wentorf work out a problem concerning the "belt," a high temperature-high pressure chamber which Dr. Hall developed. This chamber allows Laboratory scientists to reach pressures above 100,000 atmospheres at temperatures above 5000 F. Extreme pressures and temperature were necessary before the Research Lab could produce diamonds.

(Continued from page 1)

Scientists of the Research Laboratory this week exhibited the tiny diamonds made from a carbonaceous material subjected to extreme pressures and temperatures. The largest stone, which measured $\frac{1}{16}$ of an inch in longest dimension, was presented to Ralph J. Cordiner, president of General Electric, by Dr. Suits.

In announcing what he termed "one of the landmarks in man's search for knowledge about his world," Dr. Suits warned that "any conclusion we are about to make diamonds of a size and quality suitable for gem use is decidedly premature." Diamonds for jewelry must have special characteristics of size, color and crystal perfection.

"On the other hand," he added, "if the present high cost of making diamonds by the GE processes can be reduced, the primary application of man-made diamonds will probably be in industrial tools for cutting and polishing." Diamonds of any quality, regardless of size and color—including diamond dust—are useful in industry. The crystals displayed here this week are not "imitation" diamonds or "diamond-like." They are purely and simply diamonds, exactly the same as are taken from mines of the Belgian Congo and Brazil.

Hardest Substance

The hardest substance known to man, diamonds are mined at the rate of about 2½ tons annually. Approximately 90 per cent are imported by the United States. Of the diamonds of industrial grade, some are stockpiled for defense purposes, but the major portion goes into tools that cut, saw, or polish other hard materials. For industrial diamonds purchased in a typical year, the U.S. paid more than $50,000,000.

Making diamonds was the result of more than four years of intensive research by Laboratory scientists under supervision of Anthony J. Nerad, manager of the Mechanical Investigations Section. "GE's success was no accident," he said, "but a part of a general program for examining various materials subjected to combined high temperature and pressure."

Tremendous Pressure Needed

In Dr. Strong's process, a carbonaceous compound was subjected for many hours to a measured pressure some 53,500 times greater than atmospheric (roughly 800,000 pounds per square inch). That run, in the Laboratory's new 1000-ton press, yielded a crystal nearly a sixteenth of an inch in longest dimension.

"After opening the pressure chamber," said Dr. Strong, "and while attempting to polish the now solidified matrix, there appeared what we were seeking, a core of superhard matter that refused to wear away under the action of the polishing wheel. With considerable excitement and expectation I removed the crystal from its surroundings, and tried one of its sharp points on sapphire, silicon carbide, and boron carbide. This 'diamond,' I could call it now, easily scratched all three."

This pressure is roughly equivalent to the "squeeze" physical scientists have computed for points 240 miles beneath the earth's surface. Using this equipment, late last year Dr. Hall developed a process that produces diamonds in a matter of minutes. Hall's diamonds are smaller, but are often produced in solid clusters. Single runs have produced up to 1/10 of a carat.

Results Confirmed

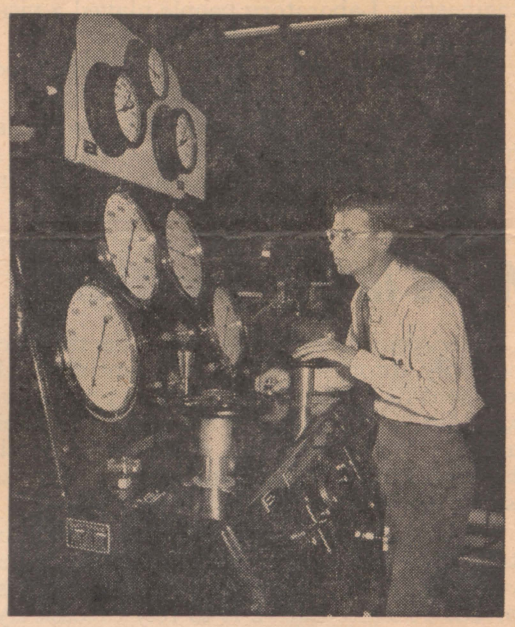
To confirm the results two independent teams of scientists from other departments in the Laboratory have repeated the experiments of Drs. Hall and Wentorf, in each case with success. All in all, the various processes for making diamonds have been repeated successfully more than 100 times.

Many of the first diamonds produced were deliberately destroyed during essential testing. For example, many crystals had to be burned to determine their carbon content.

In perfecting the long series of laboratory improvements in their struggles to achieve combined high pressure and high temperature, GE scientists gained valuable help from nature, particularly from studies of diamonds found in Arizona meteorites.

General Electric attaches great importance to the possibility of producing diamonds as a logical extension of its interest in hard cutting materials represented by cemented carbides produced in its Carboloy Department.

WORLD-WIDE INTEREST in GE's fabricated diamonds attracted news correspondents from all corners of the globe. Dr. Miles J. Martin, left, manager—Research Information Section, and H. B. Nichols, seated, manager—Public Information Unit, discuss a phase of the diamonds' manufacture with George McGann, Australian Consolidated Press; Claude Massot, *France Soir*, Paris; Renato Loffredo, ANSA, Rome; and Alex Faulkner, *London Daily Telegraph*.



DIAMOND PRESSURE—Dr. Bundy at the controls of General Electric's 1000-ton press which duplicates pressures equal to those found 240 miles below the earths' surface.

MAN-MADE DIAMONDS—A photomicrograph showing diamonds made in the Research Laboratory by the Hall-Wentorf process.