816 Cassie Dr.
Ogden, Utah 84405
November 1, 1999

Mr. John Hughes
Editor, Deseret News

Dear Sir:

I'm wondering if in your forthcoming book, "highlighting a century and a half of coverage of Utah and world events," consideration has been given to include something about H. Tracy Hall, the man of man-made industrial diamonds. His 1954 discovery, which is considered to be one of the greatest scientific achievements of all time, has been noted in a number of publications. (See the enclosed page from a *Newsweek* Special Issue, Winter 1997-98, "How an Explosion of Discoveries Changed Our Lives in the 20th Century."

This native of Weber County, who grew up on the same country road as did J. Willard Marriott, Jr., is listed in Who's Who in the World, Fifth Edition,1980/1981, "inclusion in which is limited to those individuals who have demonstrated outstanding achievement in their own fields of endeavor and who have, thereby, contributed significantly to the betterment of contemporary society."

Other awards include:

The National Association of Manufacturers, 1965
"In recognition of his outstanding contribution to the well-being of mankind through scientific research and development."

The American Institute of Chemists, May 16, 1970,
"For his role in the synthesis of diamonds which resulted in the creation of a new industry."

The American Chemical Society, April 10, 1972,
"for being the first to discover a reproducible reaction system for making synthetic diamonds from graphite, and for the concept and design of a super high pressure apparatus which not only made the synthesis possible, but brought about a whole new era of high pressure research."

Also, a gold medal from The American Chemical Society, 1972,
(see enclosed paper) "In recognition of outstanding creativity and of invention for the benefit of man."

The American Physical Society, International Prize for New Materials, March 22, 1977, "For his outstanding research contributions and inventions which include the first reproducible process for making diamond; the synthesis of cubic boron nitride; and the development of the high pressure processes that are required to produce these materials.

Diamonds greatest use and value are not as gem stones, but as industrial tools to keep the wheels of industry turning. Every modern convenience has its origin in the ability of diamond to cut, grind, shape, and polish metals and other hard materials in order that we might have automobile, stoves, refrigerators, washing machines, dryers, television sets, stereos, computers . . . the list is endless.

One example of diamond usefulness: "The car you drive runs smoothly because diamonds have polished its piston rings. It runs on gasoline taken from wells drilled by diamonds. The wire in its ignition system had, in all probability, been drawn through a hole in a diamond." Diamonds in Pictures, Sterling Publishing Co., Inc. New York, 1967, George Switzer, p. 5.

In similar fashion the work of diamonds can be traced through almost every phase of production of any manufactured article we might pick up today. It is because of this that Tracy has been lauded for his contribution to the material prosperity and happiness of people. While he appreciates that distinction, his main concern in life has always been what he might do to add to the spiritual well-being and happiness of others.

Eight months after his work at General Electric, Tracy went to BYU as professor of chemistry and director of research where he stayed for 26 years until his retirement in 1981.

Because GE's proprietary interest kept Tracy from using his "Belt" device (See illustrations. Called "belt" because of the concentric rings of steel holding things together) after he left the company, Tracy designed a totally different high pressure multi-piston apparatus whereby he could continue his research.

Still later, in 1968, Tracy filled another niche in the diamond industry where large sized diamonds are needed for wear or abrasive applications. He opened a new era in industrial diamond technology by taking diamond powder and under extreme heat and pressure was able to form it into any desired shape—wedges, points, flat plates, pierced parts, rollers, spirals, etc. for such applications as wire-drawing dies, drills, chisels, thread guides, saws, blades, specialized machining tools, grinding wheels, etc. (On the occasion of Utah's 75th birthday, its diamond jubilee, Tracy made a small ¼ inch thick polycrystalline diamond of postage stamp size in the shape of the state, for that celebration.)

So, from the small granular sized diamond grit to the larger polycrystalline diamonds Tracy outdid the diamonds found in nature. The man-made grit, because of its many triangular faces has 35% greater grinding quality that those found in nature, which are more broken up, while the larger diamonds can be immediately mounted on any drilling or abrasive tools without the hours of study and precise mounting needed for natural stones. This is because natural diamonds, though extremely hard, are also very brittle and can easily shatter if not mounted at the correct angle of force applied against it.

Many companies world wide now make diamonds. All of them are made in the "belt" device or "cubic press;" both the inventions of the same man using chemical procedures developed by him.

Tracy's arrival at these discoveries is a most interesting story not generally known. While at General Electric he spent 20 months of continuous failure before he found the combination of heat and pressure, carbon and catalyst, and timing sequence that made the synthesis of diamond possible. Unfortunately, he didn't get the support of other GE scientists working on the project because he was intruding on their "turf." Tracy's role was to work on the chemical aspects trying to determine what might be needed to transform common carbon to diamond, while others worked on the physical apparatus in which the carbon might be squeezed. Tracy couldn't wait the 18 months it would take to build a monster hydraulic press the others were producing in which to test his chemical theories, so he build his own apparatus, the "belt," wherein he could proceed with his investigations. Those who disapproved of Tracy's approach and were miffed at his intrusion into their space spent $300,000.00 in their futile effort, ($150,000.00 for the monster press and another $150.000.00 for a building to house it in) while his expenditure was less than $1,000.00. Yes, that's right, $1,000.00.

The 3 story high monster hydraulic press was never needed as Tracy accomplished his work in a six foot high hand lever operated 35 year old hydraulic press that is common to any repair shop. The secret to success was in the pressure chamber designed to withstand the enormous pressure any small hydraulic press could produce.

Now 80 years old, Tracy spends his summers working his farm, while in the winter he putters around in his own lab or one set aside for him at BYU where he continues to investigate things whereby he might yet do something else that could be for the betterment of mankind.

I hope the above information might be of use to you in your consideration of mentioning my brother Tracy for his contributions to society in your forthcoming publication.

Sincerely yours,

Donald Hall