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MARILYN KARRAS, FEATURES WRITER 7-2150

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Animation has
starring role in

TOY STORY 2

By Jeff Vice
Deseret News movie critic

LOS ANGELES — One thing the creators of "Toy Story 2" learned while making the computer-animated sequel: If you're going to try to follow a smash like the original "Toy Story," you've got to do things on an even bigger and better scale.

"Either that, or we'll have to set the bar lower because we had so much to live up to this time," joked director John Lasseter. "I mean, think about it — how can you try to out-do something like 'Toy Story'?"

(Lasseter and members of the film's cast and crew were in Los Angeles for interviews to promote the new film, which opens in theaters nationwide Tuesday.)

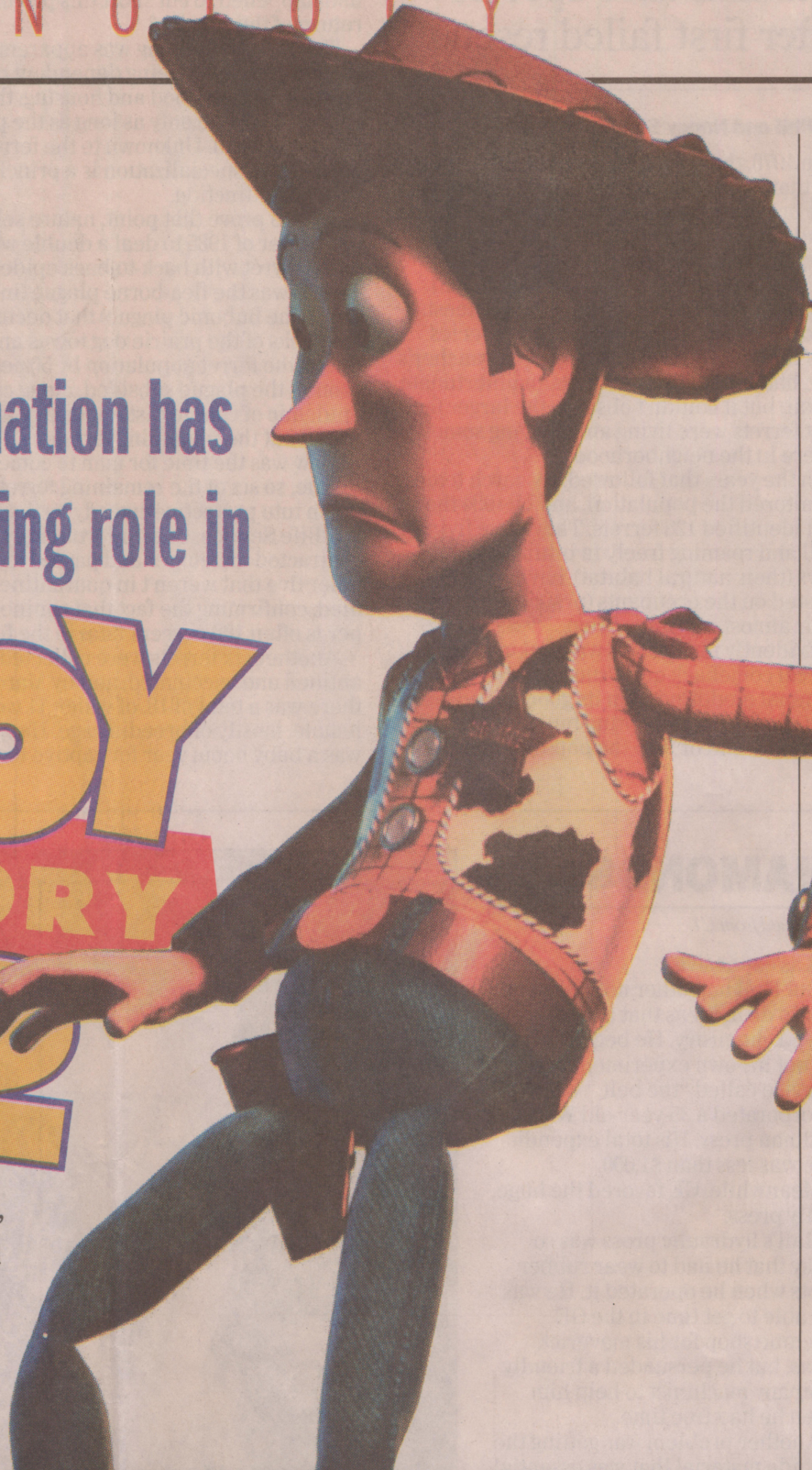
In fact, the filmmaker and founder of the Pixar animation studios said he wasn't sure a sequel was even a good idea to begin with. "Toy Story 2" was initially envisioned as a straight-to-video project, following in the footsteps of video sequels like "The Lion King 2: Simba's Pride." But then it began to take on a life of its own.

"We realized there was a lot more story to tell," he said. "It sounds a bit crazy, but these toys are such great characters. We haven't

Please see **TOY STORY** on C7



Estelle Harris, above, lends her voice to Mrs. Potato Head.



Wayne Knight, left, provides the voice of AI in "Toy Story 2."



Not fussy? Test may surprise you

By Bill Sones and Rich Sones, Ph.D.

Q. Coming up empty-handed in the romance market? Then ask yourself: Are you maybe being a little too picky?

A. Without really thinking about it, most of us dutifully follow our culture's dictates in running a quick "criteria check" on every potential partner who happens our way," say Elaine Hatfield et al. in "A New Look at Love." For most of us — if we're honest — this means ruling out anybody not close to our own age, of a different race, of a different socioeconomic class, who doesn't share our educational level or who is a lot taller or shorter than we are. (How many guys do you see with taller women?)

The moment we get down to specifics, it becomes clear that the "little" we ask is startlingly extensive. "We want a good-looking person, a person with plenty of time to devote to us, a successful person, a sensitive person, a person with intelligence and a good sense of humor — the list goes on and on. Perfection is what we really want."

If you think this doesn't apply to you, try an experiment: Over the next day or two, keep a tally of the number of men or women you encounter — at the office, store, pub — and how many of them you'd be willing to date. Be honest. "You'll be startled to find out just how incredibly fussy you really are."

Q. For math freaks:

1. Write the number 1 using all 10 digits once each (and any operational symbols). Sample using 3 digits: $(3 + 2)/5 = 1$.

2. Write 1,000 using only 8s (and the symbols).

3. Write 10 using only 9s (and the symbols).

A. 1) $143/296 + 35/70 = 1$ 2) $(8888 - 888)/8 = 1000$ 3) $9 + 99/99 = 10$ (These are not the only correct answers.)

Q. Busy as a bee, eager as a beaver, industrious as an ant — why don't more of us live up to nature's exemplary models?

A. Probably it's a good thing we don't, says Sharon Bertsch McGrayne in "365 Surprising Scientific Facts, Breakthroughs and Discoveries." While biologists spend much of their time studying animal feeding, fighting and mating, the animals spend their time resting, e.g., 75 percent of a lion's life is lazing around digesting, moose ruminate for four hours, beavers are active barely five hours a day. Sloths sleep 15 hours daily, moving so seldom algae species set up shop in their fur and claws.

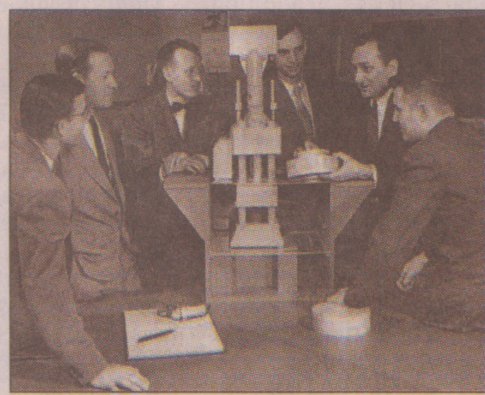
Hummingbirds burn energy fast in flight but sit on twigs 80 percent of the day and all of the night. Even ants and bees stay busy scarcely 20 percent of the time — a figure that drops to 0 percent during slow seasons for Nature's countless species of hibernators and diapausers.

Q. Would a gun fire in the vacuum of space?

A. Neither a bullet's primer (where the hammer strikes) nor the powder in the cartridge requires oxygen to function, so a spaceshot would be a blast, says three-time shuttle astronaut R. Mike Mullane in "Do Your Ears Pop in Space?" "However, if an unrestrained spacewalker ever did fire a pistol, the recoil would send her tumbling head-over-heels backward."

By the way, shuttle astronauts don't carry weapons to defend against aliens, because none are expected to board. They don't carry suicide pills either in case they get stuck in orbit. As for ears popping, this doesn't happen, says Mullane, because unlike in an airplane where air is introduced or released during ascent or descent to equalize pressure inside and out, shuttle pressures are kept steady.

(Send **STRANGE** questions to brothers Bill and Rich at strangetrue@compuserve.com)



H. Tracy Hall, third from left, and colleagues look at model of diamond press in this GE photo from 1955.

The making of a diamond

Utahn invented process to make diamonds by replicating natural forces



H. Tracy Hall displays an insert for a geological drill bit coated with 1/30,000 of an inch polycrystalline diamond.

By Joe Bauman
Deseret News staff writer

The glitter of man-made diamonds is etched in H. Tracy Hall's mind as clearly as if he first made them this morning instead of 45 years ago.

The date was Dec. 16, 1954. Other researchers for General Electric in Schenectady, N.Y., had gone home for Christmas. Working alone in the lab, the Utahn ran a device that he had cobbled together out of an old, leaky hydraulic press. He finished the experiment and looked inside. "The sun was shining through the south windows," he said last week from his home in Provo, "and, tiny as they were, I could see these little facets on these diamonds with my naked eye."

Hall had cracked the secret to making synthetic diamonds, duplicating the searing heat and crushing pressure that exists deep within the Earth's mantle.

According to the American Museum of Natural History, New York, an estimated 3 billion years ago the material that became diamonds was crystallized by fantastic

forces in the interior of our planet and later carried upward by volcanism.

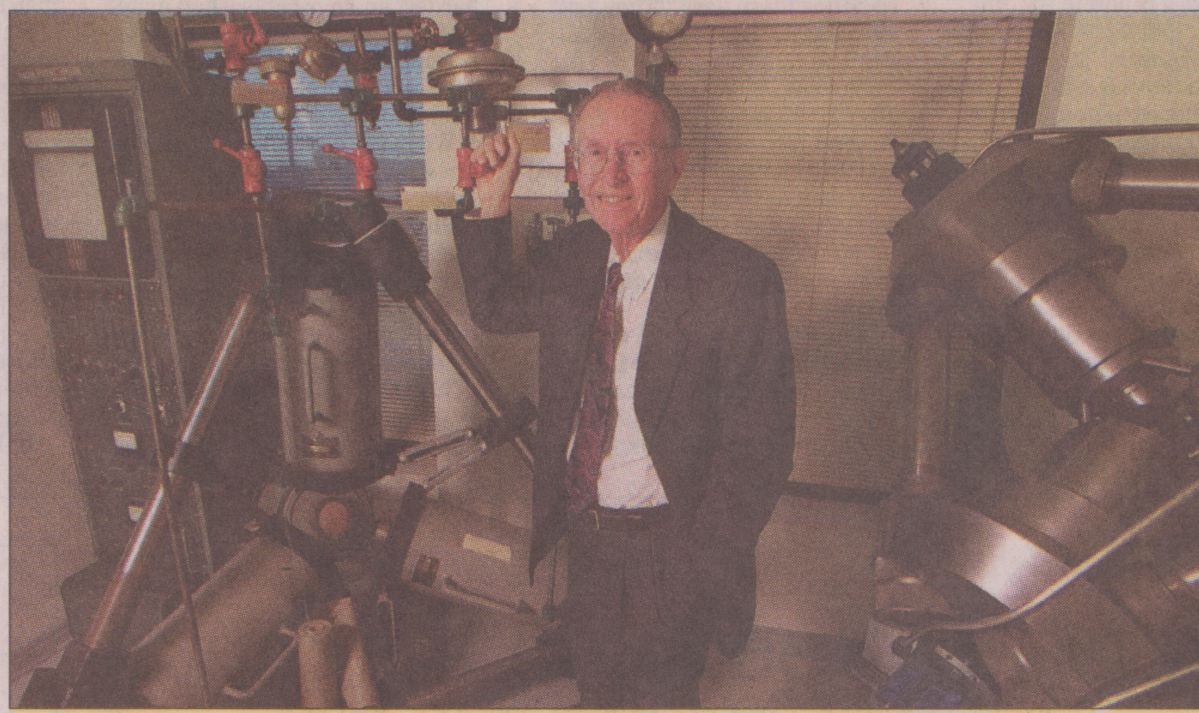
Scientists had been trying to find a way to manufacture diamonds since the late 1700s, when experiments proved that the hardest natural substance was pure carbon.

When Hall realized he had done it, he recalled, his hands began to tremble, his knees felt weak and his heart beat faster. The excitement was justified. Today, synthetic diamonds are commonplace and inexpensive, with the stones used for drill bits, electronics, polishing wheels and cutting devices.

Discovering how to make them was a revolutionary advancement. It also was an embarrassment to GE, as Hall tells it, since it resulted from Hall's lone-wolf approach and not the big team effort that GE backed.

"There was a so-called team that had, counting the director of research and underlings and everybody else . . . nine people in all involved." Although it supposedly worked as a team, he said, "everybody was going their own way."

Hall was born in Ogden and raised on a farm. Whenever the family went to town for



H. Tracy Hall stands in front of his Tetrahedral press, which he invented in 1957 while at Brigham Young University.

Please see **DIAMONDS** on C2

SCIENCE NEWS

BITS & BYTES



John E. Wamock

Big gift to the U.

John E. Wamock, CEO and chairman of the board of Adobe Systems, has given the University of Utah \$1.5 million worth of stock to establish a presidential endowed chair in the U. department of computer science.

"Endowed chairs enable the university to attract, retain and honor distinguished faculty members with the funding they provide," said a U. announcement.

The John E. and Marva M. Wamock Presidential Endowed Chair for Faculty Innovation will support scholarship and creativity of an outstanding young faculty member.

Wamock is earned three degrees from the University of Utah: a Ph.D. in electrical engineering, computer science, a master's in mathematics and a bachelor's in mathematics and philosophy. He is a famous innovator in computer software.

OUR FASCINATING EARTH

Black-footed ferrets survive 'extinction'

Humans save species after first failed rescue

By Phil and Nancy Seff

In 1978, the last black-footed ferret, one of six that had been "rescued" in a hapless captive breeding program, was pronounced dead, and the species, along with the recovery program, was considered extinct.

Therefore, in 1981, when a black-footed ferret scurried across a ranch in Meeteetse, Wyo., hope was rekindled and the species was reborn. The fact that Shep, the rancher's dog, had killed the ferret was an unfortunate detail, but it couldn't obscure the larger fact that ferrets were living and thriving somewhere in the neighborhood.

In the years that followed, research teams monitored the population, and by 1984 they had identified 128 ferrets. They were living well and roaming freely in prairie dog burrows (their natural habitat), having first feasted on the occupants (prairie dogs being their almost exclusive prey).

Evidently the species was making an ecological comeback quite successfully, with minimal meddling from its good friend man. The reprieve was exciting but all too brief, for by the end of 1985 the population sud-

denly dwindled to about 24 ferrets. Just what had happened to cut short this promising return of the species?

The ferrets' undoing was apparently their diet and lifestyle. Being dependent on prairie dogs for both food and housing, the ferrets could thrive only as long as the prairie dog prospered. Unknown to the ferrets, this kind of overspecialization is a principal cause of extinction.

As if to prove that point, nature selected the winter of 1985 to deal a double whammy to the ferret with back-to-back epidemics. First it was the flea-borne plague (in humans, the bubonic plague) that decimated the ranks of the prairie dog towns and reduced the ferret population by 50 percent. As soon as the plague subsided, along came an epidemic of canine distemper that almost wiped out the remaining ferrets.

Now was the time for man to come to their rescue, so six of the remaining ferrets were taken into protective custody by the Fish and Wildlife Service. One, unfortunately, had contracted distemper and passed it on to the other five that weren't in quarantine. All six died, confirming the fact that canine distemper is often 100 percent fatal to the ferret.

Another six ferrets were collected, quarantined and vaccinated, and by March 1987 there was a total of 18, of which 11 were female, mostly of breeding age. Happily, 1988 was a baby boom year for captive ferrets, and

the population grew to 55 after two breeding seasons. By the fall of 1991, with about 250 ferrets in captivity, 49 captive-bred juvenile ferrets (10 to 14 weeks old) were released into a prairie dog village in Shirley Basin, Wyo. Because the ferrets had been weaned on prairie dog meat and had already learned how to kill their prey, resident prairie dogs felt the sting of the ferrets almost immediately.

Life was not easy for the ferrets, since they had no experience in how to avoid predators. If they didn't learn immediately at the first encounter, they would not get a second chance. Biologists expected a mortality rate of 85 percent to 90 percent, and the season ended with numerous casualties from coyotes, badgers and owls; several ferrets, either injured or not adapting, were returned to captivity. Consistent with predictions, only four of the 49 ferrets made it through the winter, but they more than doubled their population with the birth and survival of six kits.

In 1992, 90 ferrets were set loose in the basin, and after the winter season about 20 were known to be alive; moreover, they had found mates and were contributing to a stable population. With a release rate of about 100 ferrets each year, by 1996 there were more black-footed ferrets back in the wild than there had been in 1984 when the recovery program began. Each generation of fer-

rets born wild is more able to fend for itself, and the guarantee of survival through reproductive years continues to increase.

Knowing that we will never again have 100 million acres of prairie dogs and ferrets, wildlife biologists are focusing on healthy prairie dog towns of 7,000 to 8,000 acres for each fifty ferrets. Five of these settings, located judiciously in the several states where prairie dogs flourish, would help to guarantee a permanent return. Other guarantees would be to protect prairie dog lands and to reimburse ranchers and farmers for the loss of control of a portion of their property.

A most welcome bonus to the prospering company of ferrets would be the discovery of other specimens in the wild. This is not a phantom hope, for several have been sighted by responsible witnesses in areas hospitable to the species. The contribution of a wild bunch to the limited genetic pool shared by all of the captive-bred ferrets would be their best assurance of success. There is no doubt that the species is on the rise, that the experts have learned much since the early days of ferret bungling and that badlands and prairies may again be graced by scurrying black-footed ferrets.

Phil and Nancy Seff are the authors of several science books, including "Our Fascinating Earth." Their column runs regularly in the Deseret News Science/Technology section.

DIAMONDS

Continued from C1

just as expensive.

But Hall had other notions about how to do it, ideas that also involved chemistry. He began carrying out his own experiments using a device called "the belt," which incorporated a 35-year-old Watson-Stillman press. His total expenditure was less than \$1,000.

Meanwhile, GE favored the huge, costly press.

Hall's hydraulic press was so leaky that he had to wear rubber boots when he operated it. He was not able to get time in the GE machine shop for his maverick ideas, but he persuaded a friendly company machinist to help him when he had free time.

Another problem was getting the carbide material that was essential to the device. That took the intervention of his former boss, Herman Leibhaufsky, director of GE's chemistry department.

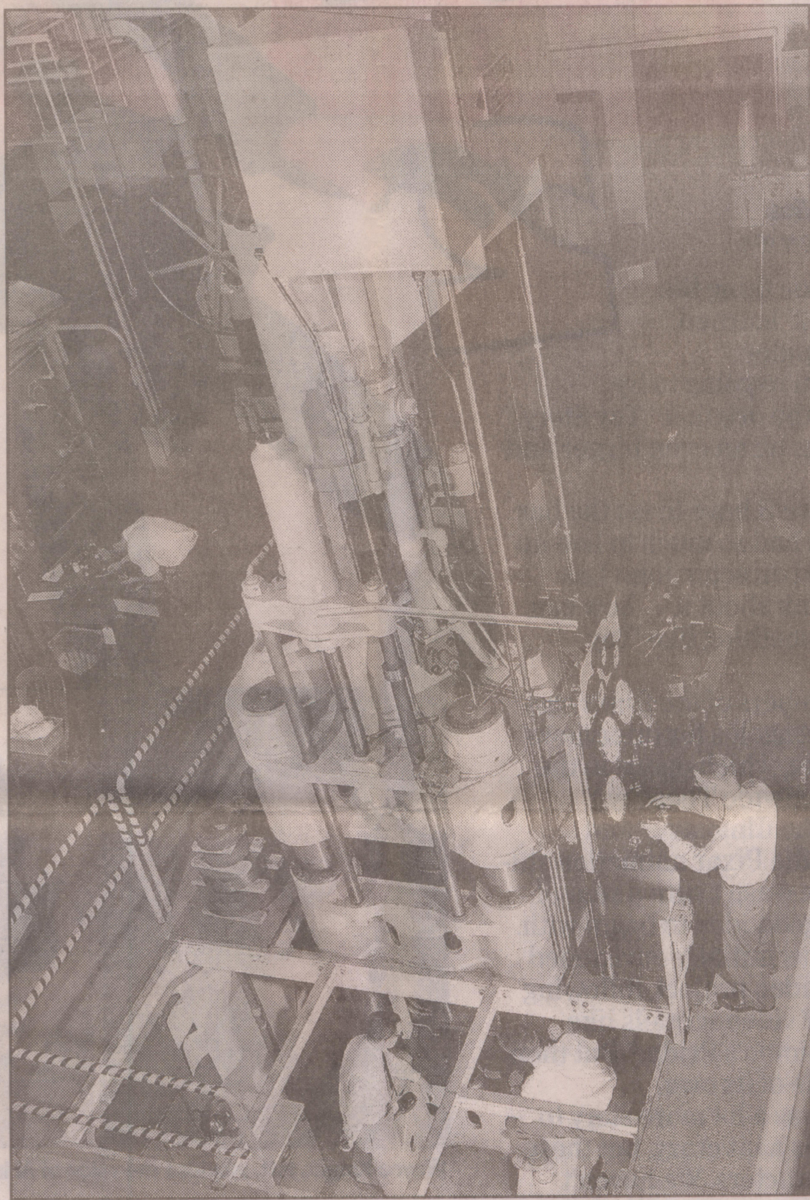
When he opened the apparatus and saw the glitter of diamonds, Hall knew he had succeeded. It was like a Superman cartoon when the man of steel crushes a lump of coal in his hands and produces a beautiful diamond for Lois Lane.

The Monday following his success, Hall had GE technicians X-ray the product. The diffraction patterns they detected confirmed that he had produced diamonds. He made run after run with the machine, producing diamonds. Next step was to get another scientist to replicate the steps.

On Dec. 31, 1954, using Hall's belt apparatus, GE chemist Hugh H. Woodbury also made diamonds.

Hall wrote a report to GE officials on Jan. 6, 1955, "A Successful Diamond Synthesis." Its abstract read, "Diamonds have been grown, using graphite as a source of carbon, at 95,000 atmospheres and temperatures near 1700 degrees C. The crystals grow rapidly, two or three minutes. The process has been duplicated."

But Hall's reward wasn't a big chunk of patent royalties. It wasn't even as impressive as Superman's reward, a kiss from the girl reporter. Patent rights belonged to GE, which he says has made billions on his invention.



According to H. Tracy Hall, General Electric Research Laboratory's 1,000-ton press did not, in fact, create the first man-made diamonds back in 1954.

"I'm just their slave," he said, recalling those days. "They gave me a \$10 savings bond. Big deal. Big deal."

On Feb. 15, 1955, two months after Hall's breakthrough, the Deseret News carried a breathless article by United Press. Dated Schenectady, N.Y., the report sounded a note of astonishment:

"Men are making diamonds. Up to now only nature has made them."

The article continued with the news that General Electric had opened its scientific research laboratory to reporters earlier that day, displaying diamond-making by sci-

entists who duplicated "nature's hardest and most cherished material." The writer quoted GE vice president Guy Suits as saying that these were not merely like diamonds but actual diamonds.

When GE announced its discovery, it showed off the gigantic press.

Stung by the lack of sufficient credit, Hall began searching for other employment. "I went shopping around: IBM and Carbide and Carbon and DuPont and some other companies."

Word got around that Hall was available. Eager to land the Utah in hopes of boosting its scientific



H. Tracy Hall holds 20-carat diamond cylinder, the world's largest known man-made diamond. The industrial stone was produced at a Provo lab in 1970.

research effort, in 1955 Brigham Young University hired him as professor of chemistry and director of research.

However, as BYU officials remembered, federal officials considered his belt apparatus such an important invention that the government slapped a secrecy order on it. The restriction kept him from using his own device.

Undaunted, within a year he had invented the Tetrahedral press, which could do the same job. "Then it, too, received a secrecy order," says a BYU summary.

Two years later the orders were dropped and Hall was free to pursue his own research with the devices. He and his colleagues published almost 150 peer-reviewed scientific papers and won more than \$1 million in research grants.

Hall's work was cited by many professional societies. In addition, he owns more than 17 U.S. and 70 foreign patents.

His innovations led to the founding of many synthetic-diamond manufacturers around the world, including a host centered in Provo.

GE remains the world's biggest producer of synthetic diamonds, said Hall's son, David Hall. Some GE employees went to the famous De Beers diamond firm, which also joined the synthetic diamond industry as a major producer.

In 1968, Tracy Hall and col-

leagues from BYU formed MegaDiamond, "probably the first spinoff from BYU," said David Hall.

Other companies eventually formed as employees began their own firms, including a group in Provo. One is Novatek, of which Tracy Hall is chairman and David Hall is president.

Novatek produces what it calls "super materials" such as synthetic diamonds, cubic boron nitride, polycrystalline diamond and other materials created by high pressures and high temperatures.

"There's actually about a \$200 million (synthetic diamond) business in Utah Valley here, all spin-offs from MegaDiamond," David Hall said. Worldwide, the synthetic diamond business "is more like \$2 billion," he said.

With all those gleaming accomplishments, what Tracy Hall considers his main achievements are not connected with science or industry.

He served as a bishop in his LDS Church ward. In 1981, he and his wife, Ida-Rose, went on a church mission to Zimbabwe. He takes great pleasure in another non-industry aspect of his life: his family.

Meanwhile, the joy of creating a new technology outweighed the grinding work that was required. "It has just been so fascinating that it's enjoyable," he said.

Close-up of Io

Fiery flashback

Jupiter's fiery little moon, Io, is giving scientists a peek at what might have been Earth's earlier state.

Photographs and data gathered Oct. 11 by the space probe Galileo during its closest flyby show that Io has more than 100 erupting volcanoes. The probe sped to within 380 miles of the surface.

"The latest flyby has shown us gigantic lava flows and lava lakes and towering, collapsing mountains," said Alfred McEwen of the University of Arizona, Tucson, a member of the Galileo imaging team.

Io's lava is estimated as reaching 2,700 degrees.

According to the Jet Propulsion Laboratory, Pasadena, the last time lava that hot spewed here in a major outflow was more than 2 billion years ago.

Plague alert

Plague, one of the most devastating diseases of centuries past, is on the rise in the Southwest, according to the National Science Foundation.

The disease is caused by the bacterium *Yersinia pestis*. It occurs more frequently after anomalously wet periods from October to May, researchers in New Mexico discovered. In years when the weather was wetter than usual, they tallied a 60 percent rise in human plague cases.

Robert Pamenter, director of the Long-term Ecological Research Site in Seville, N.M., and lead author of a report in the American Journal of Tropical Medicine and Hygiene, said some outbreaks seem related to an abundance of rodents and other mammals that host fleas.

In wet years, vegetation flourishes and rodents multiply. The fleas then transmit the disease to people.



Tropical corn alternative

Tropical corn grown in Mexico and Central America could become an alternative to sorghum as cattle feed in the South, says the U.S. Department of Agriculture.

"Dairy cows and steers alike seem to prefer it over sorghum," said the USDA's Judy McBride, citing studies by the Agricultural Research Service. Tropical corn yields about 87 percent more dry matter per acre than does sorghum.

In the studies, dairy cows liked silage made from tropical corn so much better than sorghum, that they ate more and increased milk production by 10 to 20 percent.

—Compiled by Joe Bauman and Steve Fidel

VIDEO GAMES

Just put the pedal to the metal

Speed Devils takes road rage to next, competitive level

By William Schiffmann

Associated Press writer

Gas up that '70s guzzler and join the fun in Speed Devils, a colorful racing game with a few twists and turns you won't find on the open road.

Speed Devils, whipped up by UBI Soft for the Dreamcast, is a solid racing game with an excellent variety of cars and ways to play. It also offers some of the nicest looking tracks going, with weather and the seasons changing the way each track interacts with your car.

In addition, a neat twist allows you to gamble on the races with other drivers in championship mode, betting your winnings on whether you can beat an opponent to a spot on the track or set a faster

time. Sometimes, one specific opponent will pose the bet in a vendetta race; the wager is the pink slip on your favorite ride.

Some advice, learned the hard way—don't accept a vendetta challenge unless you have the cash to buy a new car. If you lose, you're hiking—and it's a long way home.

Now comes the really lucrative part. Win two challenges and the mysterious Bet-taker gets involved. His wagers can include upgrades to your car that aren't available any other way.

Arcade mode lets you jump in and use almost all the cars available on a variety of tracks. There's also a multiplayer mode, which is excellent.

But it's championship mode that's the clear winner.

At the beginning, you meet the Bet-taker, a mean-looking brute in a limo who sets you up with a junker and a garage to work on it. You start in the lowest racing class and have to earn driver points by doing well in competition with four other drivers.

The points translate into cash, which can be used to upgrade your car or repair it after each race.

Move up to the next class and your competition gets tougher. To win the game, you have to battle all the way to the top class and defeat Driver X, which is no piece of cake.

You can also collect spending money in other ways, including setting the fastest lap or leading the race for the longest time. You lose cash if you get caught in a radar trap.

Tunes and sound effects, especially the engines, are excellent. There might have been some chatter from the drivers, but it's not a big deal.

Control is spot-on, although there's not much to do if you pick the automatic transmission; just stand on the gas and steer. Brakes are available for the faint of heart, but except for U-turns from top speed, it's rarely necessary to stomp them.

The graphics department has provided beautifully rendered tracks, with the power of the



Dreamcast used to full effect. Light-sourcing is delightful, colors are lavish and weather and day-night effects work well.

It didn't take long for the Dream-

cast to provide its first fantasy racer. It could be better—a little chatter, more cars in each race to ratchet up the competition factor.

Speed Devils is rated E, for all ages.