

Industrial 'R2-D2s' do their work with a smile

DETROIT (AP) — They don't take coffee breaks or demand vacations. They generally don't get sick. And they are not inclined to file union grievances. They don't even see the problems that most workers do in their jobs — even though these are the dirtiest, most boring and least attractive in factories — but more and more they do "see" and even "feel."

This ever more popular darling of American manufacturers is the industrial robot, a mechanical marvel closer to R2-D2 of "Star Wars" than most people imagine. He now numbers about 3,000 in the United States, some 30,000 in Japan, according to the Detroit-based Robot Institute of America.

What he lacks in the personality of his movie cousin, however, he more than makes up for with work from his whirring and clicking tubes, hoses and fingers.

What comes out is of consistent quality, says Al Williams, Midwest regional manager for Unimation Inc. of Danbury, Conn., the nation's largest maker of industrial robots. "If a guy leaves out a couple of welds, someone gets a car with rattles. With the robot, you get an improved product."

"One of the main things it does is it doesn't get tired," adds Donald E. Hart, head of the Computer Science Department at General Motors Research Laboratories.

Automakers are among the leaders in developing robots. Ford Motor Co., for example, has used robots since 1958, when a device was introduced in one plant to transfer hot parts. "It's a deadly, ugly, dirty business there," says Ford spokesman Ed Snyder. "The robot was accepted by the workers and there was no union objection."

Ford now has 236 robots employed in such jobs as stamping, spray painting, die casting — "areas of worker discontent," Ford says.

GM, meanwhile, has about 150 robots, including 32 pioneering body welding machines installed in 1970 at its Lordstown, Ohio, assembly plant. Those are known in the industry as "pick-and-place" repetitive action robots, carrying price tags starting at \$10,000, says Don Vincent, manager of the Robot Institute. But research now, he says, is aimed at \$100,000 sophisticated programmable robots who have the ability to know what they are touching and "see" what they are doing through use of cameras.

"We think the idea of equipping robots

with cameras and computers to give them vision is going to open many new avenues to increased productivity," said Frank Daley, GM's director of manufacturing development.

GM was the first U.S. firm to use computer vision, installing a system at its Delco plant in Kokomo, Ind., nearly two years ago. There, the SIGHT-I system inspects circuits and positions electrical test probes. Now, its second-generation brother, CONSIGHT, relies on computerized vision to control all six joints of a robot's hand.

"Our ultimate objective is to be able to pick parts out of jumbled heaps in bins," says GM's Hart.

The world's largest carmaker also points to the new technology as improving efficiency and thus generating money for "unprecedented multi-billion dollar outlays for new product programs," says Alex C. Mair, vice president of GM's technical staff.

GM touts its PUMA — Programmable Universal Machine for Assembly — robot as "the latest and probably the most advanced robot on the world scene today." Recently unveiled at the GM Technical Center in suburban Warren, PUMA also is capable of "seeing," although its first use will be sightless

work at a Delco plant in Rochester, N.Y. PUMA will assist in assembly of small electric motors by picking up a hot part — about 450 degrees — positioning it, adding a component and then placing the part on a conveyor belt for further work.

A similar project is being developed by Westinghouse Electric Corp. and the National Science Foundation. The new twist in the \$1.8 million experiment, however, will enable the robot to change and assemble different product styles or adjust to variations in parts, according to Richard Abraham of Westinghouse.

The reliability of the devices now in the plants seems remarkable, considering daily absenteeism in an auto operation of up to 10 percent. Ford officials say robots function 98 percent of the time.

The United Auto Workers union has no objection to their use, but the union's skilled trades department, readying for contract negotiations later this year, recently approved resolutions for a contractual ban on layoffs "if the in-

roduction of a technological advance or change results in reduction of the workforce."

Robot backers contend no one is being eased out of a job, though GM's Daley says "they may be shifted around some."

Despite the continuing success, Vincent at the Robot Institute said he believes the robot industry still is in the pioneering stage. "More and more applications are being made," he says. "The aerospace industry soon is going to drill 4,000 holes in a wing with robots."

Vincent tells one story about a poultry firm looking for a robot to pluck chickens. And he says he heard a bank was interested in a robot for handling money, apparently to eliminate thefts.

Regardless of their growing influence in industry, most robots are not the thing you'd want around the house. Without proper sensing devices, they'd be running into furniture and generally being pests.

"It would be horrible," Vincent said.

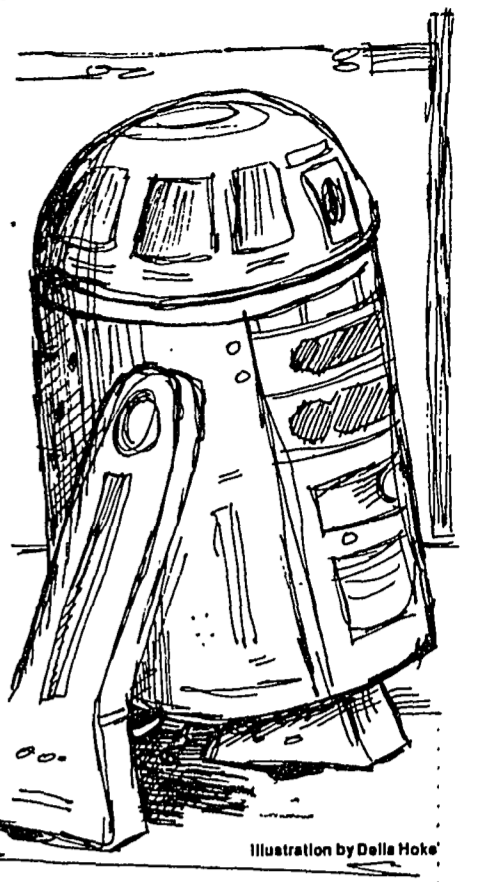


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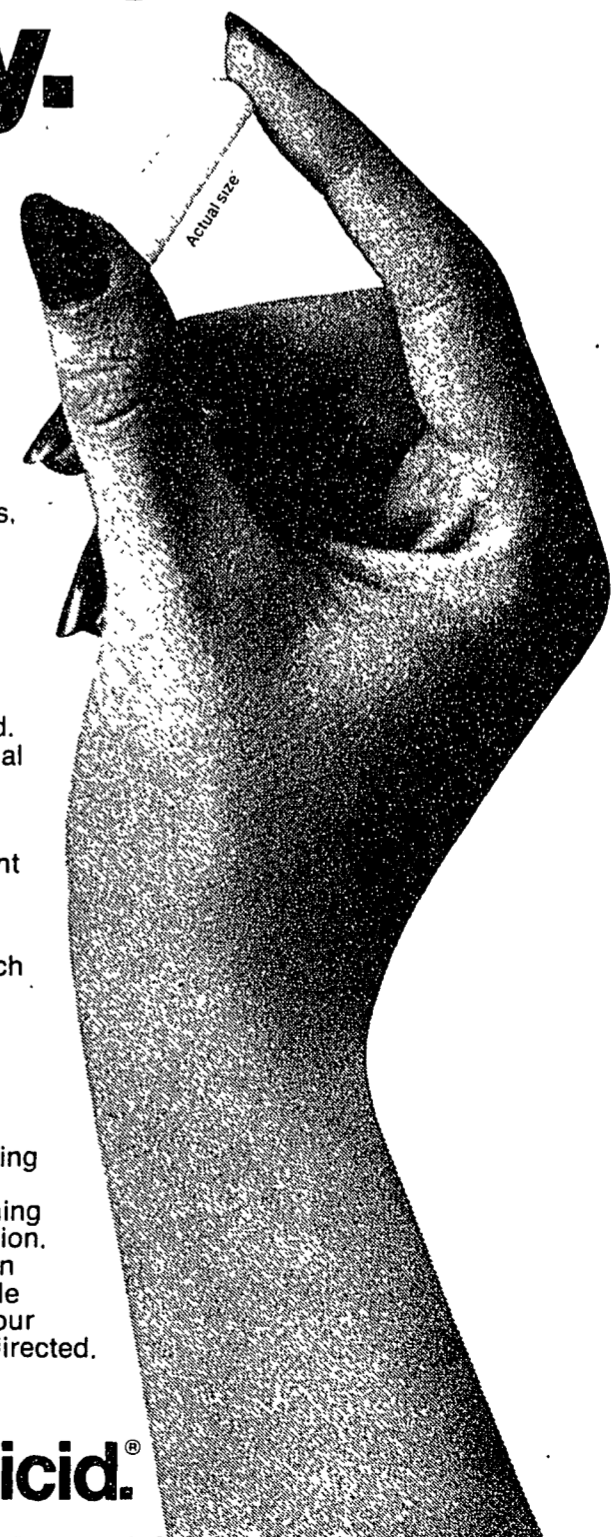
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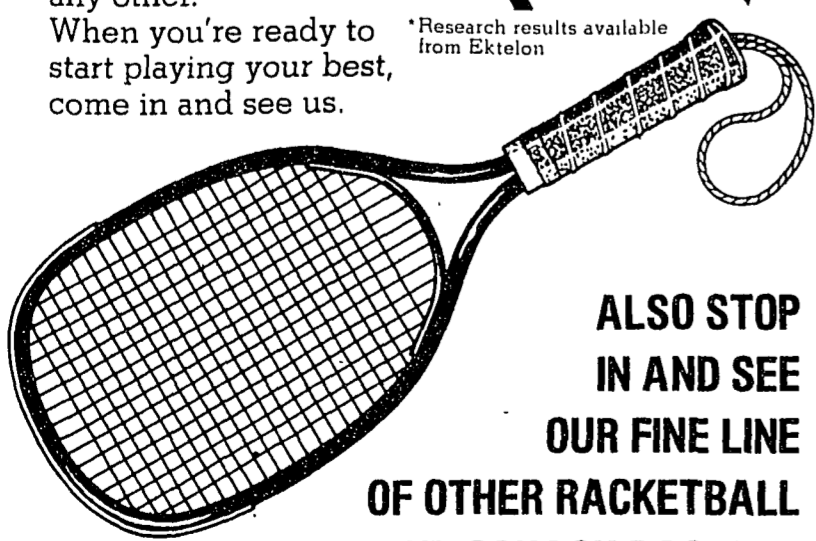
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