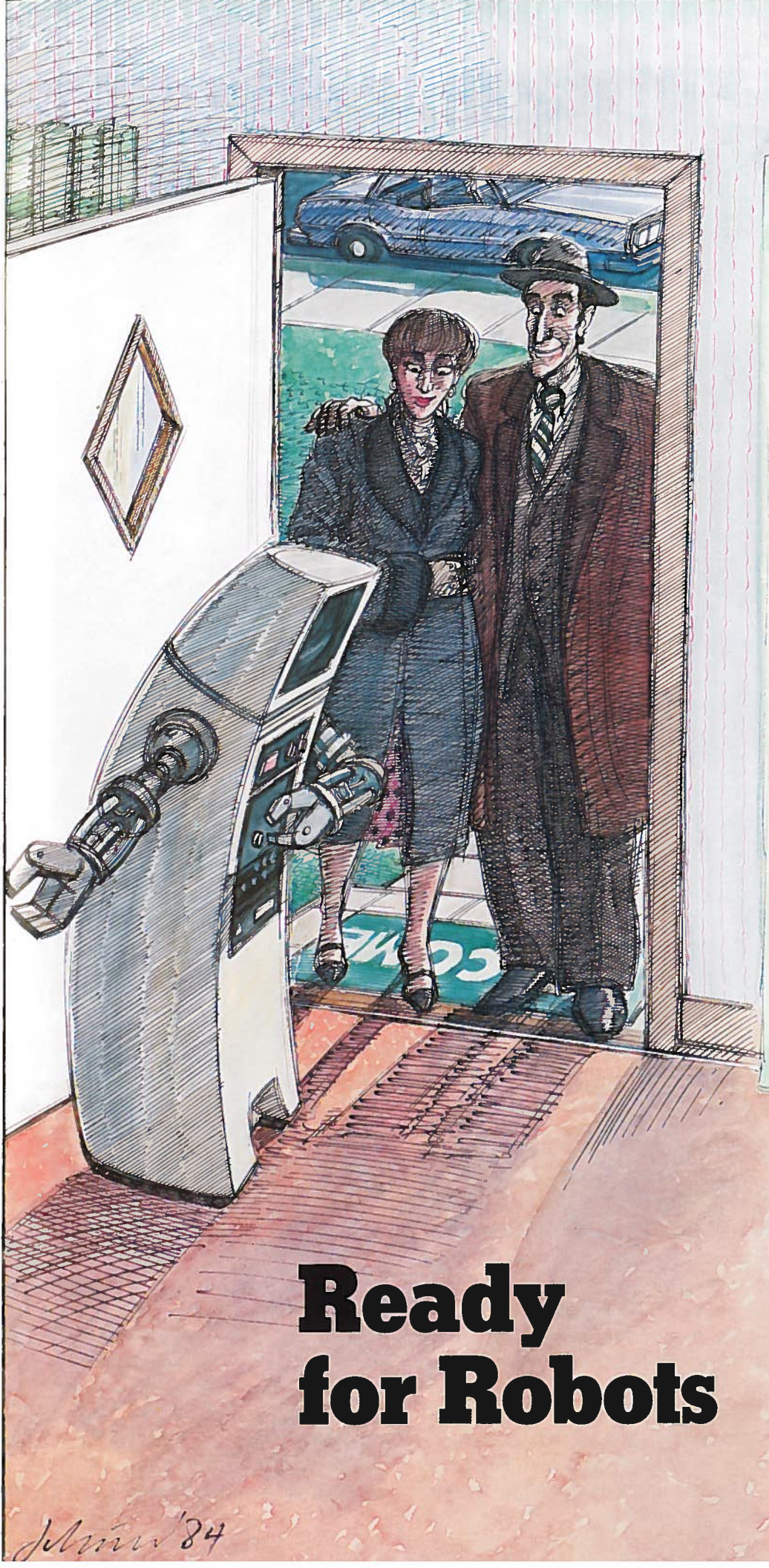


Ready for Robots

Hello... Won't you come in?

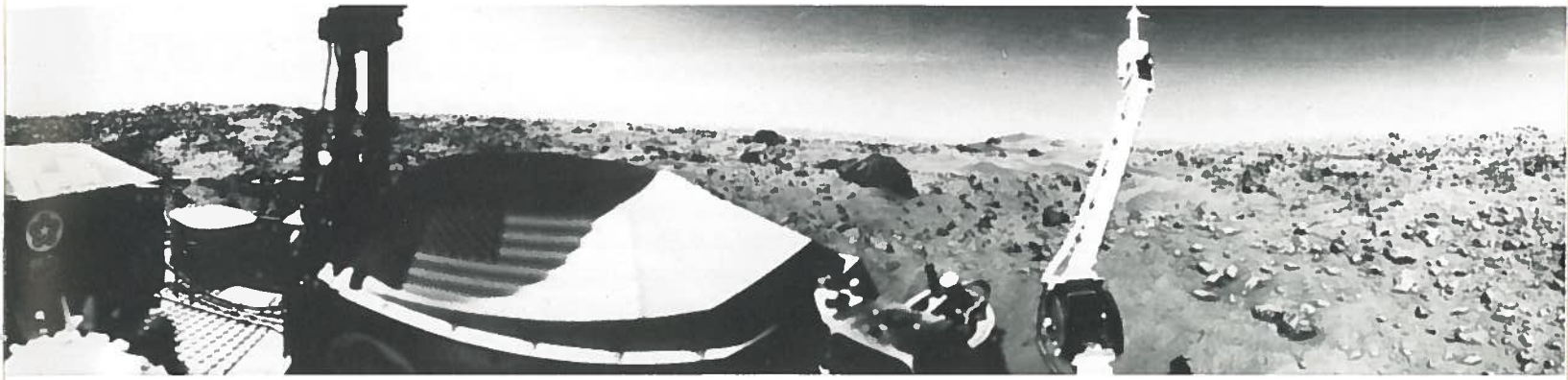
Guests who visit a New York family are in for a surprise when the new butler, Hubot, answers the door. "He" is a $3,495 robot, manufactured by Hubotics, Inc. The robot has an AM-FM radio, a video game slot, a personal computer, and his screen doubles as a black-and-white television. He greets guests, serves refreshments at parties, and already has taught the family's 2½-year-old son the alphabet and how to count to 20.

Robots may be new on the domestic scene, but they've been a part of industry for many years. Robots have landed on Mars and worked aboard the Voyager probes. They have been used in automotive and industrial plants for more than 20 years in welding, spray painting, die casting, forging and machine tool loading. They can maneuver objects light as a feather or heavy as a ton, and handle 400 bolts an hour on an assembly line.

Working with cyanide gas, infrared radiation and temperatures of 3,000 degrees Fahrenheit doesn't affect their health or performance. These marvelous machines keep going, three shifts a day, seven days a week. They never complain or get tired, never get sick or go on vacation.

How robots work in industry

The first robot in American industry, designed for unloading die casting machinery, was installed in 1960 at a General Motors plant in Trenton, N.J. Today about 13,000 are being used in the U.S. Robots do the dangerous, repetitive jobs—and do them well. They increase produc-



This dramatic photograph of the rocky Martian landscape was taken by robotic equipment on board Viking I. The "lander" portion of the spacecraft touched down on Mars in July 1976.

tivity, improve quality and cut costs. They also reduce injuries and illness because they can replace workers in hazardous jobs.

Two C&F Underwriters Group insureds, American Precision Industries in Cheektowaga, N.Y., and Schwabel Fabricating Co., Inc., Tonawanda, N.Y., use robots for several plant operations. Schwabel makes tanks and vessels; American Precision makes heat exchangers (metal pipes used to transfer heat away from a machine that is generating too much heat while operating). The plants are highly specialized and manufacture products to a customer's specifications.

Both companies use robots in welding operations: they are programmed to burn holes in metal plates. Ultraviolet or incandescent light traces a pattern that the "burning arm" of the robot follows. The robot has increased productivity and also removed workers from exposure to hot metal, ultraviolet light rays and fumes from burning metal.

Insuring robots 'nothing special'

"Robots are not new to us," said Don McLaughlin, CFU vice president—underwriting. C&F Underwriters Group and the U.S. Insurance Group have several manufacturing and processing risks that use robotics heavily. They cover them with an all-risk personal property policy or an inland marine floater.

"We write all kinds of tailor-made contracts for machinery, such as seismographic instruments and huge $6 million drag lines for strip mining," McLaughlin explained. "If an insured requested coverage for a robot that performs a sophisticated function, we would write an all-risk policy. It would just be an extension of coverage we write now.

"There's not an overwhelming need in the market today for robot insurance," he stressed, "but we're accumulating data as the robotic industry grows, so we can respond quickly when the need develops."

Elroy Dyksen, assistant vice president—underwriting with USIG, pointed out that robots could present serious underwriting considerations from a business interruption standpoint. "When a robot goes down, replacing or repairing it can be a big problem," he said.

McLaughlin agreed. "Your insured could have considerable loss of income if he/she must wait a long time for replacement parts before getting back into business," he said. "Evaluating how long that piece of equipment could be down is extremely important in pricing a risk."

A robot's hazards

There's not enough loss experience yet to know what *all* the problems are with robotic equipment, but determining how fast a robot could be working again is a major one for loss control reps. Carl Manfra, USIG assistant vice president—loss control, explained, "With business interruption coverage at stake, you can't afford to have a whole production line held up for any length of time. Plants should have a backup plan for 'downed' robots such as an alternative machine, or workers who could do the job."

Other possible exposures involve the robot injuring employees, or the machine itself being damaged. An enclosure should be constructed around the machine's "envelope," or working area, to keep employees out of reach of the robot's moving arms. Electrical grounding for the robot must be properly insulated so that it doesn't short out or get a sudden electrical charge and make unexpected movements that might hurt someone. A fire protection system should be installed over the robot and its computer, or "brain." If a computer controls several robots, it may require specialized protection.

Robots should have built-in mechanical safety devices to limit

their movement, and emergency buttons to stop them if they go beyond their programmed area. They should also be installed where they won't be damaged by other plant operations, and controls for each robot should be outside its working area.

Manfra pointed out, "Robots taking over hazardous jobs will reduce employee injuries and, hopefully, exposure to occupational diseases. However, it is imperative that all employees who come in contact with a robotic machine thoroughly understand its hazards and safety features."

"Loss control reps and underwriters will require more expertise to know how robotic equipment really works and how significant the loss exposure is," commented Jim Davis, CFU vice president—loss control. "That's why we developed a reference article on robots. It helps our people know what robots are and lets them evaluate the exposures and recommend safety controls. Sooner or later there will be a demand for robot insurance, and we want our people to be prepared."

Looking ahead

Rockford, Ill., a major center for the tool and die industry, is only 30 miles from the USIG Freeport Branch. Gene McKeever, the branch's loss control manager, expects robotic equipment to become a major factor in that industry as soon as robot prices come down. Depending on the application, a robot can cost from $25,000 to $150,000.

To handle robotics accounts when they *do* come in, the Freeport Branch maintains a current file of all developments in industrial robots, and last August, included robotics for the first time in a training session for loss control reps. The presentation featured videotapes from robot manufacturers and the University of Wisconsin's Industrial Safety Program showing how robots are used in industrial plants and what their safety hazards are.

"We used to think flying in space was a long way off," McKeever noted, "and that's how many people still regard robots. They will be taking over more and more industry functions sooner than people realize."

Lori Lachowicz, manager of the Robotic Industries Association (formerly the Robot Institute of America) in Dearborn, Mich., agreed. "More industries will use robots as they become less expensive and people realize their advantages," she said. "They're already being used in new applications such as manufacturing furniture, packaging chocolates and assembling television sets." Industry experts expect the U.S. robotics industry to exceed $1 billion a year by 1990.

'More human' robots coming

Robot manufacturers see them doing extraordinary things—underwater geological surveys, coal mining, cleaning skyscraper windows, seam-welding ships at sea and satellites in space, and even brain surgery. GM plants are using robots with a vision system that can pick up different shaped objects moving on a conveyor belt. A California-based company called Odetics, Inc., has developed the first "functionoid," a remote-controlled walking robot. With more capabilities, functionoids could be used, for example, to enter a contaminated nuclear power plant or for guard duty by the military services.

Robots are being perfected that will detect gas leaks, fires or intruders; dial the police or fire department; respond to voice commands; and even vacuum rugs. Researchers are also improving their microcomputer brain so robots can "think," and tactile sensing in their hands so they can "touch." When the scientists are finished, a robot will—like the Tin Man in "The Wizard of Oz"—have everything but a heart, and maybe even that.

Robots: 'perfect working machines'

The word "robot" dates back to 18th-century Austria-Hungary where the Slav word "robota" meant forced labor. But it wasn't until 1923 that it became part of the English language.

It was introduced that year in the English translation of a play, "R.U.R." (Rossum's Universal Robots) by Czech dramatist, Karel Capek. The science-fiction play told the story of Rossum, an eccentric scientist, who created artificial life to prove that man, not God, was master of the world.

His experiment failed, but his nephew, a greedy factory owner, used his formula to create the perfect working machines to replace his human workers. He exploited the robots as slaves until they rebelled, became ruthless and almost destroyed the world. The play ends happily, however, when an enamoured robot couple, a mechanical Adam and Eve, go off to create a better world.