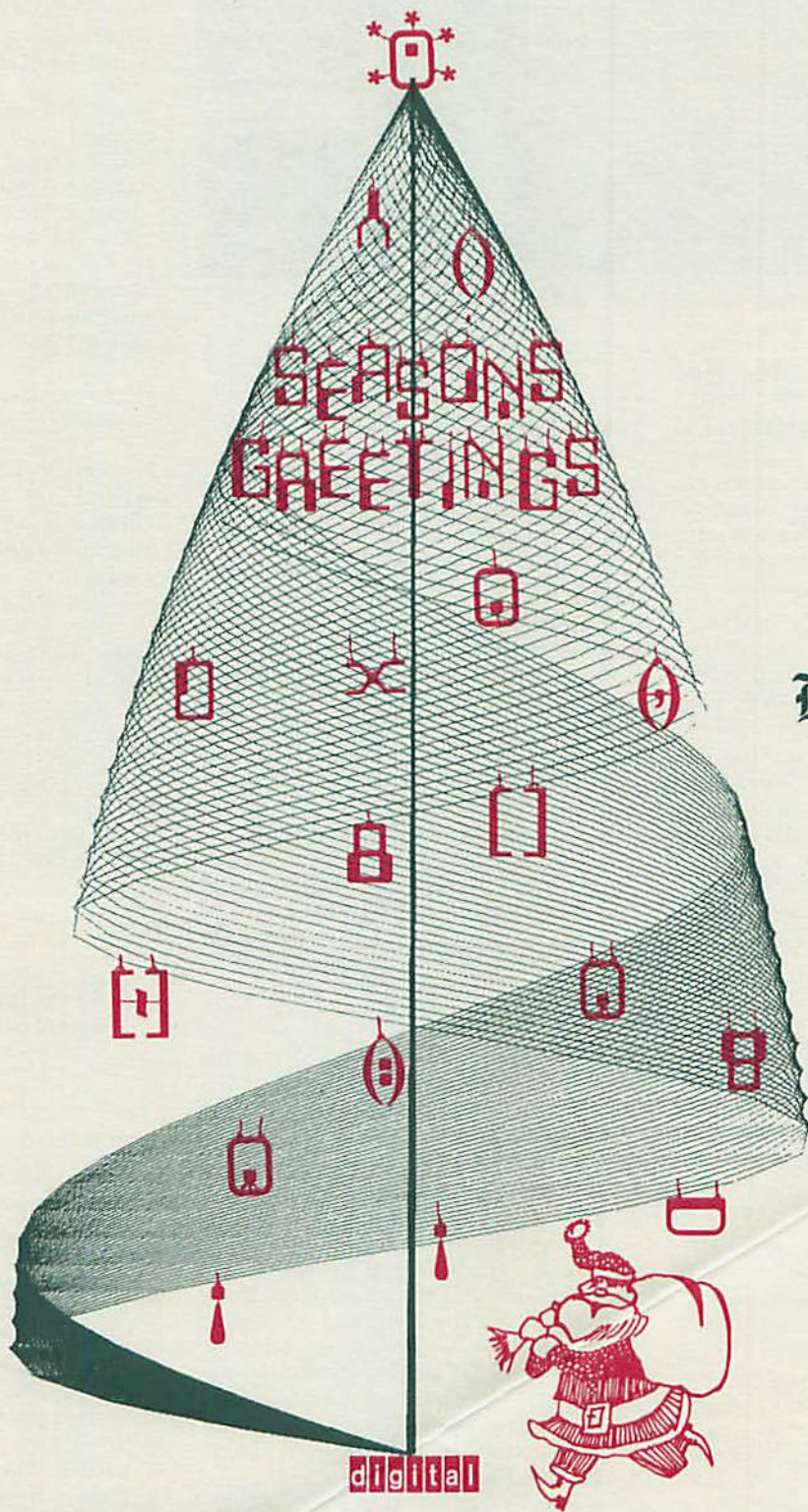


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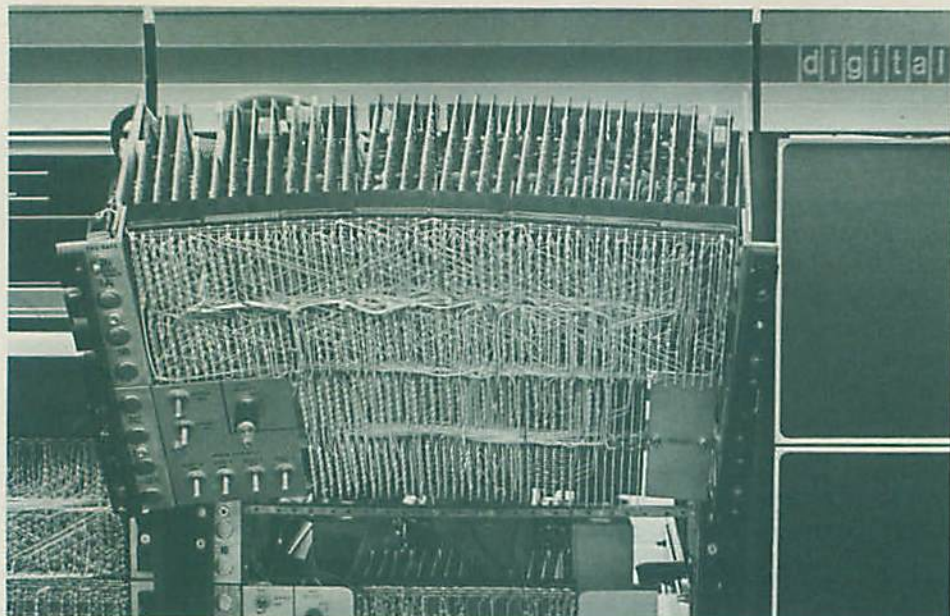
DIGITAL EQUIPMENT CORPORATION

DECEMBER 1989



Best Wishes

Jan Olsen



After the fall: the INDAC-8 mounting panel.

INDAC-8 Proves Its Mettle! Despite Near-Calamity, System Works

The INDAC-8 demonstration system sent to the Instrument Society of America meeting in Houston last October was put to more of a test than anyone expected, and it came through with flying colors.

The movers apparently knew nothing about the laws of inertia and rushed the INDAC-8 system toward the booth using a fork lift. After a sudden stop, there was a loud bang, which echoed throughout the Astrodome. The system, consisting of a PDP-8/I, disks, and interface for analog and digital I/O lay on its back on the floor. A door had been sheared off, one surface of a disk was gouged, mounting racks were bent, the chassis wells were loosened, and several other dents were incurred. It would have been the end for nearly any other system.

This was a real challenge to the Digital personnel at the show, from both Maynard and Houston. Only three days were left before the show was to open. In that time, the pile of maimed items had to be repaired and a working system for the final checkout of the demonstration programs had to be generated.

The DEC engineers and technicians really did an outstanding job. In less than 24 hours, new disk and A/D converter units arrived in Houston from Maynard. However, our field service team from Houston, aided by the project engineer for the ISA show, Roger Gagne, and his people, Hank Vezina, and Dick Kane, didn't wait for the units and, with incredible efficiency, had the system working with the replacement of just a single module! They flipped over the gouged disk, marked the timing tracks, mended the door, and

bolted the chassis wells together. Even the STOP switch on the PDP-8/I console had to be mended.

When the system was operational again, (nobody at the show believed that this was possible), Supervisor of Data Acquisition Software Harvey Shepherd, and Dave Herman performed a minor programming miracle. Here is where the INDAC-8 language proved its salt. It would be virtually impossible to do any work on most other systems in such a short time. The real-time INDAC-8, however, designed for data acquisition and control, is simple to use and each of its statements says a lot. Lo and behold! By Sunday afternoon, everything was working and the INDAC team was at the Astrodome relaxing as if nothing had happened.

The INDAC language is a compiler-level, FORTRAN-BASIC-like language with real-time statements. It was used at the show to control three exhibits: the first was a scale, which calculated both the individual and running averages of people's weights. A total of 374,228 pounds of human flesh and bone, belonging to 2,302 visitors, was weighed. The second was a motor-generator test station, where the computer automatically exercised the motor-generator and scanned its input and output voltages and speed, presenting the scanned values on a logging teletype. The third exhibit was an operator's console specifically designed for the show, demonstrating the ability of the system to retrieve and display parametric information, including setpoints, limits, and operational variables. It was also used to control the motor-generator test station manually.

An Apple a Day . . .

Jaime Ferrera of Digital-Puerto Rico's Accounting Department had a unique gift to bring back to Puerto Rico with him last fall.

Visiting Digital-Maynard, Jaime was taken to the new Leominster Plant by Cy Kendrick, Manager of Module Production. On the way they passed many signs advertising apples for sale, and finally, Jaime asked if they could stop at a stand.

When the next fruit stand appeared, Cy stopped and the two looked at the various fruits and vegetables for sale. Jaime, however, was single-minded: "How many apples in half a bushel?" he asked the startled woman. It was evidently the first time anyone had asked, but she dutifully counted, and arrived at the total of 60-70. "Fine," said Jaime, "I'll take five bushels!"

Why on earth would anyone want five bushels of apples?

It seems that in Puerto Rico, apples are a symbol of the continent. Since the climate is unsuitable for apple-growing, all apples must be imported, and an apple to a Puerto Rican is like a mango to a resident of the continent.

Jaime wanted to give two apples to each Digital employee at the San German facility as a gift. And so he did. They were shipped by DECAIRE, Digital's DC-3 cargo plane, which makes weekly trips to the island.

From last reports, everyone was "thrilled with them!"

Refer a Friend

Want Some Publicity?

Anyone who believes that his department or group merits some publicity or who has witnessed an interesting or humorous incident at Digital and wants to share it is invited to contact Sandra Rosenthal at X3056. Employees at branch offices should write to Sandra, c/o Public Relations on 5-2, in Maynard.

Manufacturing Overview

(Editor's Note: This article is based on an interview with Pete Kaufmann, Digital's Vice President for Manufacturing. We have paraphrased his statements.)

Digital has built an exceptionally fine reputation because of its concern for its customers and its emphasis on quality. We emphasize customer-orientation in our work and our overriding concern in Manufacturing is to get a quality product to the customer on time.

Quality

Considerable emphasis is being put on building a Quality Control organization as well as on decentralizing the quality responsibility. Quality control and testing are extremely important and we plan to make Puerto Rico and Canada self-sufficient in these areas. These plants will not only build equipment, but they'll also be responsible for testing and quality control.

Decentralization

Because Digital has developed such an excellent reputation in the industry, the demand for our products is growing very rapidly. Manufacturing, like all the other organizations at Digital, has to keep pace with this growth. And we have to prepare ourselves to cope with the growth that we expect in the years ahead. Right now we are at a critical juncture in the Company's development: we are moving away from a small centralized company with one major manufacturing facility to a large decentralized corporation with several large plants. We're restructuring the Manufacturing organization and giving it more depth; we're adding a vast amount of manufacturing space; we're improving our production techniques and equipment, and we're attempting to become far more self-sufficient.

Change=Opportunity

At times the changes we are undergoing can be somewhat unsettling if these changes are not understood. We believe that the kind of changes Digital is going through are positive signs that we are a successful company. These changes are creating new jobs; they're opening up

new opportunities for people to learn new things and do more sophisticated work. Take the Module Assembly area in Maynard, for example. A lot of the high volume module work they used to do is now being done in Puerto Rico and Leominster. Instead of volume work, the people in Maynard are now doing more complex module work such as helping get new modules started and helping with new production techniques.

As far as physical expansion goes, we've reached our capacity in Maynard so we're building new plants that should be able to handle our expansion for several years. We're also expanding manufacturing facilities in England, Canada, and Puerto Rico.

New Plants

The pilot plant in Leominster started production in October and it's coming along nicely. They're making modules, subassemblies, and cables as a back-up for Puerto Rico and Canada. In Westfield, our new building is almost complete and we should be able to start moving in soon. We're going to start off with circuit boards and cabinets and some general sheet metal and machine work. Construction in Westminster started last month, and we will be up and running there next summer.

"We're attempting to become more self-sufficient... by doing more ourselves... we hope to reduce the manufacturing costs of some items by 25%."

More In-House Work

We are not only acquiring space to meet the increased demand for our products, but also to reduce the amount of outside contracting we now require. In the sheet metal and machine areas we're increasing the equipment and the amount of work we handle inside the company. Right now



Pete Kaufmann

we are doing only about 43% of the work in-house, but we're shooting for the day when we can do 80% of the work ourselves. In our printed circuit facilities we are putting emphasis on getting the plated-through-hole operation going and staffed so we can fulfill about 85% of our requirements ourselves. We are also expanding our wire-wrapping capabilities, and by the end of this fiscal year we will be doing 80% of the wire-wrapping ourselves. By doing more ourselves in all these areas, we hope to reduce the manufacturing costs of these items by about 25%.

Staff Improvements

As far as staffing is concerned, we're now concentrating on building a second level of management in our Manufacturing operation, and will be working toward decentralization. We are building very talented material control and production engineering groups. We're also moving closer to a materials management type of organization by bringing material control closer to purchasing.

One of the major challenges Manufacturing faces is how to introduce new products into the system quickly and efficiently. This year we've had a significant number of new products — more than ever before. So we are trying to improve our technical skills and our management capabilities in the production engineering organization, which is responsible for new products. Some products have a relatively short life cycle, so the speed with which you can get production started becomes vital.

Flexibility and Quick Reaction

I think we can be proud of our manufacturing team. It is flexible and has a unique ability to react quickly to problems and changes. This ability is one of the keys in our business.

Maynard Module Group Becomes Proving Ground

Emphasis Shifts from Volume Production to More Complex Work

The type of work in the Module Assembly areas on the fourth floor of Building 5 in Maynard has changed considerably. The emphasis has shifted from volume production to complex experimental type work.

Some time ago, volume was stressed and Maynard Module Assembly used to strive to produce 100,000 modules a month or more. Now the pace is very different. Maynard Module Assembly has become the Company "proving ground" for new modules and new production techniques.

"We're not so much a module production group as we are an experimental group," explains Supervisor **Gloria Porazzo**. "Puerto Rico and Leominster are doing the volume work, while we're concentrating on debugging new modules and new production techniques. The experience of our Maynard people is very valuable and we're dependent on their skills to help us with the complex work."

"It's a challenge for us and it's nice to have the confidence of other departments that if there is anything wrong with a new module our people will find it," Gloria added.

Typical of the experimental work done in the Maynard module group was the testing of a PDP-8/I to control insertion machines. After all the bugs were worked out of the system, it was moved to Leominster. Process engineer **Fred Haefner**, who developed the system, was high on praise for Module Group Leader **Joan Bedford**. "She made lots of valuable suggestions about how to make the machine easier to operate," Fred stated.

According to Gloria, many members of the group will have opportunities to make contributions like Joan Bedford's - contributions that will help make production more efficient and easier.

Far more is done on the Module Assembly floor than the name implies. Computer subassemblies, mounting panel and logic assemblies are done, as well as module testing. The nature of the work in these areas is either changing or will change as routine volume production is performed elsewhere. As in many other areas, the Company's growth has brought change - change that is creating more sophisticated and more challenging work.



MODULE TEST



WIRE-WRAPPING
Eva Analons



SUBASSEMBLIES
Lorraine Scruton



N/C INSERTING MACHINE
Jeanette Rezuks

d for New Techniques



FINAL ASSEMBLY



FINAL MODULE INSPECTION
Lillian Moody and Jennie Latini



MOUNTING PANEL
Maria Cavaco



HAND ASSEMBLY



A model of the Westfield Plant

Leominster Opens; Westfield, Westminster Underway

Digital's expansion of manufacturing is well underway with plants under construction in Westfield and Westminster and production already in progress at the new pilot plant in Leominster.

In Westfield the first phase of construction, consisting of two 260,000 square foot sections, is nearing completion. One of the sections will be ready for occupancy next month, and the other will be used when more manufacturing space is required.

Construction of a 260,000 square foot manufacturing facility was started in November on a 250-acre site adjacent to Route 2 in Westminster and completion is scheduled for the beginning of July.

At the Leominster pilot plant production of modules, subassemblies, cables, and mounting panels is already well under way. There are now 80 employees in the 60,000 square foot building and hiring is continuing.

The plant is under Module Production Manager Cy Kendrick. Galen Davis is plant supervisor. Group leaders responsible for the commencement of operations and training were Melinda Franciose, Barbara Stebbins, Anita Carton and Dorothy Lewis. The machine set-up and installation of assembly lines was the responsibility of Steve Spaulding. Module Production Supervisor Gloria Porrazzo lent her experience and knowledge in launching operations.



Leominster Plant Supervisor Galen Davis welcomes Melinda Franciose, Irene

Cormier, and Julie Pulsinelli to the new plant.

Repair Depot Serves Canada

The Carleton Place Repair Depot was formed in 1967 to provide depot maintenance, as opposed to field maintenance, for electro-mechanical peripherals, such as the ASR-33 Teletype.

In February of 1969, the concept of the Repair Depot was enlarged to include PDP-8/L computers. Because of their light weight and small size, they were ideally suited to depot maintenance. Anthony Chicoyne, repair depot supervisor, points out that the Depot has really only one purpose, "to provide good service for all Canadian customers." He notes that the major advantage to the customer of repair depot maintenance is better maintenance at lower cost.



John Koning retrieves a Teletype from the chemical bath.

The Depot's facilities include a complete stock of parts, cleaning equipment, and test equipment. Among the cleaning equipment are a high pressure air cleaner, a solvent bath unit, and an oil spray gun. Test equipment includes a variety of oscilloscopes, meters, a PDP-8, and a variety of tools.

Anthony believes that the role of the Repair Depot in Carleton Place activities will increase. As computers and peripherals become smaller and lighter, the need for repair depot maintenance will become greater, he claims. Consequently, Anthony expects that the facilities will have to be expanded to meet the increased demand. Within the next six months, he expects to install a PDP-8/L.

"Dial M For MAINDEC"

"We're a new breed," said Marv Horovitz of himself and his group of Diagnostic Programmers. "Our evolution has been rather accelerated, taking place mostly within the last three years!"

According to Marv, Manager of Diagnostic Programming, diagnostic programmers were relatively unnoticed in the industry until recently — but not anymore. They are a select group of highly-skilled programming engineers whose services are in great demand.

What do diagnostic programmers do? They write programs to test computer systems to engineering specifications. They also write "MAINDEC" programs to test and diagnose the computer system, using the failing computer to test itself.

One function of Diagnostic Programming is to test complex modules through the use of an LTD (Logic Test Diagnoser) tester. The programmers write the software that tests all the logical functions of the modules. When an error is detected, the program describes the error and its causes. This tester, with its diagnostic programs, has been an invaluable aid to technicians who repair modules.

Another group under Marv is the Systems Diagnostic Programming Group. Their work starts when an engineer contacts them to say that a new device is being designed and asks them to support his device with diagnostics. This is followed

by meetings with Field Service, Production, and Engineering to study the engineering specifications and production plans. The programmers also recommend hardware that should be added to make malfunctions in the system more easily diagnosable. They then design and write the necessary programs needed by Engineering, Production, and Field Service.

No amateurs, Marv's programmers have extensive backgrounds in both hardware and software. Just a few years ago, Marv had three diagnostic programmers; now he has 25 and could use more. Because of the highly specialized work, however, qualified personnel are hard to come by. A half dozen or so technicians are also in the group, training for diagnostic programmer positions. Most of them came to Marv from Production.

Marv summarizes his group's functions as quality and maintainability assurance. "Our task is to ensure that every DEC computer or complex module that goes to a customer performs exactly as DEC has said it will," Marv pointed out, "and is easily maintainable by both Field Service and the customer."

Marv estimates the number of currently active programs developed by his group at more than 200. If a problem develops in a product already in production, Marv and his programmers get to work on it immediately, writing and rewriting until they find the flaw or flaws.

Reprints Available

The following reprints are available from the Public Relations Department:

"Simpler Machine Control Has Read-Only Memory," by Neil Sclater, *Product Engineering* (May 5, 1969).

"Computers Take Off on Relays," by T.H. Malim, *Iron Age* (May 22, 1969).

"What Kind of Computer for Your Plant?" by Ronald P. Noonan, *Chemical Engineering* (June 2, 1969).

"Invasion of the Minicomputers," by William H. Long, *Automation* (August, 1969).

"Recent Developments in Automating the Medical History," by Herbert A. Haessler, *Computers and Automation* (June 1969).

"The Little Company That Could," by Harry T. Paxton, *Hospital Physician* (June 1969).

Marv's project leaders are Ed Steinberger (PDP-8 and PDP-14), Jack Richardson (PDP-9 and PDP-15), John Hittell (New Products), Ed Kenney (PDP-10), and Jim Kelly (PDP-12 and complex modules).

With the diagnostic programmers around, there's no need to ask for a doctor if your computer is ill; Marv's group will detect the problem, and they don't even use X-rays!



The Diagnostic Programming Group. (Front row, seated): Robert Underwood, Robert Brain, Sherron Metivier (Secretary), Kenneth Elfand, Edward Steinberger, and John Rodenhiser. Row 2: John Richard-

son, Earl Haight, John Kirchoff, Earl Bouse, Marv Horovitz (Manager), Robert Whitton, Kenneth Chapman, Raymond Shoop, and Edward Kenney. Row 3: Patrick Coyne, Robert Koller, Michael

Sturak, Richard Gaudin, Kenneth Whitney, Robert Christopher, James Kelly. Missing from photo: John Hittell, Edward Hilton, and Stephen Beeman.

Promotions and Appointments



W. Brown



J. Spencer



K. Stone

Wes Brown was recently named Branch Manager of the newly opened Indianapolis Branch Office. A graduate of Oregon State University with a B.S. in Engineering Physics, Wes was a sales engineer for the Cutler-Hammer Company before joining Digital in January of this year.

John Spencer was recently appointed Branch Manager of the Dallas Office. After attending Palm Beach Junior College, Rollins College, and Louisiana State University, John became an instrumentation engineer in the Flight Test Department of McDonnell-Douglas in St.

Louis. He later joined the Space Division of the Chrysler Corporation in New Orleans, where he was in charge of the Computer Data Acquisition System in the Structural Test area. At Chrysler, John first used Digital equipment and, in November of 1968, he joined Digital as a sales engineer.

Jim Stone was recently appointed Branch Manager of the Minneapolis Office. After joining Digital in January of 1969, Jim's initial responsibilities included development of the MIRU Project proposal in the Biomedical Marketing Group. He joined the Sales Department about the middle of the year. Prior to joining Digital, Jim was a programmer with Univac in Minneapolis.

Ken Stone is the new Corporate Manager of Software Support, replacing **Bill Segal**, who has become manager of Biomedical Marketing. Ken joined Digital in February 1968 as the Regional Software Support Manager and was assigned to the mid-Atlantic Region until his new appointment. He has an extensive background in programming and teaching.

Physics Marketing Group Formed

Digital recently set up the Physics Marketing Group to assist salesmen and customers in applying DEC products to physics problems and to develop standard products and programs based on DEC's wide experience in this dynamic field.

To study the fundamental structure of the atom, physicists employ tools such as linear accelerators, cyclotrons, and atomic reactors. This sort of equipment can be found at national research laboratories and major universities around the world. With these tools, the experimenter generates large amounts of data at great cost, which he wants to record and analyze as quickly as possible. Our computers allow them to do just that. The relationship, in fact, has been so successful that approximately 15% of Digital's computers have been sold for use by physicists.

Although Digital is proud that its computers played a part in analyzing the first moon rock samples and identifying the

104th element, it is the day-to-day experiments carried out in laboratories all over the world that have earned DEC computers the reputation of being easy to work with and reliable.

The Physics Marketing Group is composed of a well-rounded blend of scientific and marketing talent, devoted to helping customers in new applications. Members of the group are **Dick Devlin**, Group Manager; **Mort Simon**, **Ed Wargo**, and **Clarence Tilger**. **Dick Socash** will join the group on January 1.

The Physics Marketing Group works closely with other Digital physics experts, including **Alan Titcomb** in the PDP-10 Group, **Rudy Penczer** in PDP-15, **Cindy Kretchmar** in Programming, and **Alex Campbell** and **Charlie Valentine** in Computer Special Systems. These people look with pride on DEC's accomplishments and look forward to increasingly greater involvement in the physics field.



The Physics Marketing Group: (standing l. to r.) **Dick Devlin**, **Ed Wargo**, and **Rudy Penczer**. **Clarence Tilger**, seated, demonstrates a pulse height analysis program utilizing the PDP-8/L. **Mort Simon** is absent.

strates a pulse height analysis program utilizing the PDP-8/L. **Mort Simon** is absent.

You Shot a What? ?

When Mechanical Assembly Supervisor **Bob Burg**, an ardent huntsman, saw what he believed to be a bobcat streak across the road in front of his car in New Hampshire, he pulled over, ran into the woods with his gun, sighted the animal in his telescopic sight, and felled it with one shot.

Imagine his amazement when he arrived at the scene and found not a bobcat, but a *baboon*.

He's still having trouble convincing his friends, but can back his story with color photographs of the dead simian.

"I really thought I was shooting at a bobcat," he said, "there's a \$15.00 bounty on them. I shot it at 50 yards in the rain and it was just a blur in my telescopic sight. When I got over to it, I just stood there in the pouring rain. I was amazed."

He said he turned it in to the New Hampshire Fish and Game Department, which had not received any reports of missing baboons.

Bob's work area is now decorated with cartoons his co-workers have drawn about his hunting exploit. One sign near his desk proclaims him as New Hampshire's baboon hunting champion. His title should be safe for a long time, unless the dead baboon has left some relatives up in the wooded, wild country north of Meredith, N.H.