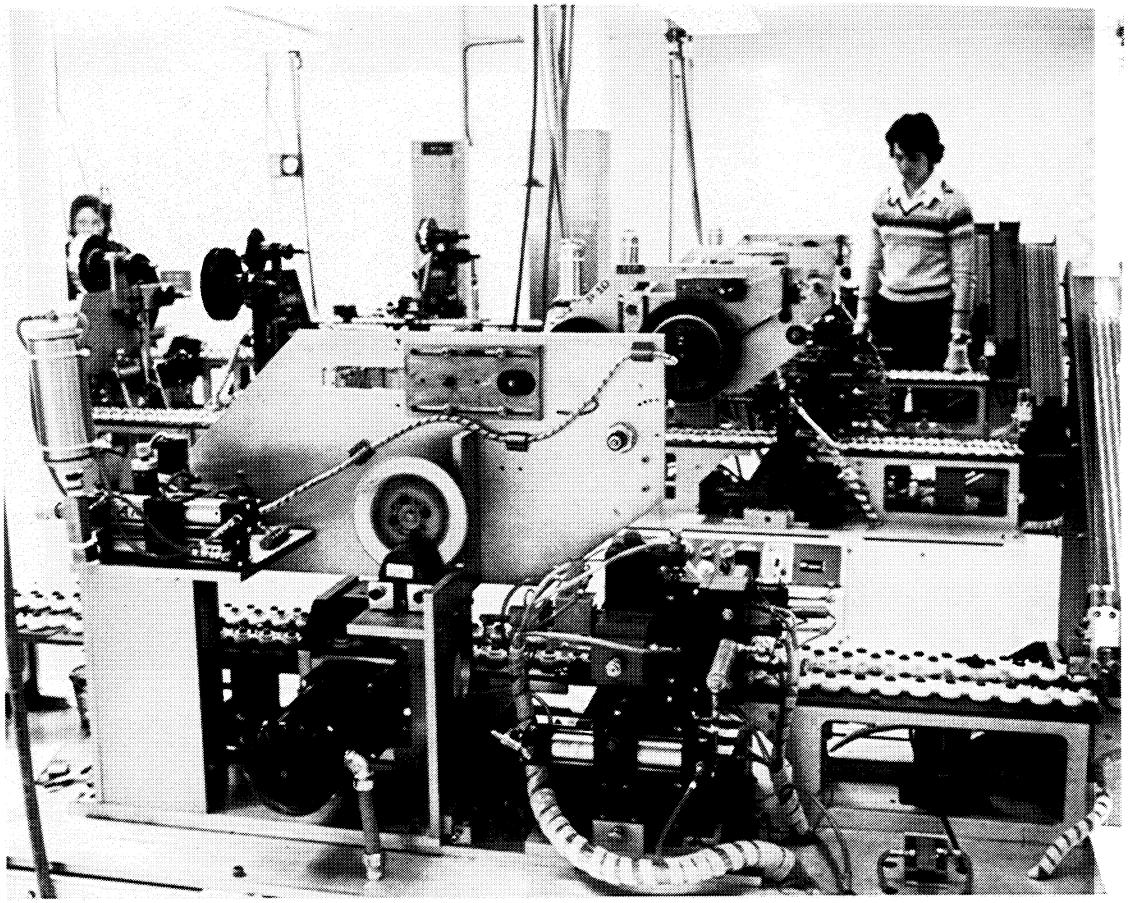
Microbe Detector

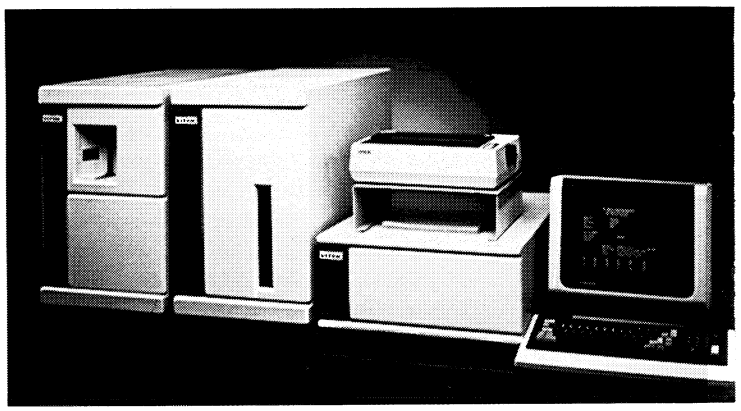


The above photo shows a part of the Hazelwood, Missouri plant of Vitek Systems, Inc., a subsidiary of McDonnell Douglas Corporation, where Vitek is producing a device known as the AutoMicrobic System® (AMS). Both the product and the company owe their existence to technology developed in NASA's Voyager interplanetary exploration program.

For Voyager, McDonnell Douglas developed a Microbial Load Monitor (MLM) to detect bacterial contamination aboard the spacecraft. Under another NASA contract, McDonnell Douglas studied an expanded MLM with the additional capabilities of detecting and identifying bacterial infections among the crew of a manned mission to Mars. The Mars flight is still in the future, but McDonnell Douglas, recognizing the MLM's commercial potential, invested further effort in converting the Voyager/Mars mission technology into a time-saving system for analyzing a patient's body fluid samples.

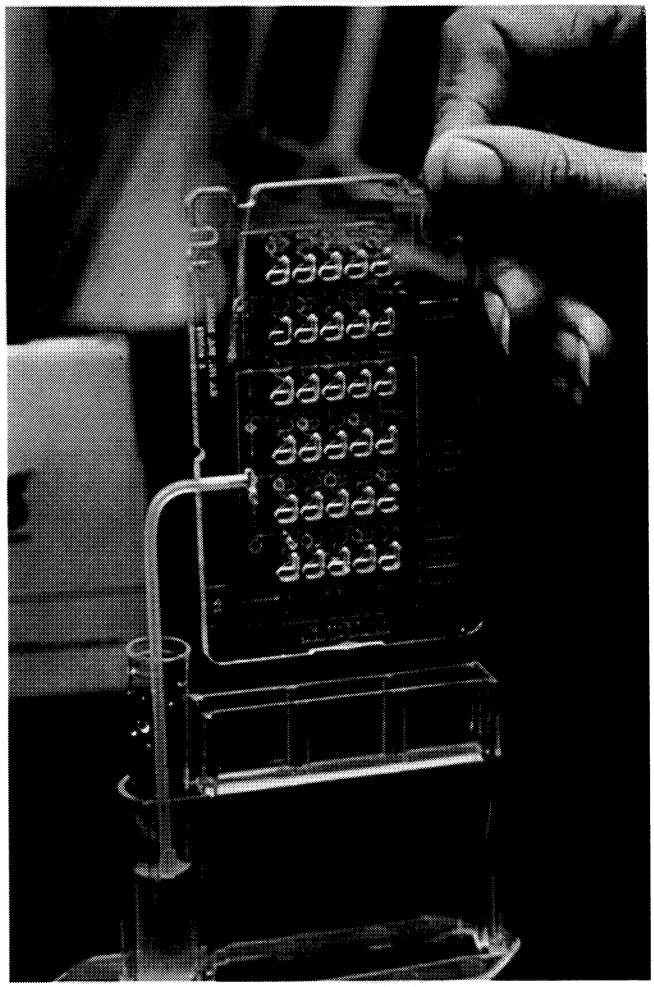
McDonnell Douglas created the Vitek subsidiary to manufacture and market the AMS and introduced the system to hospital use in 1979. Since then Vitek has delivered several hundred units, mostly to medical laboratories, but the system is also finding acceptance in industrial laboratories of companies producing pharmaceuticals and food products. At right is the latest version of the system, the third generation AMS III, which performs the identification and analysis functions much faster than the original system.

AMS offers a means of reducing hospital stay times by allowing quicker identification and earlier



treatment of an infection. The traditional method of testing for disease-producing microorganisms, or pathogens, involves three steps. First, specimens of body fluid—urine or sputum, for example—are prepared in cultures. Next, the cultures are incubated for two to four days. Then microbiologists study the cell growth that took place during incubation, from which they can determine the presence of pathogens and identify them.

AMS does the same job quicker. Instead of the petri dish customarily used to prepare cultures, AMS employs test kits (right center)—disposable, plastic cards approximately the size of a playing card, each card containing from 16 to 30 wells and each well holding a different chemical substance. There are two



types of cards: Identification Cards and Susceptibility Cards. A body fluid sample is injected into the Identification Card (above right) and organisms in the sample react with the chemicals in the wells. Mounted in trays, the cards are placed in an incubator/reader module of the AMS. Scanning each well once an hour, the system "reads" the reactions taking place, compares them with information in the computer and thus identifies the organism—or gives a negative report when no organism is present. Identification data for each specimen is reported on a display screen and also provided in printout form.

Once an organism is identified, the body sample goes into another plastic card—called the Susceptibility Card—whose wells contain a number of

different antibiotics. This card is similarly inserted into the system for computer examination, which results in a report as to which antibiotic is most effective against the organism; there may be more than one, in which case a physician would make the final selection. The whole process, including identification and susceptibility determination, takes from four to 13 hours, compared with two to four days for culture preparations. AMS can handle as many as 240 specimens at one time.

AMS enables the microbiology laboratory to furnish guidelines for antimicrobial treatment within one day of specimen collection, a large-scale time saving over standard laboratory methods. In addition to its promise for reducing hospital patient stay time, AMS offers important advantages to the laboratory: it minimizes human error, reduces technician time and increases lab output. Aside from medical use, AMS is also a useful tool for industrial laboratories in such applications as detection and identification of organisms during incoming, in-process and finished goods inspections; identification of biological indicators in sterilization processes; and in-plant environmental testing.