The AutoMicrobic System (AMS) is a fully-automatated system which detects harmful micro-organisms in the human body, identifies them and determines which microbe-killing agents would be most effective in eliminating them. AMS originated in a NASA study. Samples of body fluids are placed into the AMS where they are exposed to nine different microbe nutrients. The AMS automatically monitors which cultures grow and therefore which pathogens were present in the fluid sample.

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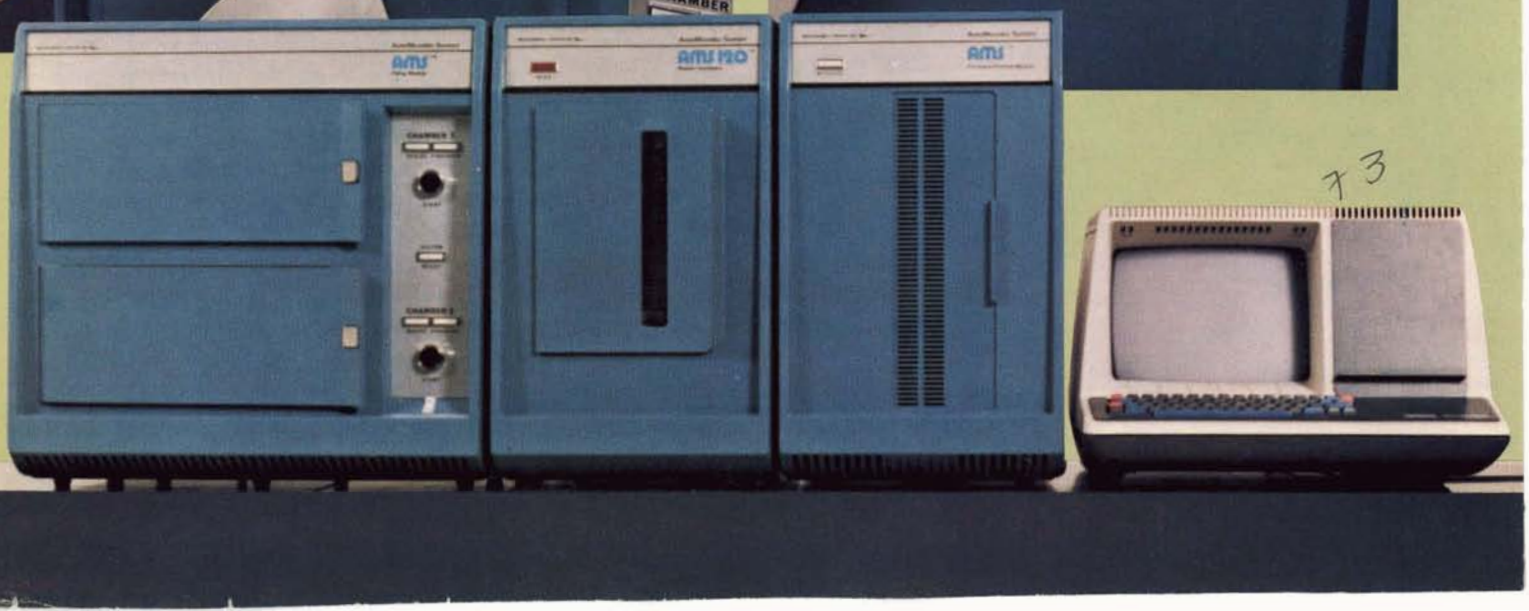

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Microbe Detector

Space science has contributed an advance to microbiology in the detection of harmful microorganisms, or pathogens, in body fluids. In the traditional manual method of testing for pathogens, specimens are prepared in cultures which are, in effect, "food" for specific microbes. The cultures are incubated for two to three days and studied for cell growths indicating the presence of disease-producing organisms. This process of incubation, detection, and interpretation now can be done automatically.

The AutoMicrobic System (AMS) represents years of intensive research and development by McDonnell Douglas Corp. that originated with a NASA study aimed at development of a fully automated microbial detection and identification system for spacecraft use. A urine specimen is placed into the system, where it is subjected to different freeze-dried microbe nutrients for the nine most common pathogens. An electro-optical scanner studies each specimen once an hour through a 4-to-13 hour cycle, operating automatically. Changes in cell growths on each culture are monitored by computer. The presence of pathogens is indicated when growth reaches a predetermined level.

The system also enumerates the pathogens and specifies the type. Developed initially to handle urine testing, AMS soon is expected to allow analyses of blood, spinal fluid, and other body fluids.

An additional capability under development is "susceptibility testing," or the determination of which microbe-killing agents—such as penicillin or other antibiotics—would be most effective in eliminating the pathogens. The whole process of detecting, identifying, and enumerating the pathogens and determining susceptibility is accomplished in less than half the time required for the manual procedure. On pushbutton command, results are printed or displayed on a screen.

The AMS minimizes human error, reduces technician time, and increases laboratory output. In cooperation with six leading microbiology laboratories, McDonnell Douglas and the marketing firm, Fisher Scientific Co., are conducting studies to compare data derived from the system with tests obtained by traditional manual methods. The Food & Drug Administration's approval of the susceptibility-testing procedure is pending.

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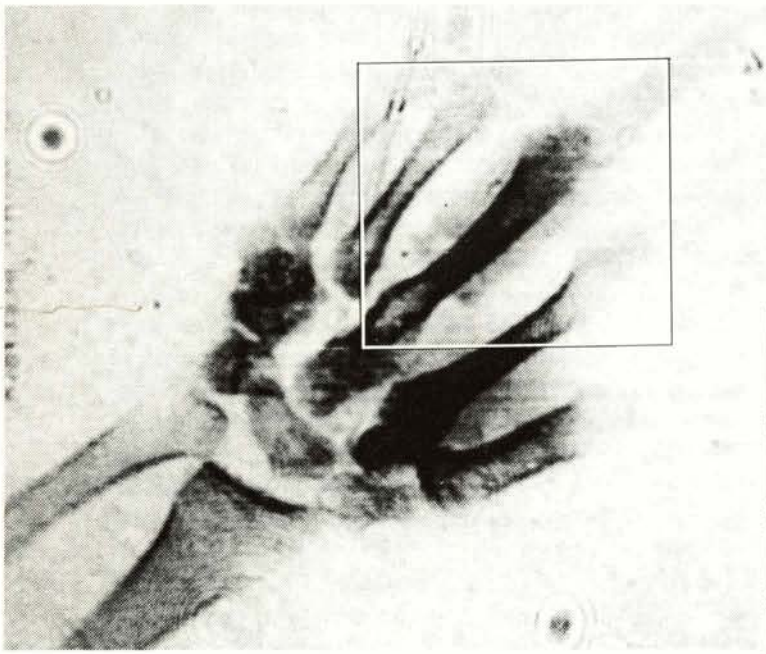

Bone blocks underlying tissues, making it difficult to get clear x-rays of soft body tissues. A promising improvement: use of filters, such as those employed on the Landsat Earth resources satellite, to block out bone and enhance the soft tissue image. NASA's Goodard Space Flight Center is adapting Landsat technology to x-ray usage.

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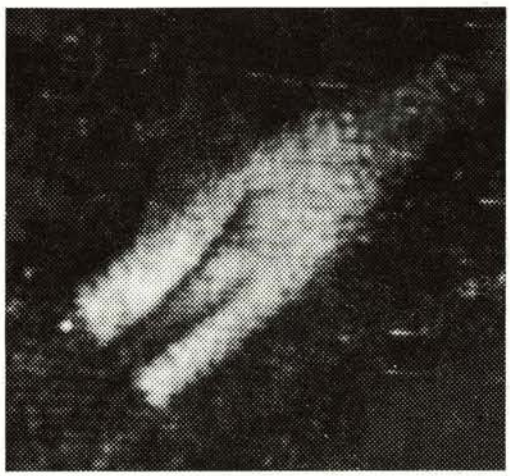

Space Imaging in Medicine

Space imaging techniques can have important applications in diagnostic medicine: getting clear X-ray images of soft parts of the body is difficult because they are blocked by bone. An example: early detection of lung cancer is vital but often difficult because, in the X-ray picture, the bone structure of the rib cage obstructs the view of the underlying lung tissue. To get a better picture of soft tissue, radiologists use internal dyes and radioactive substances, but these methods do not always produce good results, and they can be uncomfortable for the patient.

A promising improvement in soft-tissue imaging utilizes filters such as those employed on NASA's Landsat Earth-resources satellite. Landsat images can be filtered so that a specific area of interest shows up prominently and other areas are subdued. Landsat