

# Cytoanalyzer

The cytoanalyzer, an automatic optical electronic machine which may greatly speed detection of cancer of the uterus, has been installed by the National Cancer Institute, Public Health Service, at the University of Tennessee in Memphis, for further testing. The machine is designed to detect abnormal cells by microscopically scanning slides of specimens from vaginal smears almost as fast as they are fed into it.

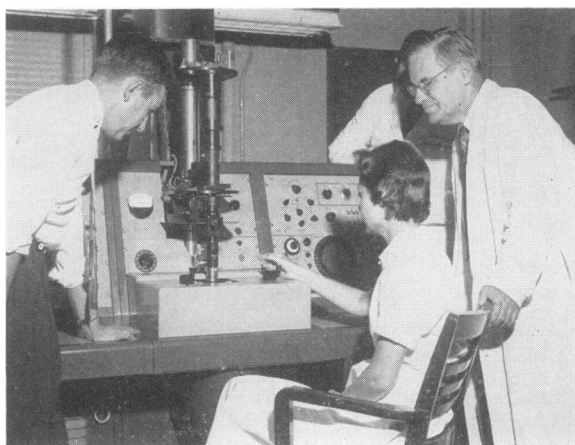
Cancer of the uterus is the second largest cause of cancer deaths among women. This fact and the current scarcity of technicians to analyze cell examination results underline the importance of perfecting the cytoanalyzer, which through speedier detection of the disease, may lead to more cures. The majority of women with uterine cancer can be cured if the disease is diagnosed in its early stages.

The cytoanalyzer being tested at Memphis was developed by the Airborne Instruments Laboratory, Inc., Mineola, N. Y., where Walter E. Tolles directed the research. Dr. George N. Papanicolaou, professor emeritus of clinical anatomy at Cornell University Medical College, has been consultant.

At the Memphis project, results given by the machine will be compared with those obtained by present methods in which technicians examine specimens under a microscope, and suspicious specimens are then referred to a pathologist. If the machine is perfected, the pathologist will examine only the slides selected by the electronic scanner.

The machine consists of a scanning microscope, computer and analyzer, and recorder. The scanner examines the pertinent area of the smear and converts the optical information into an electric beam which is passed to the computer and analyzer.

The computer measures the cells' nuclear size and nuclear optical density and distinguishes between signals arising from normal and suspicious cells. A nuclear measurement graph



At the University of Tennessee in Memphis, the cytoanalyzer undergoes testing for further development. Observing the machine's performance are, from left to right, Riley C. Bostrom, project engineer, Airborne Instruments Laboratory; Irma Rube, chief cytologist, Public Health Service; and Dr. Douglas H. Sprunt, professor of pathology and chairman of the division of pathology, Medical School of the University of Tennessee.

plots each accepted measurement so that cells can be rated as normal, suspicious, or deficient in information. The recorder makes a permanent record of the graph, notes the location of all abnormal measurements, and records the decision of the automatic smear classifier. Recordings of the nuclear measurement graph are made by a high intensity cathode ray tube and an oscillograph. All computations are made by the machine as the slide is scanned in less than one-fifth of a millisecond.

The Memphis project is concerned solely with uterine cancer. However, the National Cancer Institute is in the process of setting up four new centers to develop the application of the cytologic test to cancer of other body sites, the lung, large intestine, stomach, prostate, and urinary tract. Successful development of the cytoanalyzer will probably lead to its use in detecting cancer in these other sites.