ELECTRONICS

Automatic Detectors

Machines being tested that may replace humans for use with search radar systems, doing away with errors due to fatigue or boredom.

➤ AUTOMATIC DETECTION machines for use with search radar systems are being tested by Navy researchers. The machines may replace the human operators who now decide whether return signals are "blips" from distant targets or interfering noise from harmless sources.

The machines, of course, do not make errors in judgment because of fatigue or boredom. In 200 test runs for a detector built by U. S. Navy technicians, there were "no false alarms and no misses," J. W. Caspers of the U. S. Navy Electronics Laboratory, San Diego, Calif., reports.

No way has been found to entirely eliminate interference in radar reception. The noise makes small targets a long distance away particularly difficult to detect.

The machines use computer techniques to process radar data and decide between noise and target signal on the basis of established statistical possibilities.

The usual scanning radar gets a fixed number of observations for each scan of the antenna. A detector that judges return signals from a fixed number of per-scan observations is called a fixed-sample detector.

Detectors that do not use a fixed number of observations are called sequential detectors. Sequential detectors, Mr. Caspers claims in the current Naval Research Reviews, July, 1961, offer "several advantages" over the fixed-sample type.

For each observation, a sequential detector makes one of three choices. It decides it has detected noise, or a target signal, or it decides the scanning antenna should take another observation to make sure.

Under this system, the antenna scans irregularly. It looks in one direction "just long enough for the detector to reach a decision and no longer," Mr. Caspers said.

With a sequential detector, the faster process saves from 30% to 90% of the detection time required for fixed-sample models.

The scanning process, however, must be modified to permit the sequential detector to hold the antenna beam in one position while detection judgments are being made, then move the beam to the next position when a decision is reached.

• Science News Letter, 80:98 August 12, 1961

GENERAL SCIENCE

Science in the Capital

➤ THE NATION'S capital is also a strong contender for honors as the nation's scientific capital.

The Washington, D. C., area has more scientific personnel per 1,000 population than any other in the nation.

The area's privately owned research and development firms have doubled in number since 1954, and quadrupled since 1950.

Some 24,100 persons, including 6,650 scientists and engineers, are employed by 270 private firms. Among these organizations are 190 doing research and development in the physical and life sciences, 53 in social and psychological research, and 27 specialists in documentation, operations research and computers.

Additionally, the Government's 30 research laboratories employ 36,200 persons. Of these, 12,200, or about one in three, are scientists and engineers.

The small size of many of the private firms "reflects the embryonic character of the Washington scientific community," according to Gordon Kennedy Jr., science bureau manager for the Metropolitan Washington Board of Trade. Eight of the research and development firms account for 50% of the employees, 63% have fewer than 51 employees, and 35% have fewer than 21. Many are showing "dramatic growth."

Federal research and development workers include 14,000 in weapons development, the largest single category. Medical research employs 9,000; mapping, 2,500; the Department of Agriculture, 3,300; the Bureau of Standards, 2,300; and weather and astronomy, 1,400. Only 1,400 are involved in space activities, but Mr. Kennedy predicts "a meteoric rise" in this field.

The private scientific community pays about $145,000,000 in salaries and wages annually in the metropolitan Washington area. The Government research payroll is estimated at $211,800,000 annually. The Greater Washington area includes Frederick and Annapolis, Md., and Leesburg, Va.

The Board of Trade's report on scientific resources is the first of its kind. It also points out that seven major universities in the Washington-Baltimore area contribute to the scientific climate through graduate instruction and research. Libraries and scientific academies, associations and societes are "legion," Mr. Kennedy noted.

The area includes the oldest electronics company in the United States. Vitro Electronics, in Silver Spring, Md., was founded in 1888. The company is responsible for the telemetry systems used in Project Mercury.

The report and directory, "Scientific Resources in the Washington, D. C., Area," is available at $2.00 a copy from Science Bureau, 1616 K St., N.W., Washington 6, D. C.

• Science News Letter, 80:98 August 12, 1961

CYTOLOGY

New Technique to Study What Makes Cells Stick

➤ A MEANS for studying what makes a white blood cell able to stick to things has been reported by Dr. James E. Garvin of the Northwestern University Medical School in Chicago.

Samples of human blood were mixed with heparin, a substance to prevent blood clotting, and poured through a two-inch-long column of more than 100,000 tiny glass beads into a glass tube. The phagocytes—cells that cling to bacteria in the blood and kill them—stuck to the beads.

The stickiness of the white blood cells and other cells is expected to shed some light on other problems besides the resistance of bacteria. The mechanics of adhesion may reveal how cells organize themselves and are held together to form body organs as well as what makes cancer cells break loose and spread in the body.

The white blood cells being studied by Dr. Garvin are the polymorphonuclear neutrophils (PMN), white cells with nuclei of many shapes. The results so far show that the adherence of PMN depends on some active process within the cell. Below 59 degrees Fahrenheit, the adhesiveness was lost.

Dr. Garvin reported his findings in the Journal of Experimental Medicine, 114:51, 1961.

• Science News Letter, 80:98 August 12, 1961

BOTANY

Chemical Helps Prevent Virus Plant Disease

➤ A CHEMICAL commonly added to agricultural solutions to make them cling to plants also helps prevent virus diseases in plants.

U. S. Department of Agriculture scientists at the Agricultural Research Center, Beltsville, Md., have found that the chemical compound, dioctyl sodium sulfosuccinate (DOSS), "markedly reduced development of five virus diseases in bean plants." Further tests are now underway to see if more insect-borne virus infections can be stopped, Dr. I. R. Schneider and J. W. Mitchell reported in Agricultural Research, 10:4, 1961.

"How DOSS is able to inhibit virus is still not known," the scientists reported, but its effectiveness is directly related to its ability to reduce surface tension of the water found on plants.

The chemical compound was highly effective against the mosaic viruses that attack tobacco, beans and alfalfa and cause a stained or mottled appearance.

"DOSS is not a cure for plants with established virus diseases," the scientists emphasized, but rather a preventive.

• Science News Letter, 80:98 August 12, 1961