Theoretical relationships between the vertical ascent of air and the rate of precipitation were developed into practical forecasting procedures.

A new type balloon made of nylon webbing launched from the nose of a rocket was used to obtain weather data from extremely high altitudes.

A new seismograph capable of recording strong earthquake waves after they have circled the earth eight times went into operation and recorded mantle Rayleigh waves, extremely long waves that may penetrate to the core of the earth and reveal its structure.

Fragments of a skull unearthed in Oregon were identified as belonging to a 10,000,000-year-old mastodon.

An inexpensive, easy-to-build wind gauge was developed for the use of farmers in connection with agricultural spraying.

An optical hygrometer, new, highly sensitive, speedy instrument for measuring humidity, especially useful in below-freezing temperatures, was developed.

Study of 50-year records of the intensity of sunlight revealed information about the thickness of the ozone layer surrounding the earth.

The speed with which stars twinkle may indicate where jet streams are and how fast they flow, it was suggested.

Dammed up water in three abandoned anthracite coal mines seriously threatened the economic future and safety of three counties in Pennsylvania.

Fluctuations in the Florida Current, important branch of the Gulf Stream, were measured during 1953 by electromagnetic induction.

Oceanographers found a heat flow from the ocean bottom equal to that from high and dry continents caused by radioactive elements.

For the first time in 20 years, snow-covered glaciers in Norway slowly moved forward.

A new research tool, in the form of a bibliography of all the literature on the Arctic put out in the last 75 years, was made available.

ENGINEERING-TECHNOLOGY

Tape Recording System For Color Television

A tape recording system was developed for black and white and color television programs which permits immediate playback, can be wiped clean and reused, and costs much less than film recordings.

"Project Tinkertoy" proved satisfactory; it is a program for putting radios, radars and electronic bombsights into mechanized production through use of standardized parts of printed circuits that can be assembled by machine.

Progress toward entirely push-button factories included an electronic machine controlled by instructions on a magnetic tape, and an automatic eye operating in the infrared to give a continuous analysis of liquid chemicals.

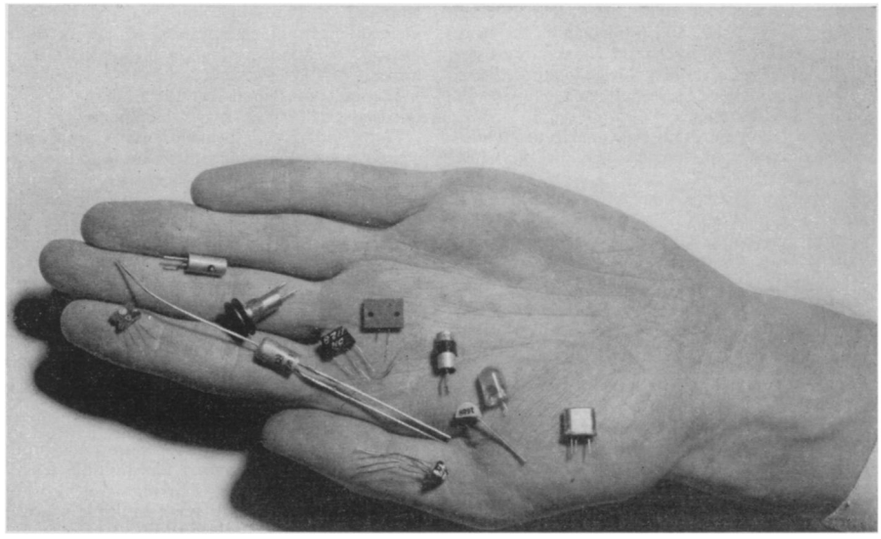
Electronic machines to handle such clerical work as production scheduling and supply problems were under development.

A mathematical model of an electronic computer that reproduces itself was developed.

A new type of "brain" utilized 10,000 tiny ring-shaped magnets woven into a netting of wires to serve as a memory to store 10,000 bits of information in an instant.

A new automobile motor oil was developed to help engine starting in extremely cold weather, but which will not evaporate when the days turn warm.

A wrist radio using five transistors instead of vacuum tubes was produced; it picked up broadcasts 40 miles away.



TRANSISTOR MODELS—These are experimental models of the novel device that promises to revolutionize electronics and communication. Of extremely small size, and using infinitesimal amounts of power, the transistor is nevertheless rugged and does most of the work of fragile vacuum tubes.

A 400-kilovolt transmission line was successfully used to transmit hydroelectric power over a 600-mile distance in Sweden; this is a record high operational transmission voltage level.

Development continued on unusual ceramic materials needed by the Atomic Energy Commission to withstand the harmful effects of atomic radiation and extraordinary high temperatures.

Some half dozen catalyst beads impregnated with radioactive zirconium were used routinely to indicate the circulation rate of billions (tons) of catalyst beads in several gasoline cracking refineries.

An experimental plant went into operation to extract aluminum metal from common clay; the idea is to make this country independent of imported bauxite as an aluminum source.

A specially built camera making exposures of from one- to ten-millionths of a second was used to photograph tiny dirt and moisture particles in the air.

Nut shells and fruit pits were put to industrial uses such as anti-skid agents in car tires, fillers in plastics and blasting grits for cleaning airplane engine parts.

Silicone rubber was used successfully for electric wire insulation, standing up under extremes of heat and cold.

A "bottle-cap" bomb was developed to be exploded underwater in case of shipwreck to send a call for help through water to the Navy's underwater listening posts in the Pacific.

A miniature radar-ranging gear was developed to feed range information continuously and automatically to the gunsight in a fighter plane to relieve the pilot of this extra work.

An airborne television camera was under development to aid in battle action, and to survey disaster relief needs and work.

A three-dimensional technique was developed for making photomicrographs.

A combination of asphalt and white-burned flint was used to make a skidsafe highway surface.

New streamlined periscopes were put on Navy submarines.

An electric power generator with turbine was designed to be powered by steam above the "critical pressure"—the point above which water changes to steam without boiling first.

Water was pumped into the subsoil of Mexico City by rehydration wells to restore the water supply of the city and stop its sinking into the ground.

Small gobs of air, called "dielectric" eddies, in the atmosphere were found to disrupt television transmission in fringe areas.

Television waves and other very high frequency signals were found to be bent around mountains by diffraction to continue along a long path on the other side of the obstacle.

A new film scanner was developed to improve the quality of movies broadcast by television.

Coating cookie trays and other baking pans with a new plastic, polytetrafluoroethylene, made it unnecessary to grease the pans.

Storing natural gas underground near the location of heavy users was found to help alleviate gas shortages during sudden cold snaps.

An L-shaped fence staple with the long shank threaded was introduced and found to carry a heavier load and hold better in creosoted posts than the older U-shaped staple.

A wire rope with a plastic core unaffected by acids, caustics and other sub-surface substances was developed for use in drilling oil and gas wells.

Magnesium was used in lightweight automobile bodies and found to be better than plastic.

An electromagnetic "divining rod" was developed to locate underground water sources.

A new method of reproducing maps by line-scribing on an opaque emulsion applied to plastic sheeting was reported.

The familiar white stripe marking the traffic lanes on highways can now be made of long-wearing plastic, it was reported.

An aerial estimator, device resembling a reflector-type gunsight, was developed to help in estimating the size of forest fires, timber stands, lakes, etc.

A fluorescent lamp with quartz inner tube was found to give about two and a half times more light than an incandescent lamp of equal wattage and to last about five times longer.

A method was found for working 16-Alfenol, heretofore an unusable magnetic curiosity.

Use of barite as an aggregate in concrete was found to help buildings withstand the blast of bombs and protect the occupants from atomic radiation.