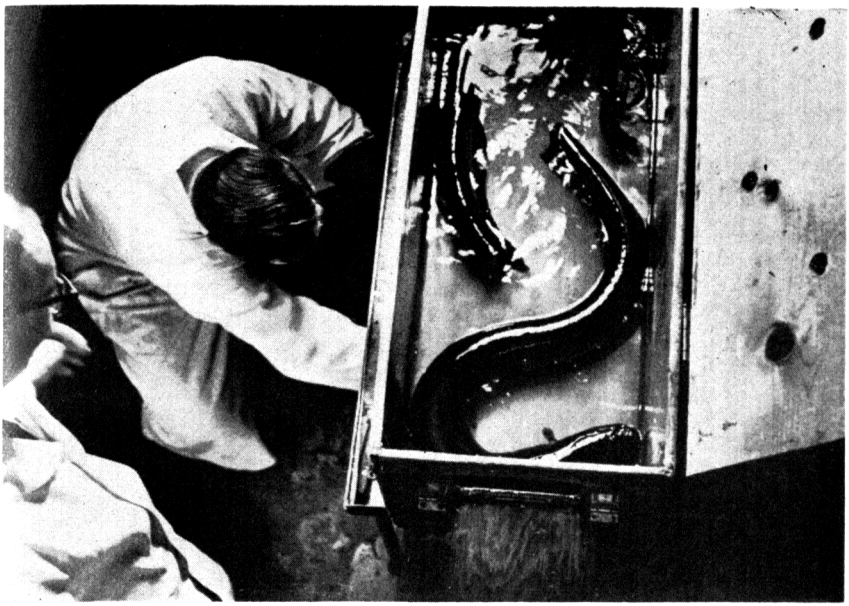
A Photographic Sampling of Foundation-Supported Activities

568169—61——3

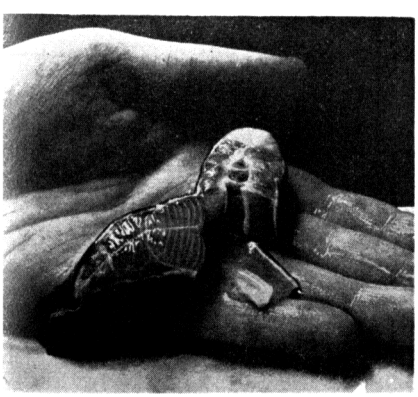
PHOTO CREDITS

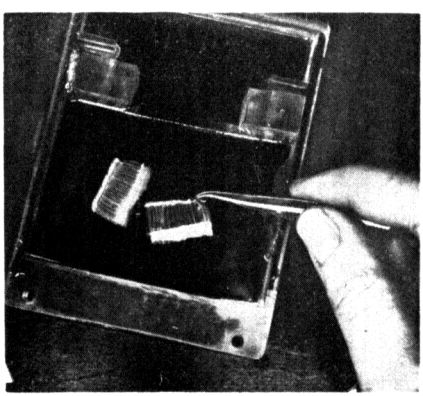
Page 21: Medical News Photos by Arthur Leipzig. Page 22: NSF photos. Page 23: (top) Martin Schwarzschild, Princeton University; (bottom) Corning Glass Works. Page 24: University of Vermont. Page 25: Smithsonian Institution. Page 26: Marine Biological Laboratory, Woods Hole, Massachusetts. Page 27: Chicago Natural History Museum. Page 28: NSF photos. Page 29: NSF photos. Page 30: Jerry Hirsch, Columbia University.

Electric Eel Illuminates Mechanism of Nerve Activity



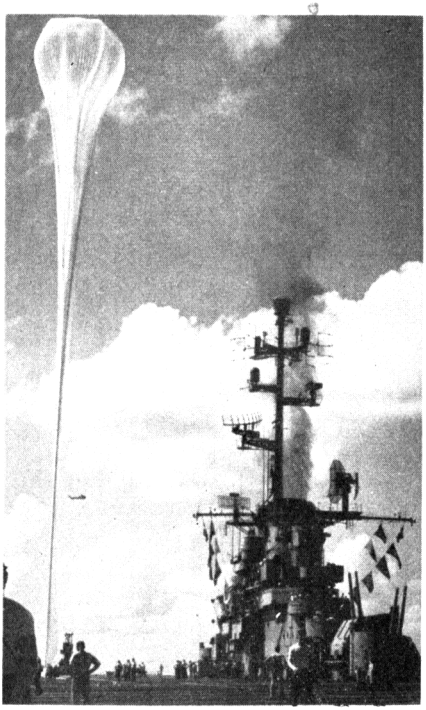
Of the 5- to 7-foot length of an electric eel, all but the first foot constitutes the electric organ composed of compartments arranged in columns. Each compartment is composed of a single cell, an electroplax, about one-half inch long, capable of producing 0.24 volt. The removal of one of these cells and its mounting for experimental purposes are also shown. See page 68.





Project ICEF for Studying Cosmic Rays at High Altitudes

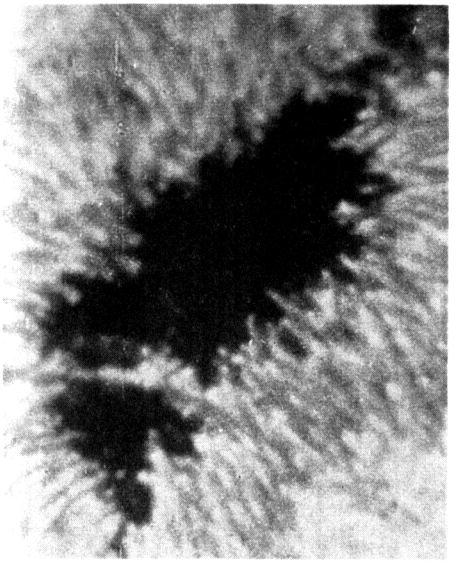
International Co-operative Emulsion Flights (PROJECT ICEF) took place from USS VALLEY FORGE early in 1960 to capture high-energy cosmic rays and the succeeding particle jets on nuclear emulsion flown at 100,000 feet in southerly latitudes. The giant emulsion stack has been divided among many universities in the United States and abroad for analysis and study. Project ICEF, sponsored by the National Science Foundation and the Office of Naval Research, is directed by the University of Chicago.



LEFT PHOTO shows 10 million cubic-foot balloon poised on bow of the aircraft carrier just prior to launching. Balloon and ship's stack gas stand straight up, showing care and precision with which carrier was kept on course to provide a "no wind" condition on deck.

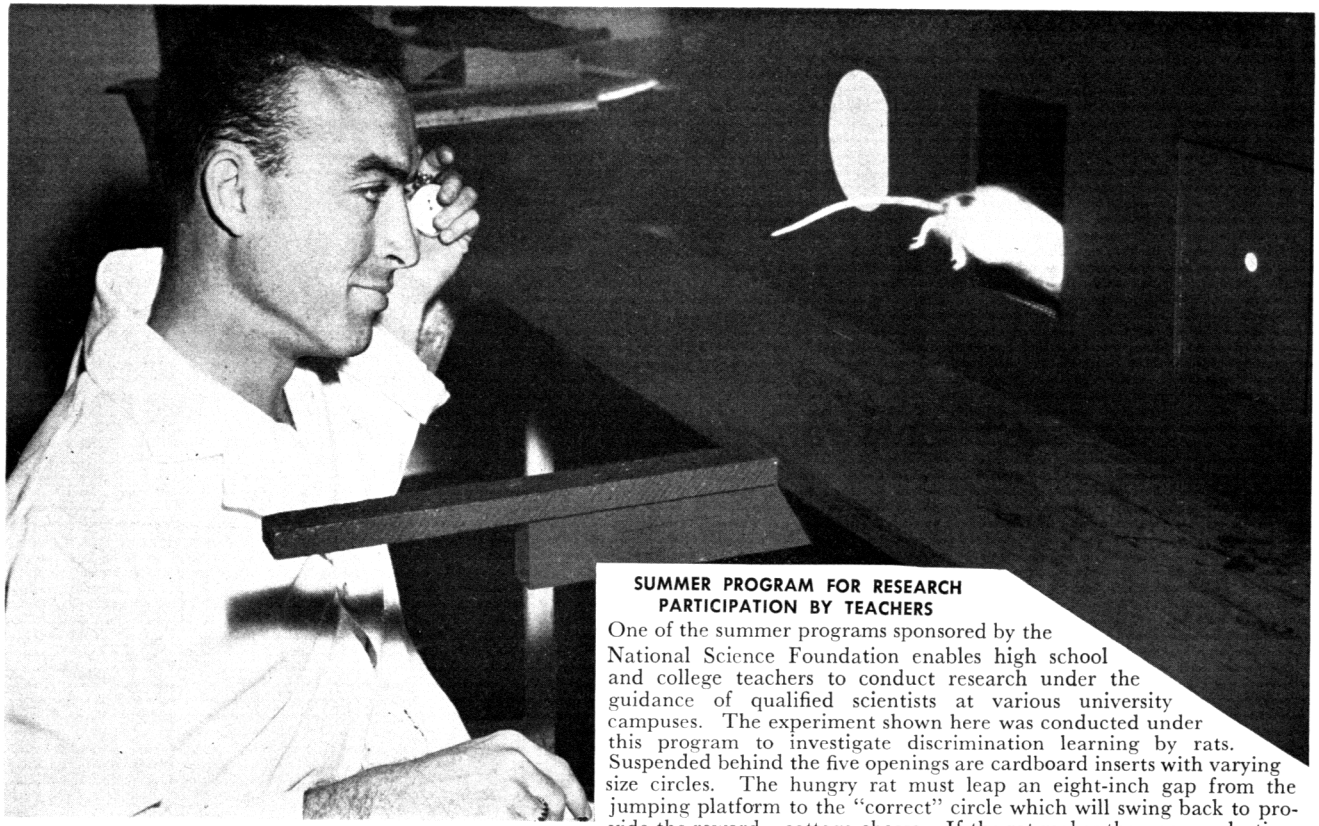
RIGHT PHOTO shows battered gondola containing nuclear emulsion, after one flight and prior to a second.

Balloon-borne Telescope Photographs Interior of Sun Spot



PROJECT STRATOSCOPE continues outstanding balloon astronomy research. The above photograph, released by the Foundation and the Office of Naval Research, was taken by STRATOSCOPE I—12-inch solar telescope-camera—at an altitude of 80,000 feet, and shows clearly for the first time white dots in the center of sun spot umbra. These spots, less than 200 miles in diameter, are apparently convection cells of rising gases, strongly suppressed by the magnetic field of the sun spot.

Photograph below show fused-silica primary-reflective mirror for a 36-inch telescope now under construction for observing stars, planets, and nebulae. The telescope with camera equipment will be lofted by unmanned balloon by the Princeton University STRATOSCOPE II team.

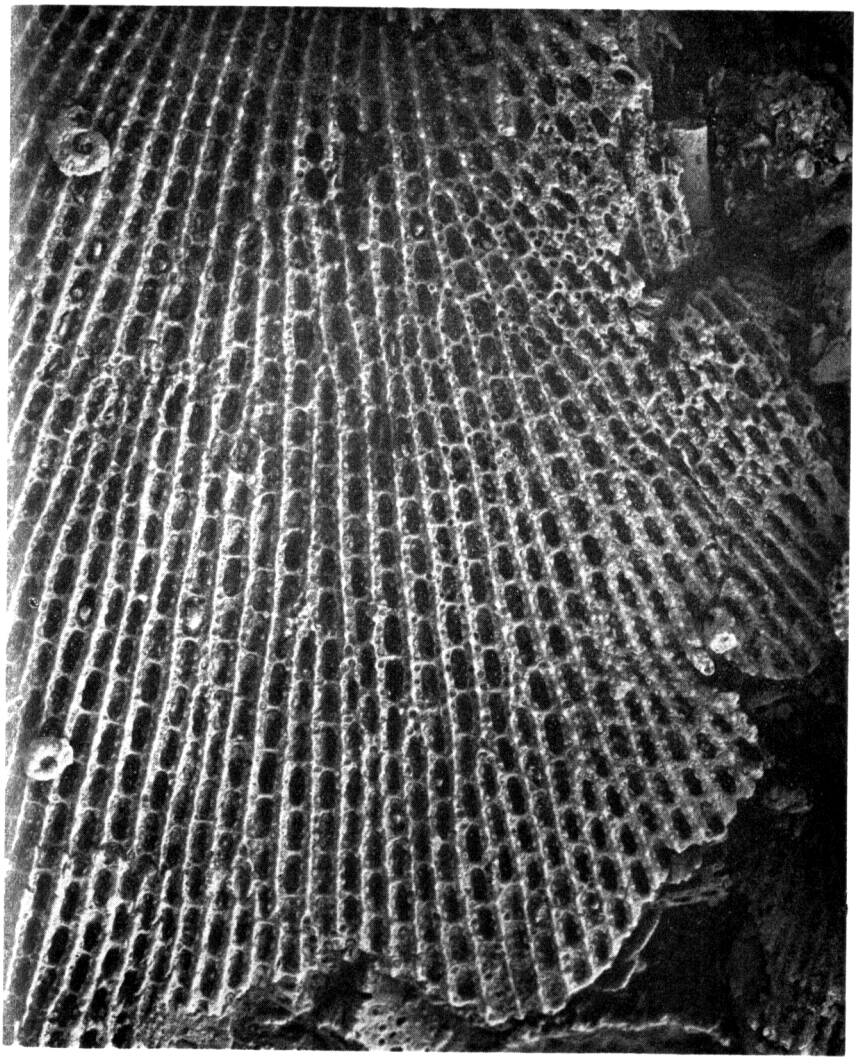


SUMMER PROGRAM FOR RESEARCH PARTICIPATION BY TEACHERS

One of the summer programs sponsored by the National Science Foundation enables high school and college teachers to conduct research under the guidance of qualified scientists at various university campuses. The experiment shown here was conducted under this program to investigate discrimination learning by rats. Suspended behind the five openings are cardboard inserts with varying size circles. The hungry rat must leap an eight-inch gap from the jumping platform to the "correct" circle which will swing back to provide the reward—cottage cheese. If the rat makes the wrong selection, it bumps its nose and falls into a net instead.

Small Aquatic Moss Animals Built Great Reefs

Bryozoa, a group of small aquatic organisms known as moss animals because of their superficial resemblance to plants, are the subject of a comparative study recently undertaken by an NSF grantee. An example of a bryozoan is *Fenestella rudis* Urlich, shown here. The genus *Fenestella* (resembling windows) occurred abundantly during the Paleozoic Era 330 million years ago. Despite an exceptionally delicate structure, nearly infinite numbers of bryozoa, each surrounded by calcareous walls, built great reefs. Some of the largest reefs, estimated to be 240 million years old, occur in the western approaches of the Ural Mountains. Acting much like giant sponges, the reefs often become saturated with oil, and in fact are a principal source of petroleum in Russia. The twisted shells are those of the marine worm *Spirobis,* often found in association with a Fenestella colony.

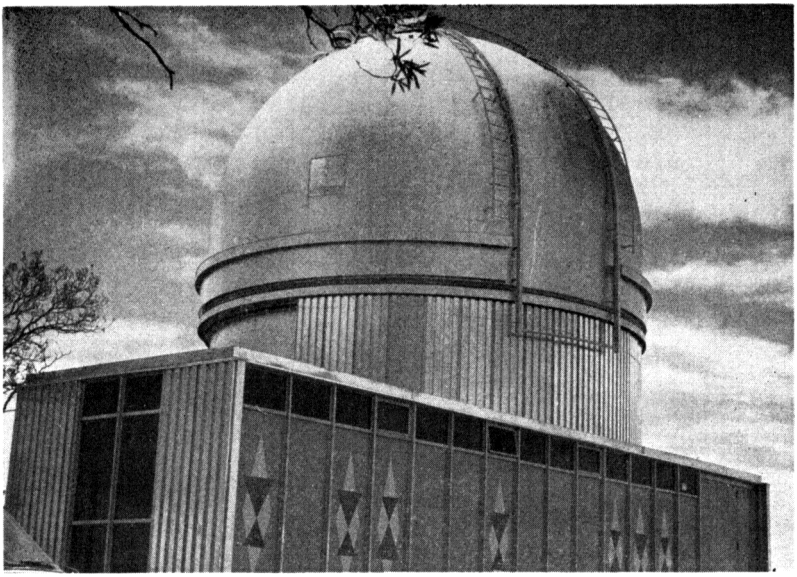


Recognizing the urgent need for new and more modern research facilities, the Foundation has provided assistance to universities and other nonprofit research institutions. The accompanying photograph is of a new 32,000-square foot, 4-story laboratory building at the Marine Biological Laboratory, Woods Hole, Mass. It replaces three wooden buildings dating from the late 19th century and provides research space for approximately one-third of the 375 to 400 summer investigators. It contains such special features as X-ray, cesium radiation, and isotope units, and refrigerated salt water laboratories. The shell of the building is waterproofed reinforced concrete faced with vertical cypress planking.

Unique Sacred Image of Tribal God Found in Arizona Excavations

A unique Katchina, or image of a tribal god, was one of the discoveries of an archaeological expedition to eastern Arizona. The nine-inch multicolored image carved from sandstone was found in a secret crypt in the remains of a large Kiva, or pueblo ceremonial chamber, near Vernon. When unearthed, the image's right arm was missing, probably broken off intentionally to curtail the image's "god-like" powers when the Pueblo Indians abandoned it six to seven centuries ago. The photograph is of a replica made at the site.

For description of other discoveries of this expedition see page 71.

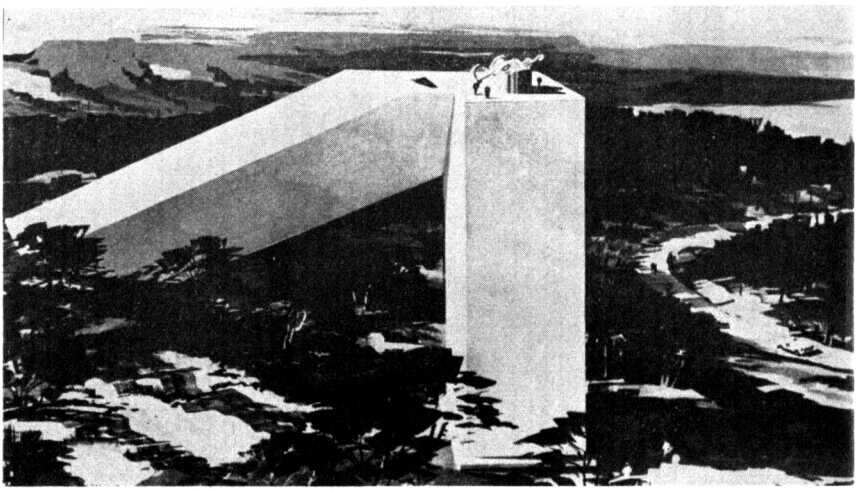


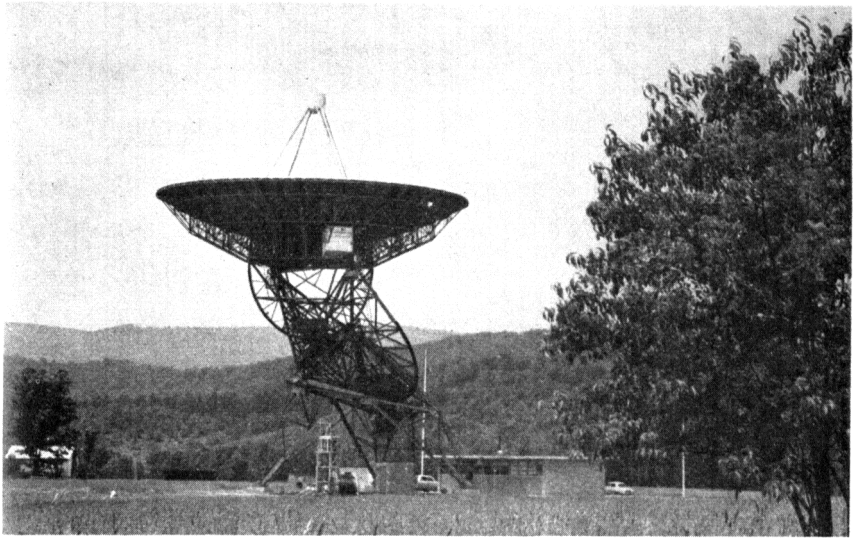
New Optical Facilities at Kitt Peak National Observatory

Kitt Peak National Observatory, dedicated March 15, 1960, has begun a major observing program with its 36-inch reflecting telescope, housed in building shown above. The structure includes office and dark room facilities, and an unusually high pier for the telescope to raise it above air turbulence at ground level.

Below is artist's conception of what will be the world's largest solar telescope, now under construction at the observatory. It will have a focal length of 300 feet, and will form images of the sun almost a yard in diameter. The building will stand 110 feet high, and the diagonal shaft will be 480 feet long, of which 280 feet will be underground. The observing room will also be underground.

Both the Kitt Peak National Observatory and the National Radio Astronomy Observatory are national research centers open to all qualified astronomers. They are maintained by the National Science Foundation; Kitt Peak is operated by the Association of Universities for Research in Astronomy, Inc., and NRAO by Associated Universities, Inc.

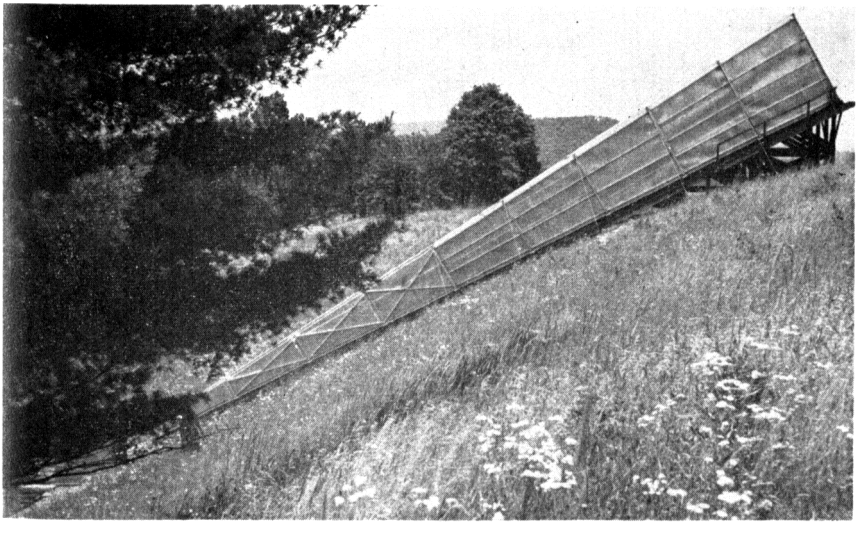


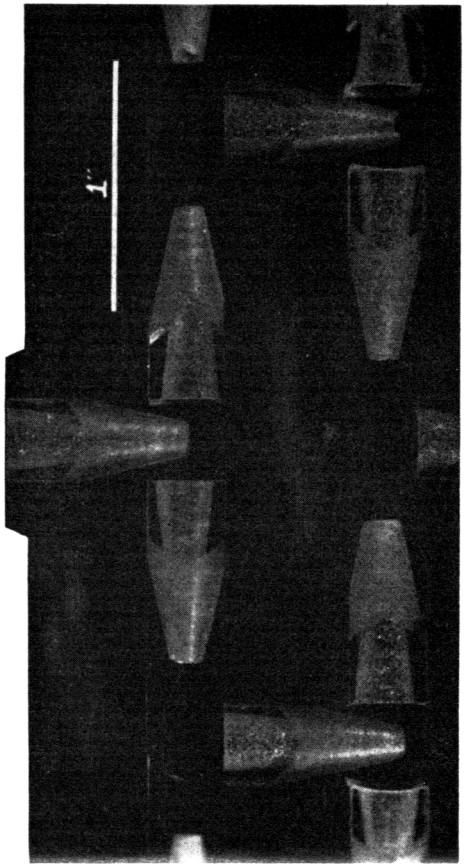


Radio Telescopes in Use at National Radio Astronomy Observatory

National Radio Astronomy Observatory telescopes now include the 85-foot Tatel telescope (above) and the "Little Big Horn" (below). The Tatel instrument has been used since March, 1959, for projects including a radio contour map of the center of the Milky Way galaxy and Project Ozma, to listen for signals by other beings in outer space. It is on a polar mount with one axis parallel to the axis of the earth and the other perpendicular, and may be rotated to point steadily at a celestial object moving across the sky.

The "Little Big Horn" is a radio telescope of unusual design, known technically as a horn antenna. It is fixed so that once each day it observes the strong radio source in Cassiopeia. This is used to measure accurately the energy of the incoming radio waves—which the 120-foot-long horn is particularly suited to do—and thus provides a calibrated source in the sky that all radio astronomers may use as a standard.





Maze for Studying Variation in Gravity Response of Fruit Flies

A. Entire maze. Flies are introduced in vial at left and finish in vials at right, being attracted by food in the latter vials and by a fluorescent light in a vertical position at the right. Variation in response to gravity causes the flies to finish in vials at different heights. By means of this maze it has been possible to show that the genetic variability of flies introduced into the maze influences the variability of their response to gravity. (See page 68). ⟶

B. Maze consists of numerous T-units in which flies, moving from left to right, are confronted with choice of going upwards or downwards. Cones discourage backward movement of the flies in the maze. One such unit and parts of two others are shown here.

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