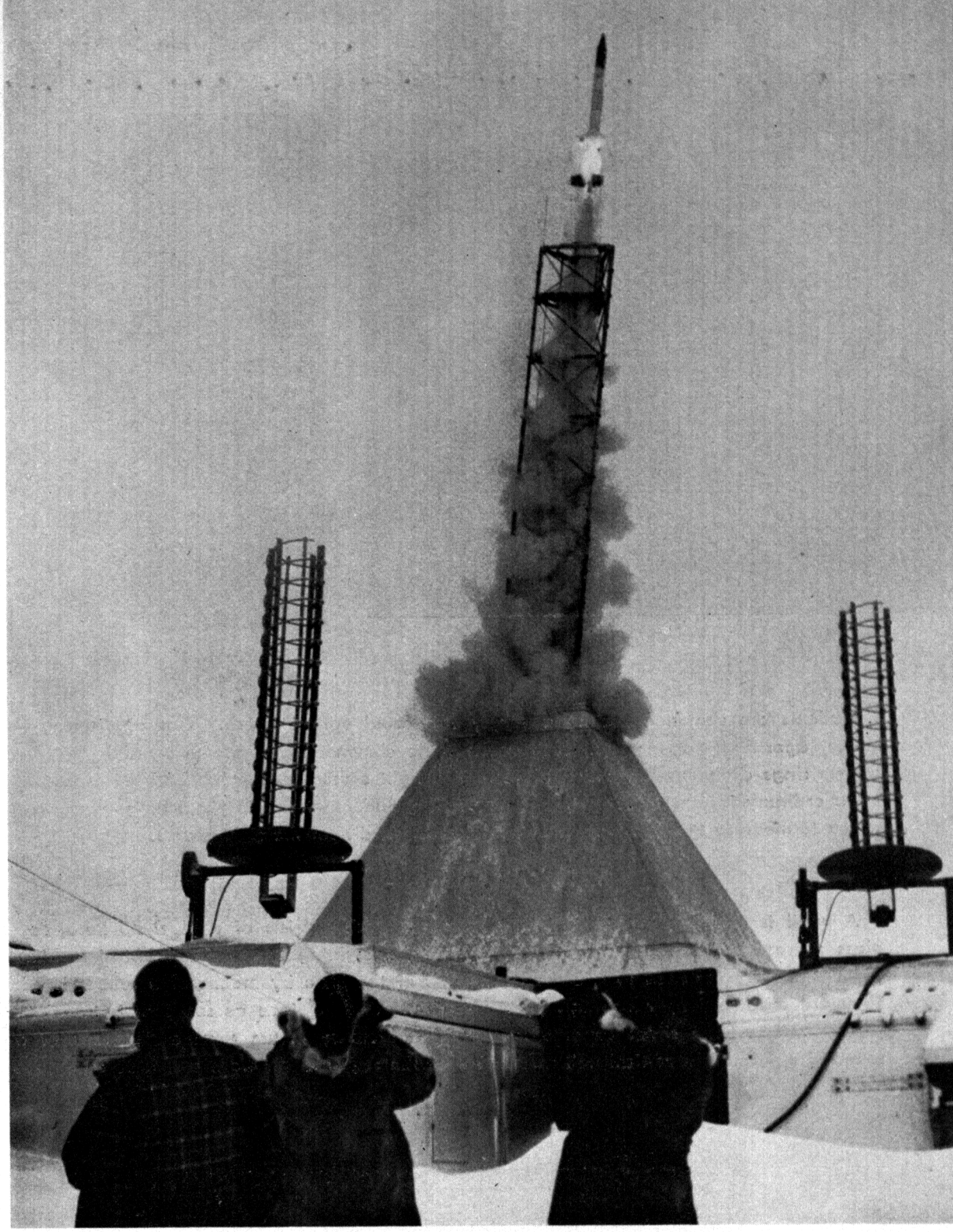
NATIONAL SCIENCE FOUNDATION

A Photographic Sampling of Foundation-Supported Activities



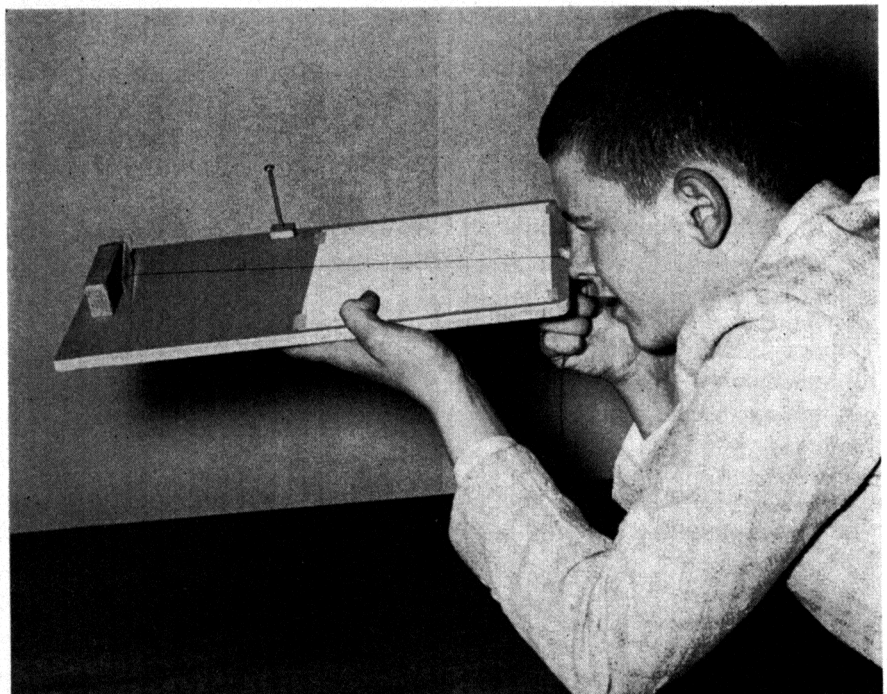
UPPER ATMOSPHERE RESEARCH

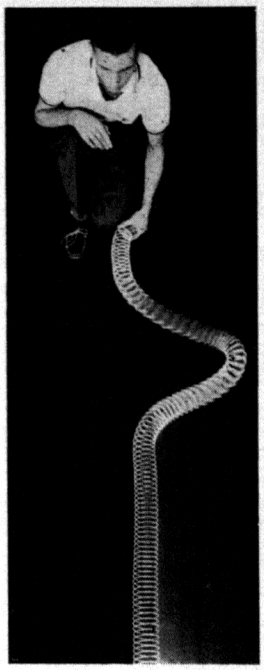
An Aerobee-Hi liquid-fuel research rocket is shown being fired at the IGY rocket-launching site; Fort Churchill, Manitoba, Canada. It carries an instrument payload of 150 pounds in a 4 to 6 cubic foot space to altitudes of 150 miles. The launching platform is set indoors because of the extreme cold during the winter months. The launching tower can be tilted to counteract the effect of winds. Antennas, on each side of launching stand, are used in tracking rocket in flight.

This is part of the United States program for the International Geophysical Year conducted through the U. S. National Committee with Federal coordination being provided by the National Science Foundation.

Students are shown operating a simply fabricated optical bench. Optical elements—lenses, apertures, screens, etc., such as on table shown above—are mounted in wooden curtain rings clamped to wooden blocks. The light source, at the left end of the bench, is an ordinary incandescent bulb in a can. The student at left is positioning an opaque screen to measure the focal length of a lens positioned near the light source.

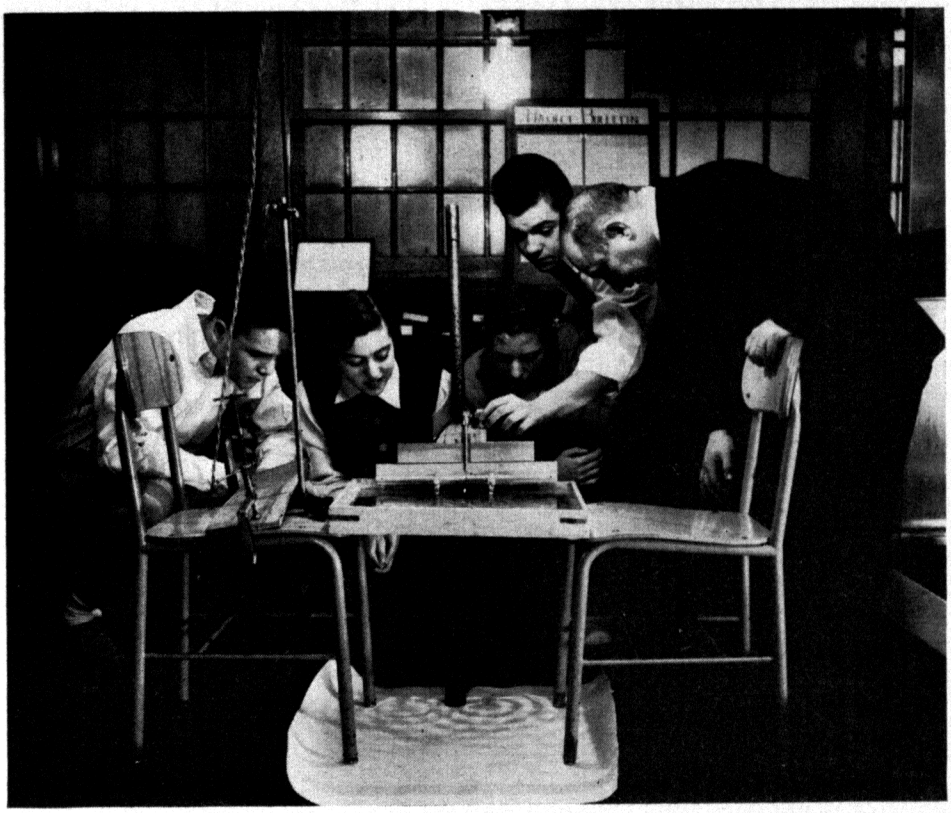
A pupil is shown using an optical micrometer which consists of a plywood base, two glass microscope slides, a reference object, and a sighting thread for calibration. The glass slides are fastened to a block at the left of the base by means of a rubber band. They are separated near one end by a pivotal needle. Objects as small as human hair placed between the slides cause a measurable difference in the apparent position of a reflected object. The vertical nail mounted near the center of the base serves as an object.



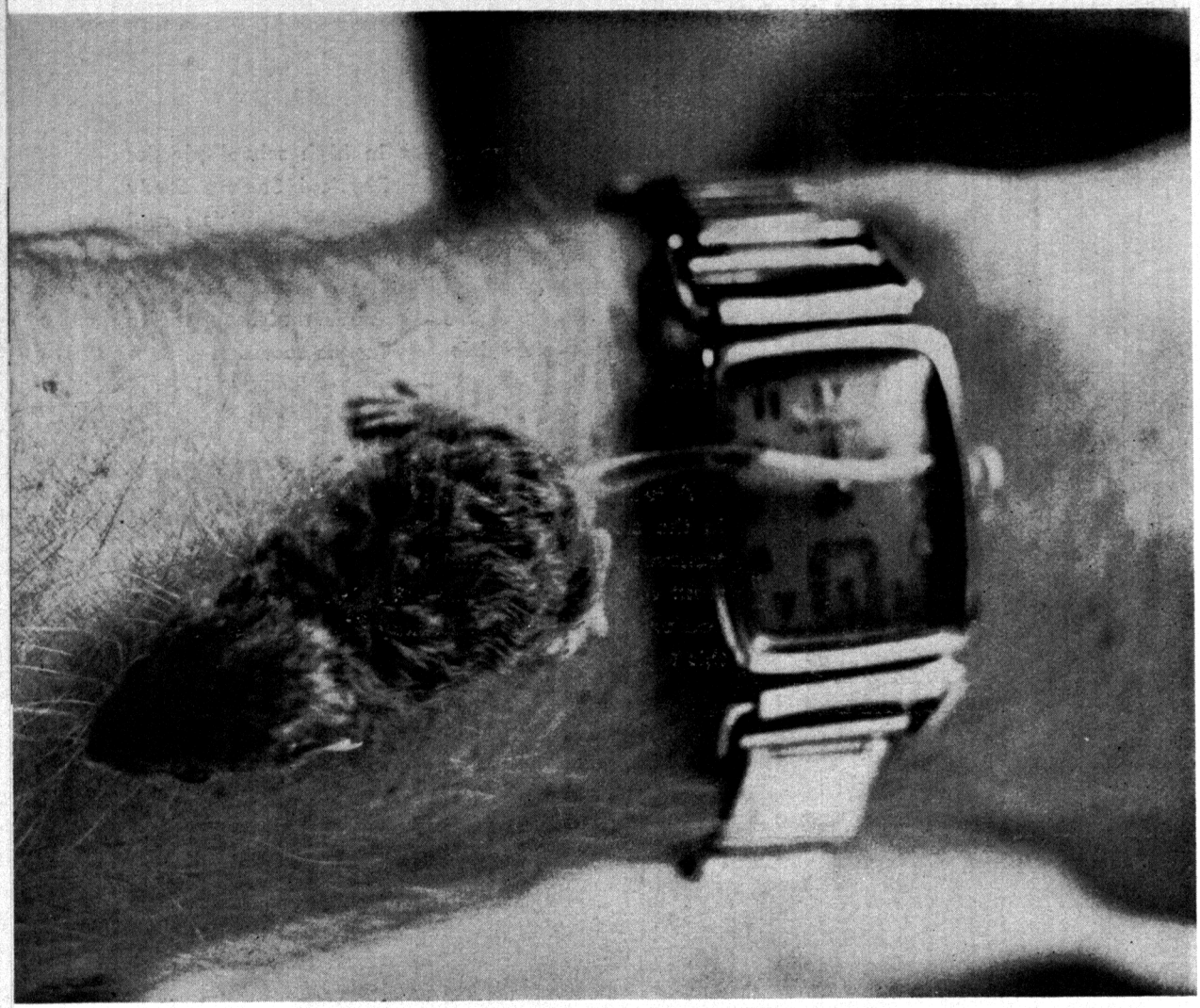


A completely new course in high school physics has been prepared by the Physical Science Study Committee composed of outstanding physicists and experienced successful high school teachers with support from the National Science Foundation. (See page 65.) Some of the ingenious and inexpensive equipment developed for use in this course is shown here.

A teacher holds one end of a "slinky" toy used in the study of wave motion. The photo shows a transverse wave formed by a quick lateral movement of the spring. Interesting effects of wave reflection and superposition may also be studied with this toy.

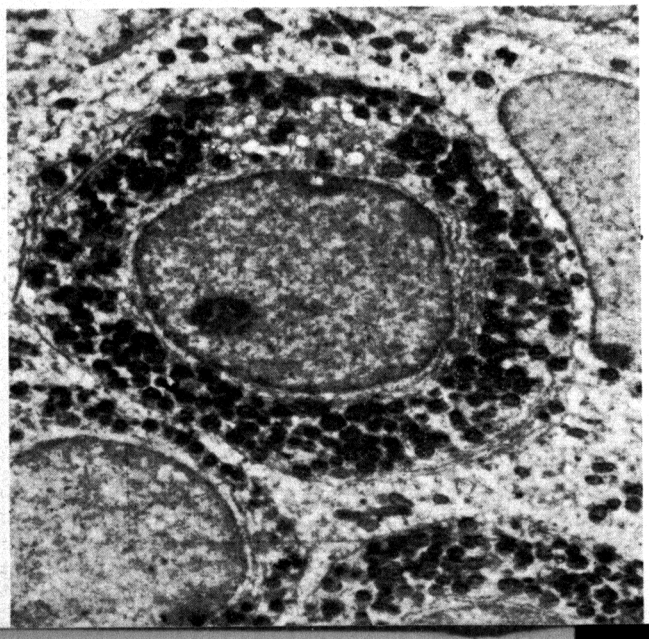


High school students using a ripple tank fashioned from readily available materials. The tank consists of a glassed-in window frame, balanced on two chairs, containing a half inch of water. The rippler is a vibrating wooden plane assembled from scraps of lumber, and powered by a six-volt hobby motor. In operation, the light source at top center, formed from an ordinary bulb in a modified tin can, projects the ripple pattern on a paper screen on the floor.



DWARF MOUSE PROVIDES CLUE TO NATURE OF GROWTH HORMONE PRODUCTION

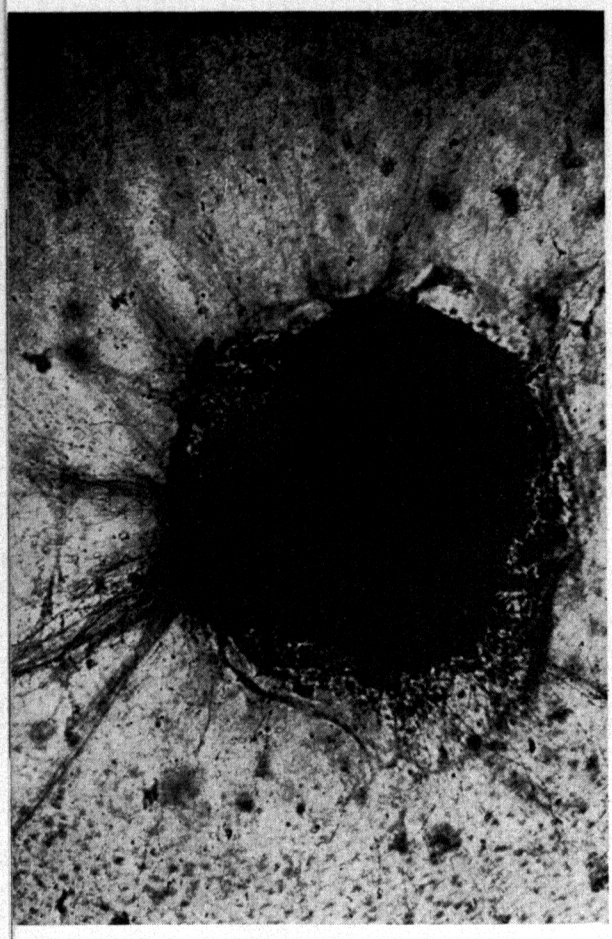
Comparison of dwarf mice—mice of normal size and appearance at birth which fail to grow—with normal mice has provided evidence that the absence of cellular granules is linked with the demonstrated absence of growth hormone produced in the anterior pituitary gland. Electron micrographs, enlarged 10,000 times, of this gland in a 21-day-old drawf mouse (lower left) shows the absence of large granules and the reduction of amount of cytoplasm of the dark cells (probably remnants of the acidophiles). A micrograph of the same part of the pituitary gland in a 21-day normal mouse shows the large granules surrounding the nucleus (lower right).

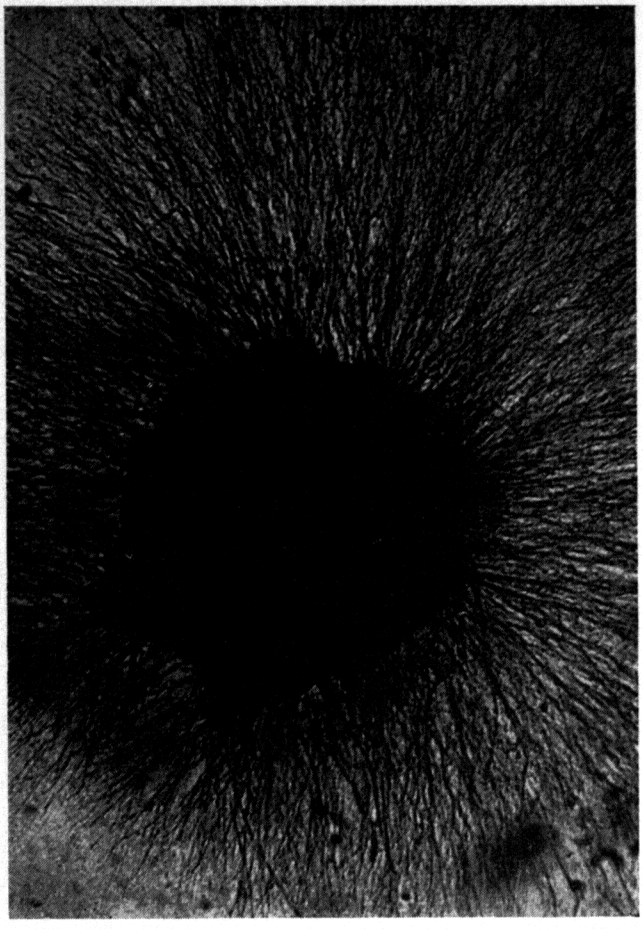


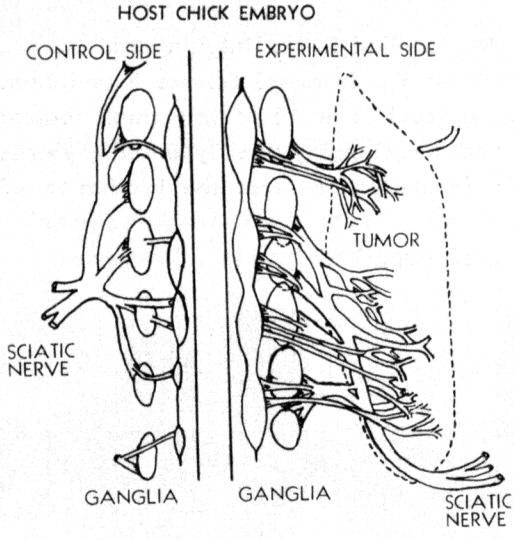
NUCLEAR REACTOR—ONE OF MOST POPULAR U. S. SCIENTIFIC EXHIBITS AT THE 1958 BRUSSELS WORLD'S FAIR

The nuclear reactor was one of 51 U. S. exhibits installed in the International Science Section of the Fair, through the coordination efforts of the National Science Foundation. The built-in safety factors and low operating power level (1 watt) of this small reactor permitted actual operation at the Fair. It is a modified swimming pool type using plastic embedded U^{235} enriched fuel. Among the public demonstrations was the irradiation of silver coins to produce harmless radioisotopes.

Other exhibits can be seen in the background. (See page 77.)

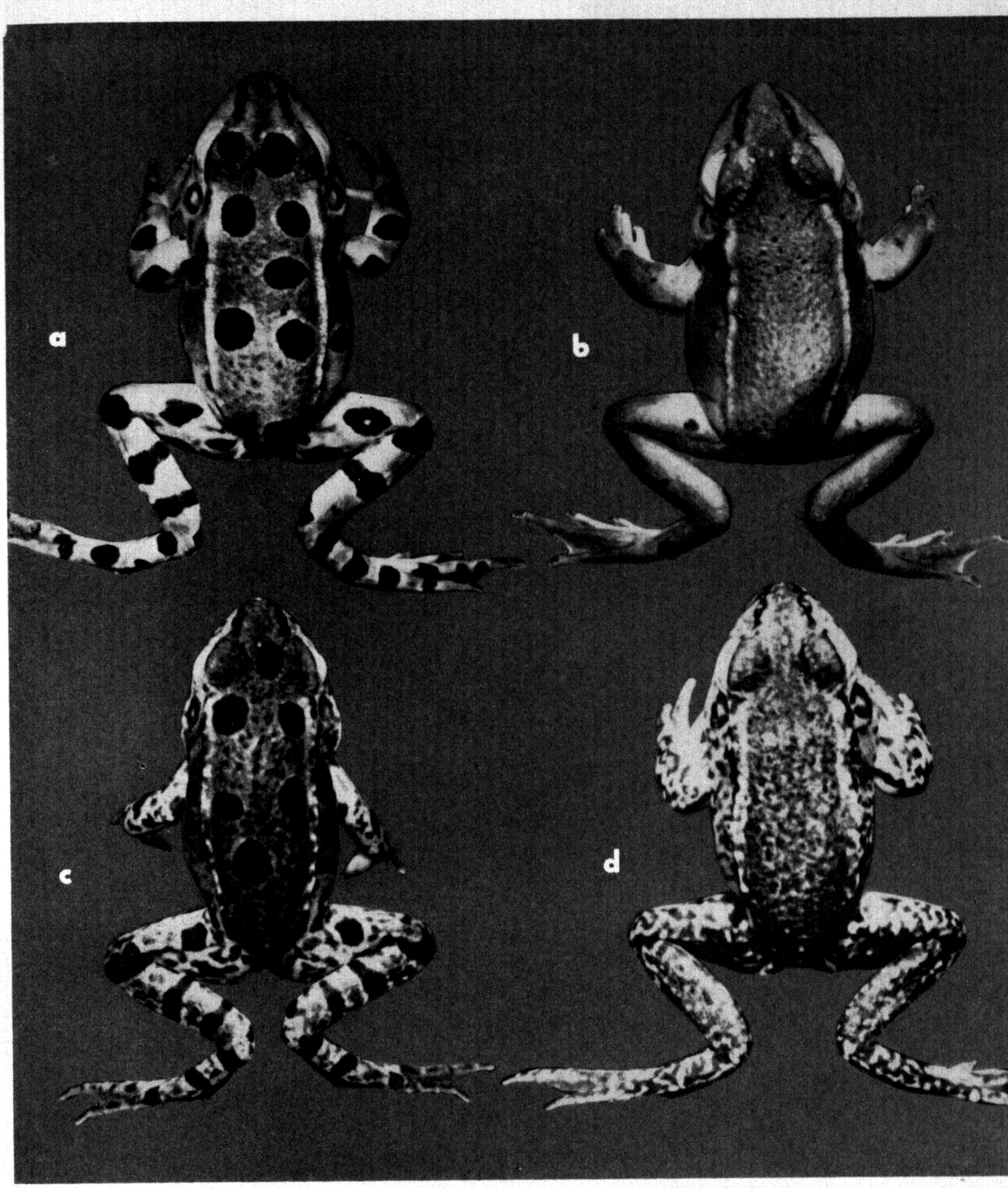






NERVE GROWTH STIMULATED BY AGENT FROM SARCOMA (A TYPE OF CANCER NOT INVOLVING NERVE TISSUE)

The influence of a diffusible agent from a mouse tumor, transplanted into a chick embryo, on the size of the ganglia and the number of nerves growing from them, can be seen from the sketch. The photo on the left shows the normal growth of a ganglion of a 10-day chick embryo as grown in tissue culture; the photo on the right shows the growth and proliferation of the nerve fibers of the ganglion 24 hours after a single drop of the mouse tumor agent was added. **(See page 31.)**

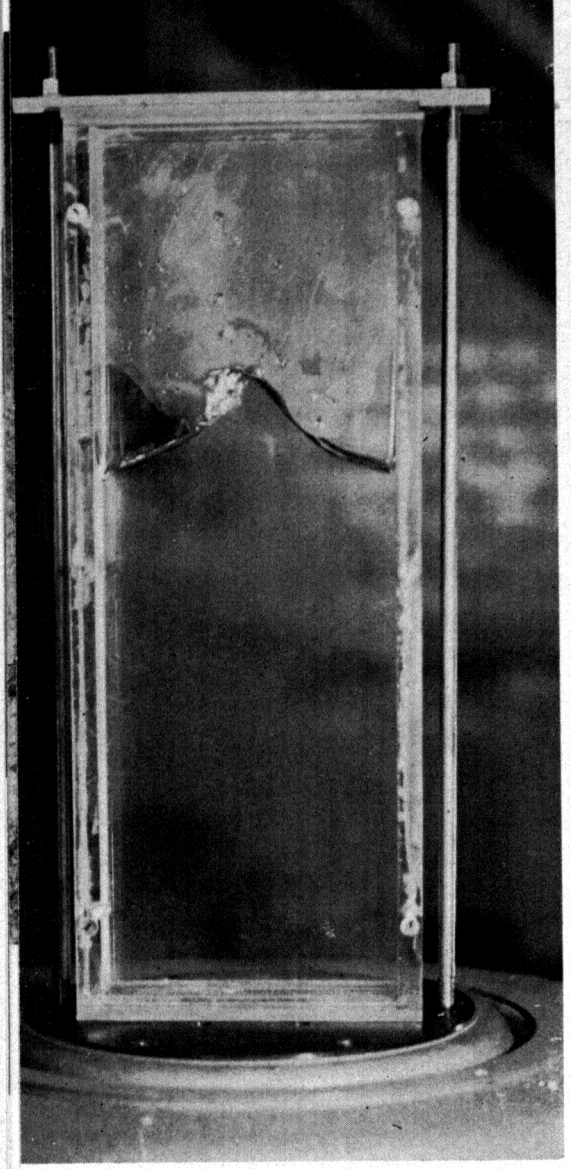


GENETIC STUDIES AID IN REVISING TAXONOMIC CLASSIFICATION

Three obviously related types of frogs belonging to the Genus Rana (see (a), (b), (c) on photograph) have been classified as different species on the basis of their pigmentation differences. Genetic studies, however, have revealed that two of these so-called species—Burnsi (nonspotted) and Kandyoshi (mottled)—(b) and (c), are dominant mutant variants of the common spotted leopard frog (a).

A fourth variant (d), which is not found in nature, was produced by crossing the nonspotted and mottled varieties. Since the nonspotted and mottled types are known to coexist the failure to find this particular cross in nature may indicate that it is at a selective disadvantage.

The other three forms are obviously successful or else they would not be so prevalent.



LIQUID BEHAVIOR STUDIED UNDER WIDELY VARYING CONDITIONS

Two projects carried on under Foundation grants serve to illustrate the wide range of studies of liquid behavior. The top photograph shows the primary stage of a surface wave just preparatory to bubble formation, in a liquid under vibration. This study explored the characteristics of bubbles in various types of liquids and under varying vibration conditions. The lower photograph illustrates research into the energy of two-dimensional water waves, through the use of a model tank which can generate both water waves and winds above the waves. The wave-absorbing ability of various arrangements of vertical walls was examined in this study.