

Technology Notes

OPTICS

Eyeball Switch for Space

A control device that could let an astronaut change his position in space by simply shifting his gaze has been developed for the National Aeronautics and Space Administration.

Called an oculometer, the device operates by continuously tracking a part of the boundary between the pupil and iris of the eye, and the reflection in the cornea of a light source fixed within the unit. No contact with the subject's head is necessary; he has only to hold his head so that he can see through the unit's eyepiece.

Besides being usable to control machinery or electronic devices, according to Honeywell Inc., Boston, who developed the unit, the oculometer may also prove useful as a device for physiological and psychological test monitoring.

Only a test version has been constructed so far, and several changes are recommended for any future models. One is to minimize the amount of hardware—beam splitters, light sources, etc.—in front of the user's eye. Another is the use of a light source of some nonvisible wavelength that will be less disturbing to the eye.

ASTRONOMY

Faster Star Measurements

A study of the actual or "proper" motions of the stars in the Milky Way galaxy will be completed at least 50 years ahead of schedule thanks to automatic measuring equipment at the University of California's Santa Cruz campus.

Between 1947 and 1954, all the stars visible from Lick Observatory on Mt. Hamilton were photographed. They were to be photographed again in the early 21st century, so that measurable differences in star positions would have had time to develop. Tedious comparisons between the two sets of plates, estimated to take another 40 or 50 years, were then to be made to yield the stars' proper motions.

Experiments at International Business Machines Corp.'s research center in Yorktown Heights, N. Y., however, have led to the construction of automatic position-measuring equipment that can pick out changes on the plates as small as 40 millionths of an inch. As a result, the second group of photographs will be taken soon, instead of several decades from now. In addition, when the series is completed, the comparison can be done in only four or five years, says Dr. Stanislaus Vasilevskis, Lick astronomer in charge of the study.

METEOROLOGY

Laser Measures Cloud Heights

A completely automatic laser system which measures the distance between ground and cloud level and provides information on the thickness and structure of the cloud has been developed by ASEA, a Swedish electrical engineering company in Stockholm.

The system, soon to be delivered to the Royal Swedish Board of Aviation, emits a straight-up laser pulse lasting

about 25 nanoseconds. If a cloud is overhead, part of the light is reflected back to the instrument's receiver, stopping an automatic timer which indicates the distance to the cloud's base. Secondary reflections come from the interior and top of the cloud.

PHOTOGRAPHY

Giant Camera Takes Tiny Pictures

A camera 32 feet long, 7.5 feet high and weighing 11,000 pounds is being used by the Army Electronics Command in Ft. Monmouth, N.J., to reduce huge electronic circuit drawings to microminiature size.

The drawings, on huge plastic sheets, move into place above the camera on an overhead railway. Each drawing is photographed more than 100 times onto a negative about the size of this page, producing a size reduction of about 100 to one. Then each multiple negative is re-photographed again onto a glass plate, after focusing the camera by microscope.

The plates are then used to produce hundreds of identical microcircuits by conventional photo-etching process. Since a speck of dust would nearly obliterate one of the tiny photographs that go into the plate, a special filter in the facility screens out particles as small as 20 millionths of an inch, while lint-free smocks, caps, gloves and shoe covers are required of the operators.

ASTRONAUTICS

Space Snake for Tricky Handling

A snake-like extension arm called a "serpentuator" is being developed by the National Aeronautics and Space Administration for handling tools, men and equipment in space.

The serpentuator can be controlled from either end. Hydraulic or electrically powered hinges enable it to move. NASA is considering a variety of models including "insep," a 20-footer for use within space stations; "exserp," a 100-foot electric unit for outside work; and a monster snake hundreds of yards long that might be used to assemble large structures in space.

Invented in NASA's Marshall Space Flight Center, Huntsville, Ala., the serpentuator is being further developed by Astro Space Labs, Inc., also of Huntsville.

ELECTRONICS

Long-duration Gas Lasers

The first gas lasers to produce beams of ultraviolet light continuously for up to 1,000 hours are being made commercially available by Radio Corporation of America, Lancaster, Pa.

Output of the laser, which uses neon gas, is variable up to 10 milliwatts, 90 percent of which is concentrated in a beam one millimeter in diameter. Ultraviolet lasers are of particular interest, RCA points out, because organic substances such as dyes, photographic emulsions, biological materials and even human skin—suntanning is an example—are especially susceptible to very short UV wavelengths.