

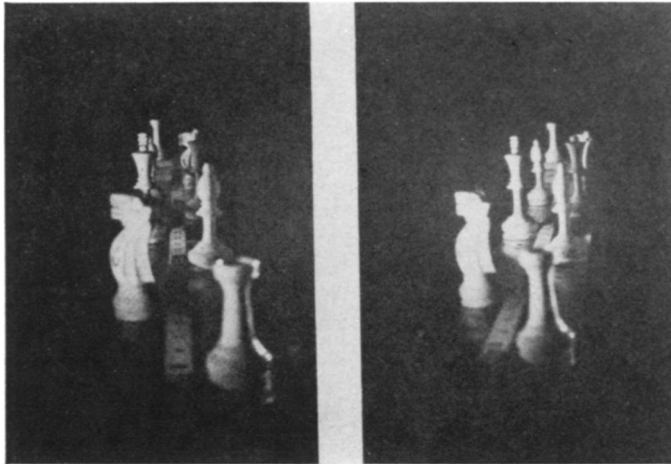
# Technology Notes

## LASERS

### Hologram Photography Enlarged

A four-foot object—in this case a row of nine chessmen spaced six inches apart—has been successfully reproduced by a laser hologram at Bell Telephone Laboratories.

Previously, the size of an object clearly photographed



by hologram was limited to about one foot.

Holography is a way of recording a three-dimensional scene on a photographic plate. Laser light is split into two beams, one going directly to the plate and the other bouncing off the object. The two beams interfere with each other to form a pattern that depends on the shape of the object. When laser light is later shone through the pattern on the plate, a three-dimensional image is formed in space that duplicates the original object.

In order to get a satisfactory hologram, the beam that goes directly to the plate has to travel about the same distance as that reflected from the object, with a leeway of about one foot. This limits the size of the object to that length.

The BTL technique, developed by D. O. Melroy, consists of splitting the reflected beam into four parts, each aimed at a different section of the object. By proper arrangement of mirrors and lenses, each part of the reflected beam is made to travel the same distance to the plate, so that each matches the direct beam.

## FLUIDICS

### Simple Carburetor Tested

A radical new design for automobile carburetors, based on the technology of fluidics, (SN: 1/21) has been tested with good results, reports its inventor, Alan M. Binder.

The new design is simple and cheap—mass produced, it should cost less to replace than it does to overhaul a conventional carburetor, says Binder, a mechanical

engineer now with Sanborn Division, Hewlett-Packard Co., Waltham, Mass.

The device has other advantages typical of fluidic control systems: simplicity, no moving parts (except a throttle), and high reliability.

Heart of the device is a Y-shaped passage in the fuel line that controls the flow of gasoline into the engine. A conventional fuel pump sends the gasoline into the base of the Y. From there, part of it goes into one arm of the Y, which is connected to the combustion chamber, and the rest goes to the other arm, which returns it to the fuel tank.

A sensor measures the flow of gasoline and air into the combustion chamber; this flow regulates how much gasoline goes into each arm of the fluidic Y. The wider the throttle is open, the more flow, and the more gasoline goes into the combustion chamber arm.

Binder built a crude model of the carburetor and ran it for 1,000 miles in an ordinary automobile. He reports his findings in the August JOURNAL OF THE SOCIETY OF AUTOMOTIVE ENGINEERS.

## METALLURGY

### Thicker Iron Oxide Films

Researchers at the National Bureau of Standards have explained the growth of oxide films on iron. The research could lead to improved prevention or reduction of metal corrosion.

Iron exposed to oxygen forms a very thin film of iron oxide which prevents further oxidation of the metal. It has been found that this film could be thickened by a factor of five or more by heating the iron in a vacuum and then exposing it to oxygen again. The thicker film gives better protection, but why it forms was a mystery.

In new experiments, Dr. Jerome Kruger and H. Thomas Yolken of NBS's Institute for Materials Research concluded that the oxide film changed from one chemical form,  $Fe_3O_4$ , to another,  $FeO$ , at temperatures above 400 degrees C. This change causes thin areas to appear in the film, which grow up again when the metal is again exposed to oxygen.

The research was reported in the August JOURNAL OF THE ELECTROCHEMICAL SOCIETY.

## ELECTRICAL ENGINEERING

### Sodium Power Cables

Sodium, a metal never found uncombined in nature because it is so active chemically, is being used to carry electricity to the new town of Litchfield Park by the Arizona Public Service Co.

The sodium cables are being laid underground, shielded from air and water by a plastic coating. Conventional copper wires deliver current to individual homes.

Although not as good a conductor as copper, sodium is much cheaper. The savings realized by using the cheaper material will compensate the extra expense of putting the lines underground, says the power company.