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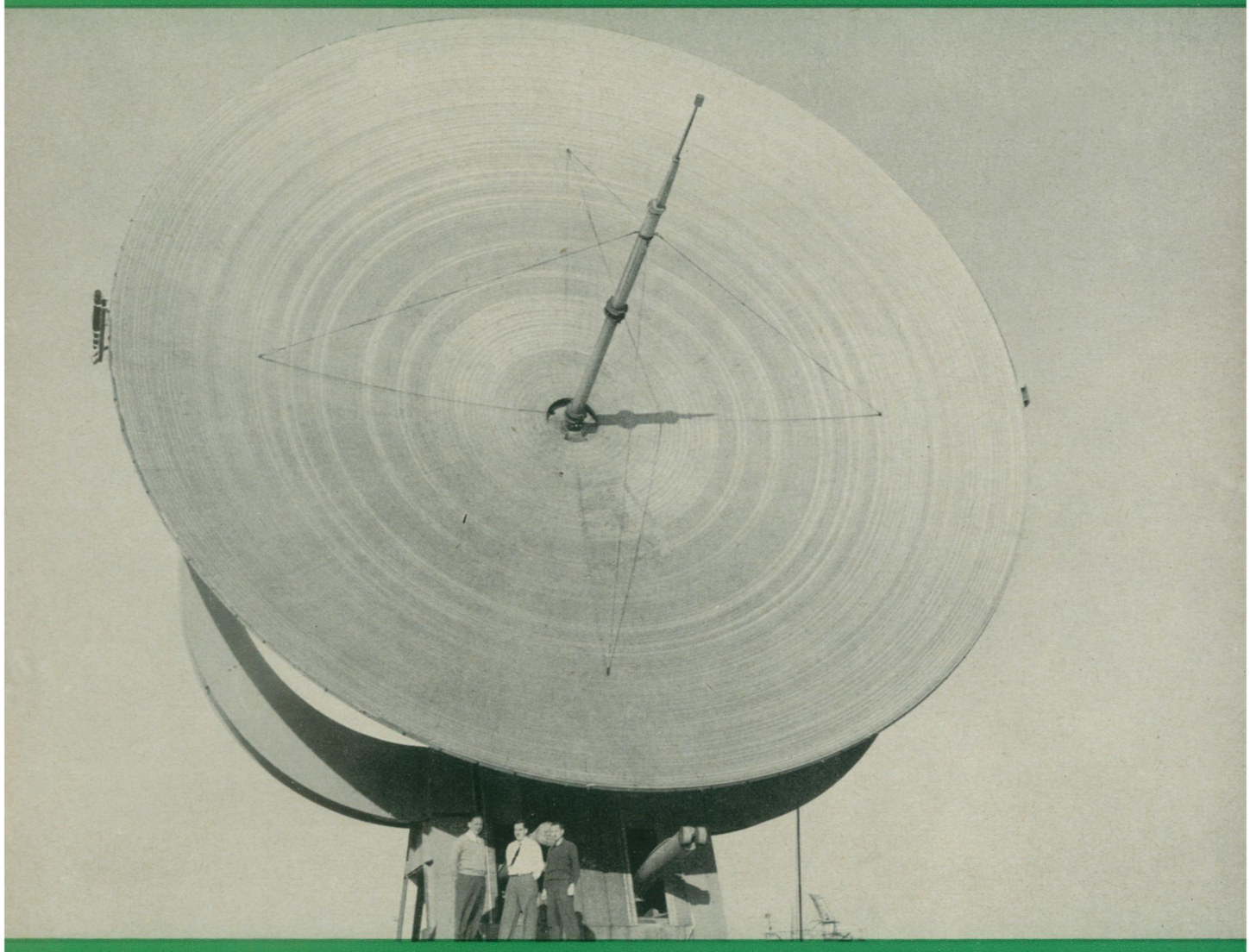
SCIENCE NEWS LETTER

®

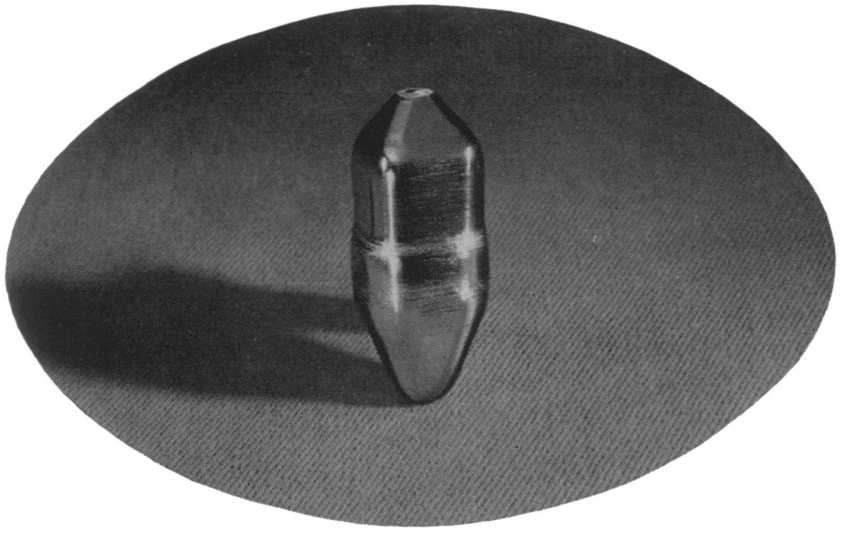
THE WEEKLY SUMMARY OF CURRENT SCIENCE



600-Inch "Saucer"

See Page 23

A SCIENCE SERVICE PUBLICATION



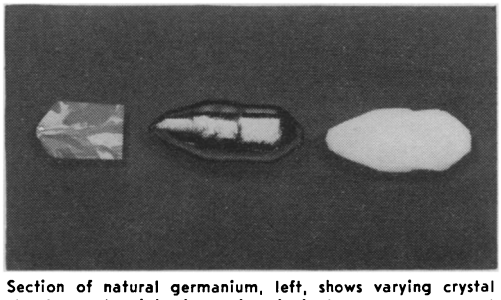
Germanium crystal grown at Bell Telephone Laboratories (half size). It is sliced into hundreds of minute pieces to make *Transistors*. Transistor action depends on the flow of positive current-carriers as well as electrons, which are negative. Arsenic—a few parts per 100,000,000—added to germanium produces prescribed excess of electrons. With gallium added, positive carriers predominate. Latest junction type *Transistor* uses both kinds of germanium in the form of a sandwich.

THEY GREW IT FOR TRANSISTORS

Heart of a ***Transistor***—Bell Telephone Laboratories' new pea-size amplifier—is a tiny piece of germanium. If ***Transistors*** are to do their many jobs well, this germanium must be of virtually perfect crystalline structure and uniform chemical composition. But it doesn't come that way in nature.

So—Bell scientists devised a new way to *grow* the kind of crystals they need, from a melt made of the natural product. By adding tiny amounts of special alloying substances to the melt, they produce germanium that is precisely tailored for specific uses in the telephone system.

This original technique is another example of the way Bell Laboratories makes basic discoveries—in this case the ***Transistor*** itself—and then follows up with practical ways to make them work for better telephone service.



Section of natural germanium, left, shows varying crystal structure. At right is sectioned single crystal grown at Bell Laboratories.

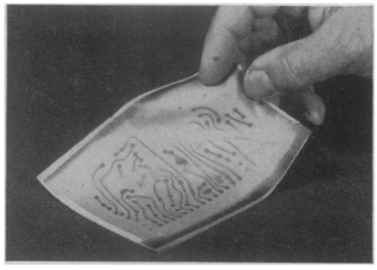
BELL TELEPHONE LABORATORIES

IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS

Kodak reports to laboratories on:

a useful new photosensitive liquid... how to find out more about cellulose acetate sheeting... how 3 x 5-inch file cards turn into a library

Photo resist



That's a circuit for an item of electronic gadgetry you see here, printed on a bit of limp glass-fiber cloth. It was made by 1) laminating a sheet of copper foil over the cloth, 2) coating a light-sensitive acid resist over the foil, 3) exposing to light through a photographic negative of a drawing of the circuit, 4) washing away the resist where the opaque areas of the negative prevented it from hardening, and 5) etching away the foil where the remaining resist did not protect it.

Printed circuits *per se* are no longer newsworthy. The kind of printed circuit news that is interesting today is of ways to turn them out more efficiently. If, for example, the light-sensitive material could be deposited on the foil-laminated support months in advance instead of just before exposure, the whole process would be considerably streamlined. If the exposure time required could be drastically reduced, that too would help. If atmospheric changes did not affect that exposure time, there would be less spoiled work.

It so happens that we have just placed on the market a material called *Kodak Photo Resist* which fulfills these conditions. It can be conveniently and quickly processed in a tray. It can also be processed in an ordinary vapor degreaser, with the usual trichloroethylene solvent. It can be dyed. It resists all commonly used acids and alkalies. It resists cyanide plating baths. It requires no "burn in" to adhere to metal. It contains no chromium salts, which are known sometimes to irritate the skin. It is not based on bichromated gelatin, silver halides, or diazo dyes. As a matter of fact, it is based on a photosensitive substance never previously used.

Possibly a few miscellaneous souls other than the photoengravers, photolithographers, color-TV-tube makers, circuit printers, and nameplate makers we had in mind will be glad we took the trouble to work it out.

Kodak Photo Resist, Kodak Photo Resist Developer, and Kodak Photo Resist Dye, *along with complete directions for use, are sold by a Kodak Graphic Arts dealer in your vicinity. For help in locating him, write Eastman Kodak Company, Graphic Arts Division, Rochester 4, N. Y.*

Kodapak Sheet

Since plasticized cellulose ester sheeting finds use in many technologies even more complex than manufacturing the familiar orchid box, we have just put out a newly revised pamphlet in which we tabulate a great many of the mechanical, optical, thermal, chemical, and electrical properties of the various forms of Kodapak Sheet. The gist of it is that Kodapak Sheet, which may be readily formed by means of heat and pressure, cemented, or high-frequency sealed, is quite a versatile material.

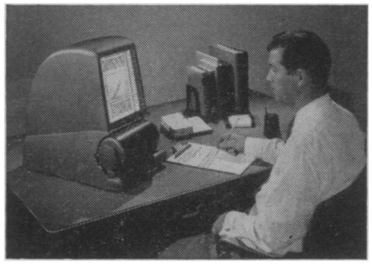
You can obtain a copy of "Properties of Kodapak Sheet" by writing Eastman Kodak Company, Cellulose Products Division, Rochester 4, N. Y.

Microprint

It's the brutal truth that a man or woman is covering a narrow field indeed if he or she can honestly claim to be abreast of all that's set down on paper about it. A remedy —microprint cards—has been proposed by which a library card catalog can replace the library itself. Almost a decade of development has demonstrated its merit. Since it is based on photography, the time has come to state our position on it:

Before 1954 ends, you will be able to walk into dealers' establishments throughout the United States and be shown the *Kodagraph Microprint Reader*. This is an instrument, weighing less than a standard typewriter, for reading microprint cards with complete comfort. Microprint cards, usually the standard 3″ x 5″, look like the familiar library catalog card, carrying classification data, perhaps a brief abstract, etc., but, instead of having then to locate the item cataloged if it seems pertinent, it's right there on the back of the card in microprint—as many as 60 pages of the actual text.

"Complete comfort" is very important. Without it there would be no spreading of microprint readers from large libraries to smaller ones, and on down to the individual user's office, desk, and even home. With large numbers of users to share the cost, microprint card literature will become vastly more extensive and intensive than it has already grown. Economic barriers to the development of automatic subject-searching equipment will fall. New microprint publishing ventures will flourish—some for profit, some for the



promotion of scholarship in fields too sparsely inhabited to support the cost of conventional publication. More industrial organizations will establish microprint systems for the debulking, speedy dissemination, and storage of private internal data as well as current publication in fields of special interest to the organization.

Our part is to work closely with everybody, supplying technical hints, *Kodagraph Micro-File Film*, *Kodagraph Microprint Paper*, and equipment to turn out microprint cards by the piece or by the peck.

If the possibilities of microprint interest you, we'd appreciate your dropping a note to Eastman Kodak Company, Industrial Photographic Division, Rochester 4, N. Y., to let us know the nature of that interest.

This is one of a series of reports on the many products and services with which the Eastman Kodak Company and its divisions are . . . *serving laboratories everywhere*

Kodak
TRADE-MARK