

## ELECTRONICS

# Bead Amplifies Current

Small electrical bead, only half-pea size, amplifies current a million times. Called a junction transistor, it operates on a millionth of a watt.

## See Front Cover

➤ A RADICALLY new and effective amplifier, called a junction transistor, was announced by Bell Telephone Laboratories.

Although only half the size of a pea, it amplifies electrical signals a million times. It requires only a millionth of the power of the smallest miniature electron tube that it threatens to replace.

The new spidery object consists of a small bead,  $3/16$  inch in diameter, with three wires extending from it. It is extremely efficient and rugged. It operates on about a millionth of a watt, which is far less power than an ordinary flashlight bulb.

Its inventor is Dr. William Shockley who during the past three years has directed the research group pioneering the development of the new amplifying transistors, a new group of electrical device.

The radically new type of transistor now produced in small quantities has "astonishing properties never before achieved in any amplifying device."

The junction transistor consists of a tiny rod-shaped piece of germanium, treated so that it contains a thin electrically positive layer sandwiched between the two elec-

trically negative ends. The entire rod is encased in a hard plastic bead with wire leads connected to each of the three regions. This new transistor occupies about  $1/400$  of a cubic inch, whereas a typical sub-miniature tube occupies about  $1/8$  of an inch.

Transistors are devices that are based upon the properties of materials called semiconductors, among which is the metal germanium. Transistors can act as amplifiers for telephone and television circuits and provide detection and amplification as in ordinary radio sets. Another kind of transistor can serve as a photoelectric cell.

In addition to the new type of transistor, the original type of transistor has been developed so that these devices will be put into actual use in the Bell System early next

year. They are now made so as to be uniformly reliable and uniform as to characteristics.

Associated with Dr. Shockley are Morgan Sparks and G. K. Teal, who built the first of the new type transistors, R. L. Wallace, Jr., and W. J. Pietenpol, who have been working on their development, and J. A. Morton, who directed work on the reliability and reproducibility of transistors.

Science News Letter, July 14, 1951

## INVENTION

## Resin Makes Paper as Strong When Wet as Dry

➤ PAPER THAT is strong when wet as well as when dry is made of the ordinary cellulosic paper-making fiber to which a melamine-formaldehyde resin is added. After the material has been formed into a felt, heat is applied to cure the resin.

Patent 2,559,221 was granted to Charles S. Maxwell, Old Greenwich, and Chester G. Landes, New Canaan, Conn., the inventors. American Cyanamid Company of New York has acquired the patent rights.

Science News Letter, July 14, 1951

## NUTRITION

## Powdered Eggshell Makes Better Gingerbread

➤ GINGERBREAD, hot rolls and other baked goods from prepared mixes will taste a little better and be quite a bit more nourishing if powdered eggshell is added to the mix.

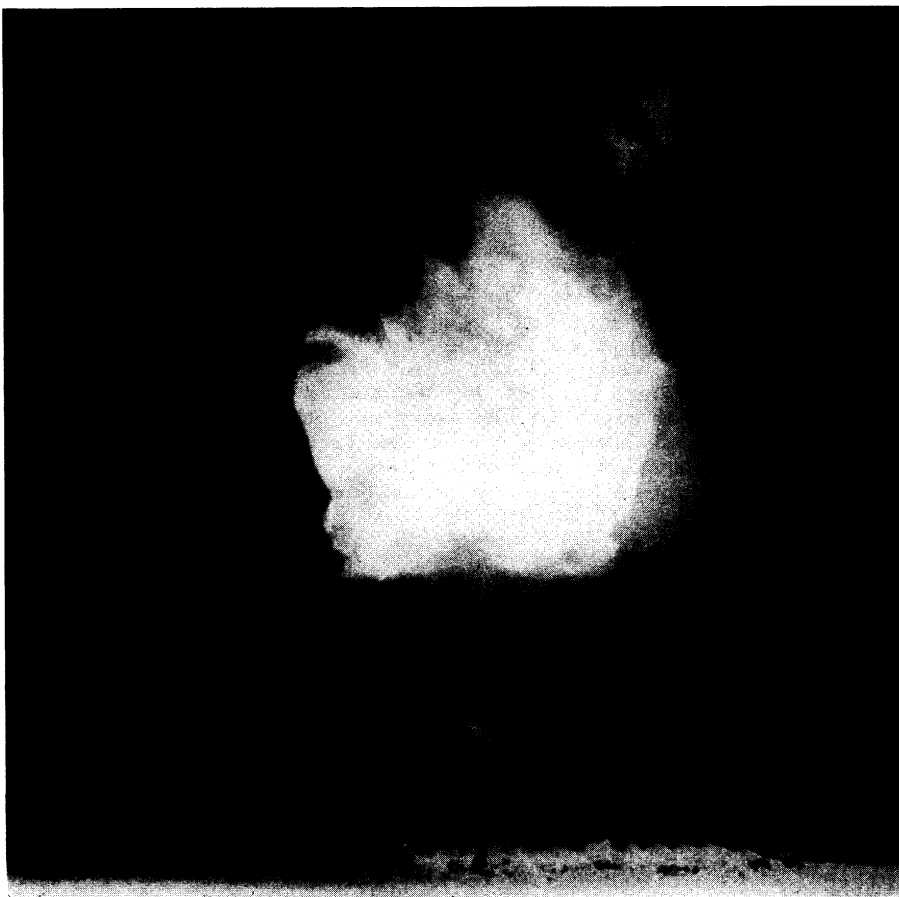
Tests showing this were reported by Dr. Helen B. Burton and Miss Eula Mae Lincecum of the University of Oklahoma at the meeting of the American Home Economics Association in Cleveland.

Calcium carbonate, or chalk, also gave good results.

Object of adding either substance is to increase the amount of calcium in the diet. American diets often are lacking in sufficient of this bone and tooth building chemical. The rising cost of milk, our best food source of calcium, often prevents families from improving their diet by using more milk, Dr. Burton pointed out.

The powdered eggshell and calcium carbonate would be inexpensive ways of adding calcium to the diet.

Science News Letter, July 14, 1951



**NEVADA ATOMIC EXPLOSION**—Although unlike any of the now familiar above-ground atomic bursts, this official Atomic Energy Commission photograph shows an atomic explosion at Frenchman's Flat, Nevada, during the January-February tests. The picture is available in color. (See page 30.)