

ELECTRONICS

Vacuum Tube Has Rival

New transistor, made of semi-conducting germanium metal, may result in more stable and durable radios, television sets and electronic devices.

See Front Cover

► THE glass vacuum tube in your radio has its first rival in 40 years—a bit of semi-conducting germanium metal that amplifies or oscillates current without the complexity of plates and wires in an airless bulb.

This new transistor, as it has been christened, should allow more stable and durable radios, television sets and electronic devices. Radios may be made smaller, when the new cylinder, slimmer than a pencil and less than an inch long, as shown on the cover of this week's SCIENCE NEWS LETTER, comes out of the development laboratories into production.

Because the new device has no filament that must heat up before it operates, it goes into action instantly. It will do some electronic tricks that conventional vacuum tubes can't do. This means new electronic devices.

Invented at Bell Telephone Laboratories in New York, the transistor's operation is possible because the ability of a semi-conductor to carry electrical current can be controlled. This is done by changing the

electronic structure of a small bit of material under the influence of the incoming current, fed to it through a fine "cat's whisker" wire. The current coming out of the other wire, just about two thousandths of an inch away, is boosted in volume a hundred fold.

Dr. John Bardeen and Dr. Walter H. Brattain made the key investigations in the Bell Telephone Laboratories that produced the transistor, while the program was initiated and directed by Dr. William Shockley.

Since electrical speech waves traveling between telephones can be amplified, the transistor will probably replace the vacuum repeater tubes now used on long distance and other telephone lines.

A superheterodyne radio set with about a dozen transistors instead of conventional tubes has been demonstrated and probably is the forerunner of a new family of radios.

Because it can oscillate as well as amplify, the transistor will be used to produce standard frequency tones and for other similar uses.

Germanium metal specially treated is the

semi-conducting material used, but other semi-conductors include silicon, some metallic oxides and other compounds. Semi-conductors have electrical properties intermediate between those of the metals and insulators.

Semi-conductors, copper oxide and selenium have been used previously to rectify alternating to direct current, and silicon has been used as a detector, particularly for microwave radio apparatus.

The transistor as now developed has a frequency limitation of about 10,000,000 cycles per second, but it is quite satisfactory in the television ranges.

Science News Letter, July 10, 1948

PUBLIC HEALTH

Later Years Are Rated Special Concern of Women

► BECAUSE the average woman is destined to outlive the average man, the middle and later years are of special concern to women, says Dr. Clive McCay, professor of nutrition at Cornell University.

"Furthermore," he says, "wives are usually younger than husbands, and like it or not, the average wife must face five to eight years of widowhood."

All of which means that older women must face the future realistically. "The best insurance for health during the late years is to cultivate good food habits throughout life."

Fixed food habits centered on poor diets such as living on tea and crackers insure poor health and disaster during the late years, he warns.

Pointing out that many more women than men are in homes for the aged, Dr. McCay says the time would seem ripe for women's organizations to demonstrate what they can do in solving problems for the aged. These problems involve economics, sociology, housing, employment, recreation, psychology, medical care and numerous other fields.

"These problems are solvable," says the Cornell scientist, "but few of us face them until our minds and bodies are too far exhausted."

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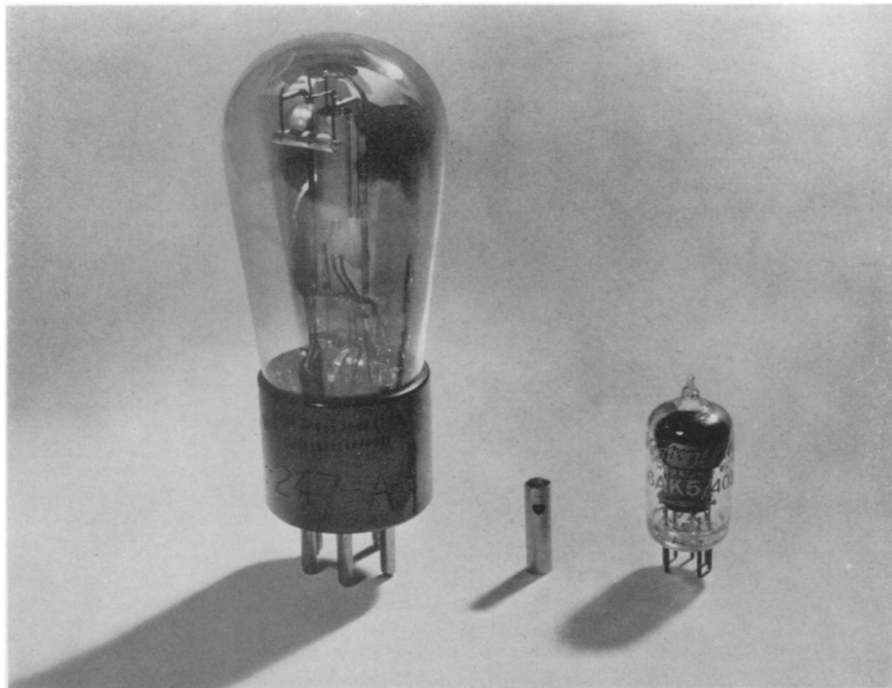
ASTRONOMY

Nova Formed by Big Shell Blown Off Star's Surface

► A NOVA or "new star" appears in the sky when a star literally "blows its top."

A star flares into a nova when a huge shell of very bright material is blown off its surface, Dr. Dean B. McLaughlin of the University of Michigan reported to the joint meeting in Pasadena, Calif., of the American Astronomical Society and the Astronomical Society of the Pacific.

The outburst, in which the star's apparent brightness may increase 10,000 times in 24 hours, is probably only a single eruption



TRANSISTOR—Overshadowed by two bulky vacuum tubes on either side, it may replace them in many electronic devices that will benefit from its small size, absence of glass envelope, plates and wires.