

A more recent and extremely significant achievement resulting from our research is that we have now discovered how to grow multizoned



FIG. 5. Ribbon bearing multiple-junction systems on germanium crystal produced by dendrite process.

crystals as dendrites, directly from the furnace melt. We regard this development as a major

event in new technology of molecular electronics. It makes available to us basic building blocks having at least three layers of zones and two interfaces. Thus it will no longer be necessary to perform many operations to create multizone elements.

In considering the implications of this basic method for crystal growth, one most interesting possibility is that it will prove practical to combine our ability to grow multizoned crystals with our ability to perform operations on the crystal at the time it is growing in the furnace. Admittedly, to achieve near-automatic production of semiconductor devices and molecular electronic function blocks is a long-range objective, but it is probable that we will eventually be able to "grow" from a pool of molten semiconductor materials some items of electronic equipment that today are of the order of complexity of radio receivers and amplifiers.

Although there was a 20-year interval between the invention of the vacuum tube and its first significant application, and an 8-year interval between the development of the transistor and its first uses, it is almost certain that no such delay is likely for molecular electronics. It is very likely that in three to five years we will see the molecular electronic concept widely applied in air space electronic systems for such important applications as telemetering, fire control guidance, communications, etc.

## OBITUARY

### SIR K. S. KRISHNAN

**W**E deeply regret to record the death of Sir K. S. Krishnan, Director, National Physical Laboratory, New Delhi, on Wednesday, the 14th of June, 1961.

Krishnan was born on the 4th December, 1898. He graduated from the Madras Christian College and later migrated to the University College of Science at Calcutta where he studied for two years. Sir C. V. Raman chose Krishnan for a position as Research Assistant in his laboratory and sponsored his promotion to the various positions held by him in later years; Reader in Physics at the Dacca University; the Mahendra Lal Sircar Professor at Calcutta in 1933 and University Professor of Physics at Allahabad in 1942. Sir C. V. Raman also proposed him for the Fellowship of the Royal Society

to which body he was elected in 1940. Krishnan was appointed as the first Director of the National Physical Laboratory at New Delhi in 1947. This position he held till his death.

In his earlier years, Krishnan was closely associated with Sir C. V. Raman in his investigations. After the discovery by Sir C. V. Raman of the effect known by his name, Krishnan and later on, other workers also in the laboratory, assisted in following up the consequences of that discovery. At about the same time, systematic researches on magnecrystalline action were initiated by Sir C. V. Raman and were first carried on by Bhagavantam at Calcutta. These were subsequently continued by Krishnan at the Dacca University and formed the basis of his election to the Fellowship of the Royal Society.