

1951, and there perfected the use of telephone lines for background-music use. He then established an electroforming and pressing plant on West 54th Street in New York City and devised the first high-speed copper-electroforming process able to "grow" a stamper in "only" 4 hours (today it takes 30 minutes). He was involved in the production of electroformed rollers for the manufacture of textured vinyl fabrics such as alligator, rattan, etc., and he remained an active consultant to some of America's most prestigious companies up to the time of his death.



K. R. Smith

I was indeed fortunate to have seen him at his home, in excellent spirits and reasonable health, only last February. K. R. was made an honorary member of the AES in 1980 for his contributions to broadcasting and record manufacturing. He was also much honored by the other AES, the American Electroplaters Society, whose lifetime achievement award he received just last December.

For us of the older generation, K. R. will never be forgotten. His cheerful disposition, sense of humor, and perfection in all things technical, remain a guiding beacon to our industry. He will be sorely missed.

STEPHEN F. TEMMER

**Alec Rangabe** died peacefully 1986 July 28 at the age of 78. Born in Crete and educated in England, he graduated in natural sciences from Cambridge. After a period of practical workshop experience he set up his own laboratory and worked on a number of new technologies, including gas discharge lighting and fluorescent techniques.

After his laboratory was bombed in the early part of the war, he joined a team of scientists gathered together under Professor Charles Ellis at Christchurch, Hants., to work on the development of a proximity fuse for anti-aircraft shells. The so-called VT radio fuse was the brainchild of Alec's cousin, A. F. H. Thomson, but without a rugged valve the concept could not work. Alec Rangabe was one of the men responsible for the successful development of a really rugged 8-mm valve capable of withstanding the shock of being fired from an AA gun. An important part of the achievement was the development of mass-production techniques in the U.K. which provided the ability to produce thousands of valves per hour. While development was getting under way in the U.K., the idea was rushed across to the United States. In fact the highly successful radio fuses in the U.K. anti-aircraft shells which defeated the V1 and took toll of German aircraft were American made.

Rangabe took the first valve to HiVac, a Ministry of Supply laboratory at Chesham, and then to SERL (the Services Electronic and Radio Laboratories) at Baldock where the short 8-mm VT radio fuse valve was perfected soon after the war ended. Sir Allen Clark of the Plessey Company, impressed with the mass production potential of these methods of making tiny rugged radio valves, invited Rangabe to join Plessey and set up a company to make them commercially. The laboratories which he set up at New Lane, Havant, for this purpose were unique in that the only raw materials used in valve manufacture were pure chemical and metal powders. Strong metallurgical and chemical laboratories were required to support the specialist manufacturing techniques. The postwar work at Havant led to the development of a miniature cold cathode, or heaterless valve with the low operating voltages of modern solid-state devices, but the story of how this potentially world-beating technology was overtaken by the transistor, and how the unique facility at Havant was dispersed, must be told elsewhere.

It is an irony of history that Alec

Rangabe's outstanding achievement was overtaken by the invention and almost unbelievably rapid development of the transistor. Rangabe knew more than most about the transistor but did not believe that it would be developed as rapidly as history proved. After leaving Plessey, he was able to give most of his time to his audio interests. In this field he was perhaps best known for Trutrak, a parallel tracking pickup arm based on a stainless steel float supported on silicone fluid, laterally guided by a patented system of opposing magnets. There were many practical difficulties with the system, and the way he solved these and measured the performance at each step was classic. Rangabe's many other inventions included the ElectroDuster which used electrostatic forces to remove dust from records, a cartridge damper which added mechanical resistance between the pickup head and the record to improve tracking at low frequencies, and an ultra-lightweight pickup which combined minute moving parts with electrostatic transduction.

Other devices included a vacuum pump of novel design, a meniscus relay with mercury the only moving part, insulation displacement connectors, and a simple method of manufacturing precision spirit levels which are supplied to a wide range of U.K. manufacturers. In his most recent work he had at last succeeded in solving the mysteries of gramophone record contamination—these being far more complex than the collection of dust in the grooves. At the time of his death he was working on new methods of cleaning records based on these findings.

Alec Rangabe had a remarkably wide knowledge of materials and processes, matched by a perpetual flow of ideas, many of them brilliant. The diligence with which he pursued them and the generosity with which he shared them with colleagues were an example to all who knew him.

DONALD BARLOW  
MONTY LEMMON  
RODERICK SNELL  
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