Television has now been around for so long that those who can imagine or even remember life without a television set are a minority. Nevertheless, the concept and its embodiment have not been modified for almost half a century; the transition from black and white to colour TV and the addition of a number of features (such as, e.g. Teletext, 16:9) have been the major changes. They are, though impressive, of a quantitative nature, simply because apparently a TV set is too good to leave much room for essential improvements.

From the very beginning Philips has been a major manufacturer of television tubes and sets, and research has made and is making a major contribution in all aspects, starting with the concept and ranging from materials through ICs to transmission protocols. The electron tube presenting a two-dimensional time-dependent picture of a scene has proved to be a most robust concept and an almost unbeatable solution. However, the desire to get rid of the bulky structure of the TV tube and to use a flat, thin display has always been there.

This special issue of Philips Journal of Research describes a particular approach to realizing a flat, thin display which, early on, was given the internal name of the Zeus display. Some alternative solutions, based upon small discharges used as light-sources or switches only, and liquid crystals, used as light valves, are mentioned in the introductory paper. In the solution presented here, use is made of a newly-discovered form of electron transport over insulating surfaces in vacuum, referred to as hop transport. The transformation of the new discovery from an interesting physical phenomenon to a practical flat, thin display device for TV applications forms the backbone of the series of articles.

Progress and development in science and technology is a continuous process with small discrete steps discernable in a continuing chain of individual publications. With usually some overlap, each new publication adds a minute amount of new material or refinement to the body of scientific or technical knowledge. Philips Research Laboratories has been actively participating in this process for three quarters of a century now. The present issue is in some sense an exception in that it presents, in some fifteen papers, the detailed results of a concerted and focused effort to produce a totally new type of flat television tube, addressing not only the
physics but also the required materials, technology, electronics and system aspects. The first, introductory, paper presents the basic principle of the display and describes in more detail the contents of each paper and the way in which it is linked into the total development effort and result.

Although the display described has been developed in close cooperation with many experts within the Philips Components, Sound & Vision and Semiconductor Divisions and, at every step, the possibility of industrial implementation has been kept in mind and has guided the choices made, it is still a research laboratory product. It results from the commitment of the Research Laboratory to provide options for future products. Whether such an option really reaches the stage of an industrial product on the market is determined by a complex mixture of factors in which the elegance of the concept and the performance of the device play an important, but not necessarily determining, role.

Whatever the future of the Zeus display, this collection of research papers gives a good flavour of the breadth of work invested in this innovative approach to realizing a flat, thin display based on the hop transport of electrons. Such a unique project automatically generates a rapport and team spirit across the boundaries of traditional scientific and technological disciplines. Such an atmosphere is indispensable for generating innovative options for the future. Philips Research is proud to be able to present the results of this effort.