

This is a particular significant year in which to discuss computer optics. Exactly 200 years ago the first diffraction grating was produced. Another flat optics element, the zone plate, appeared 115 years ago. Diffraction gratings form an integral part of many different optical devices. The zone plate plays a largely methodological role in the diffraction of light and there is no question of replacing it by lenses. When lasers appeared the traditional optical elements no longer satisfied scientific and practical requirements and new elements with broader specifications had to be produced. Since laser radiation is monochromatic the design requirements of optical elements were naturally directed towards definite wavelengths. The first step in creating a new generation of flat optics elements was the production of kinoform lenses in the early seventies. But only size and mass parameters and manufacturing methods differentiated kinoform lenses from usual ones, rather than any functional specifications. The decisive change in flat optics, which essentially initiated the development of computer optics, was the production of laser radiation focusers in 1980. The first focuser was developed jointly by scientists at the Institute of General Physics of the U.S.S.R. Academy of Sciences and the Kuibyshev Aeronautical Institute. Shortly after this work they were joined by mathematicians from the Moscow State University. In less than ten years since, a whole series of computer optics elements have been produced. Computer optics has been formulated as a new scientific endeavour at the interface of quantum electronics and cybernetics. The scope of articles published in this issue is broad enough to encompass the achievements and state of the art of this extraordinarily progressive scientific development.

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