Editorial

THIS Special Issue of the IEEE TRANSACTIONS on Microwave Theory and Techniques is devoted to two closely related fields: integrated optics and optical waveguides. The subject of optical waveguides is pertinent to optical communications by means of glass fibers and to the circuitry of integrated optics. The theory of optical waveguides has reached a stage of relative maturity while integrated optics is still in a relatively early stage of its development. Fiber waveguides seem to have a fairly secure future since the spectacular successes of glass fiber research almost certainly ensure their application in optical communications systems. Already there are examples of experimental military applications of optical fibers and their use in the telephone system is anticipated.

The subject of integrated optics—or micro-optics as it is called by some proponents—is growing at a comfortable rate. The future of integrated optics presently appears linked to individual devices and the future of optical communications systems. Integrated optics promises to provide optical communications systems with components such as lasers, modulators, filters, directional couplers, and all other parts commonly encountered in complex microwave communications systems. However, simpler optical communications systems based on light emitting diodes do not need sophisticated modulators or filters. The modulating function can be performed by turning the supply voltage on and off and multiplexing of many optical signals on one waveguide is not a necessary prerequisite for an optical fiber communications system. Each fiber requires so little space that many fibers can be combined into a fiber cable satisfying the need for large channel capacity.

Thus it appears that the activities of researchers in integrated optics are linked to the demands of optical communications systems. Increased sophistication of optical communications will require integrated optics components of greater complexity. In a very real sense the GaAs laser may be regarded as an integrated optics component. Coupling of GaAs lasers to optical fibers is another example of an early application of integrated optics technology.

The present Special Issue presents a collection of 23 papers. Unfortunately, its size was dictated by a space allocation of 200 printed pages. Many more papers should have been included in this issue and many manuscripts were rerouted to other journals only because of space limitations. More aggressive advertising for this Special Issue would undoubtedly have resulted in an even larger flood of contributions. The present selection is somewhat arbitrary and the choice of papers to be included was based on a mixture of the editor's subjective opinion and of a policy of "first come first served." It would have been easy to fill an additional 50–100 pages with the added benefit of sparing the editor the agonizing choice of papers to be included and papers to be turned away.

The grouping of papers was based on placing integrated optics papers in front of papers relating to optical fibers, reflecting the order of these two subject areas in the title of the Special Issue. A number of authors have been invited to contribute papers to this issue. Some were asked to write reviews of their respective specialties, others were given no particular goal other than the general subject area of this issue.

The mixture of reviews of the field and of new contributions should allow the reader to obtain an overview of where integrated optics and optical fibers are standing presently and in which direction the field is headed. It is hoped that this collection of papers will help stimulate further activities in these interesting fields and provide newcomers with sufficient information to wet their appetites and get them started.

——D. MARCUSE, *Guest Editor*