

Preface

Although we have given this volume the extremely generalized title *Spatial Vision*, we must issue an immediate disclaimer. We have made no attempt to cover all of spatial vision in this one volume. Since the nineteenth century when Helmholtz succeeded in doing so in the second volume of his *Handbuch der Physiologischen Optik*, the literature in the field has increased by many orders of magnitude. Even a bibliographic listing of all the relevant literature would now require more than a single volume. This is a consequence both of the ever-increasing fragmentation and specialization in this field (as in all of science) and of the much larger number of scientists who work in the area.

What justification is there then for such a book as this and for our choosing such an ambitious title as *Spatial Vision*? We realize that specialization is inevitable, given the extent of knowledge and the diversity of research techniques employed in studying vision. On occasion, though, we believe it is useful to sit back and take a broader view, to try to see the shape of the forest instead of the nature of the individual trees, to attempt to get a feeling for how the parts all fit together. This represents our attempt to do that.

We believe there is now another reason for attempting an overall synthesis of the field. For the first time a single unifying framework and a common language are available with which to consider both visual perception and the underlying physiological processes. Since vision has become so fragmented into many sub-areas, each with its own problems and microtheories, the field as a whole has had little to unify it or give it structure. In our opinion, this has recently changed as a result of two developments. One is the introduction of the techniques of linear systems analysis to the study of both psychophysical and physiological problems in vision. The other is the evidence, both psychophysical and physiological, for multiple spatial channels in the visual system. These developments have given us the hope of being able to interrelate physiology and psychophysics, as far as early visual processing of spatial information is concerned, and to give a coherent picture of the transformations that occur in the initial visual stages.

Given the vast vision literature, it is obviously impossible to encompass in any one book the whole of the anatomy, physiology, and psychophysics of early spatial vision without giving only very perfunctory treatment to many complex topics. We cannot begin to compete in thoroughness of coverage with handbook chapters, reviews, or books that go into great depth on one or another of the topics we have addressed. Such has not been our intention. Since we necessarily must be selective, we have unabashedly concentrated on those problems which we consider most tractable at this time, those which most interest us, and those

which we ourselves have studied. Due to space limitations, we have also either ignored or given no more than a passing reference to certain whole areas, such as movement perception and temporal properties of vision in general. Although we have attempted to strike a balance between broad coverage of the whole area of spatial vision and an account only of our own work and interests, we have perhaps inevitably concentrated on the work from our laboratories. The many to whose work we have not given adequate attention will no doubt question the extent to which we have maintained any balance at all. To them we sincerely apologize.

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R.L.De V.
K.K.De V.