

Preface

This book addresses the challenges faced by humans when functioning outside of the environments considered as “normal” in the modern world. Although our ancestors may have experienced more exposure to heat, cold, sun, water, and wind than does the modern person, there remains a need to be able to function in conditions that fall at the extremes. Certain vocations, such as military service, are more likely to immerse a person in a hostile environment that presents unique barriers to optimal visual function. Heavy industry and construction, among other fields, also routinely pose hazards to the eyes and vision, and injuries to the visual system are both more common than expected for the eye’s body surface area and potentially more disabling. Eye protection can mitigate many of these risks, but practical and cultural barriers to the consistent use of these protective devices remain a major challenge.

As if these terrestrial challenges were not enough, humans now can live for extended duration in microgravity, and continued space exploration and life in this completely alien environment may not be possible if a solution to the observed visual changes in microgravity cannot be mitigated. Many terrestrial, aquatic, and avian animals have adapted to life in much harsher environments than are typical for the modern human, and there are many lessons to be learned from the structural and functional differences they exhibit. Finally, even the best-protected eye will sustain injury at times, and we are fortunate to have many techniques available to restore not only anatomical structure but, in many cases, function as well.

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