

CONTENTS

PREFACE

1 INTRODUCTION

2 IMPULSES, SYNAPSES, AND CIRCUITS

THE MEMBRANE POTENTIAL
THE IMPULSE
SYNAPTIC TRANSMISSION
A TYPICAL NEURAL PATHWAY
THE VISUAL PATHWAY
VOLUNTARY MOVEMENT

3 THE EYE

THE EYEBALL
THE RETINA
THE RECEPTIVE FIELDS OF RETINAL GANGLION CELLS:
THE OUTPUT OF THE EYE
THE CONCEPT OF A RECEPTIVE FIELD
THE OVERLAP OF RECEPTIVE FIELDS
DIMENSIONS OF RECEPTIVE FIELDS
THE PHOTORECEPTORS
BIPOLAR CELLS AND HORIZONTAL CELLS
AMACRINE CELLS
CONNECTIONS BETWEEN BIPOLAR CELLS AND GANGLION CELLS
THE SIGNIFICANCE OF CENTER-SURROUND FIELDS
CONCLUSION

4 THE PRIMARY VISUAL CORTEX

TOPOGRAPHIC REPRESENTATION
RESPONSES OF LATERAL GENICULATE CELLS
LEFT AND RIGHT IN THE VISUAL PATHWAY
LAYERING OF THE LATERAL GENICULATE
RESPONSES OF CELLS IN THE CORTEX
SIMPLE CELLS
COMPLEX CELLS
DIRECTIONAL SELECTIVITY
THE SIGNIFICANCE OF MOVEMENT-SENSITIVE CELLS,
COMMENTS ON HOW WE SEE
END STOPPING
THE IMPLICATIONS OF SINGLE-CELL PHYSIOLOGY FOR PERCEPTION
BINOCULAR CONVERGENCE

5 THE ARCHITECTURE OF THE VISUAL CORTEX

ANATOMY OF THE VISUAL CORTEX
LAYERS OF THE VISUAL CORTEX
ARCHITECTURE OF THE CORTEX
EXPLORATION OF THE CORTEX
VARIATIONS IN COMPLEXITY
OCULAR-DOMINANCE COLUMNS
ORIENTATION COLUMNS
MAPS OF THE CORTEX

6 MAGNIFICATION AND MODULES

THE SCATTER AND DRIFT OF RECEPTIVE FIELDS
UNITS OF FUNCTION IN THE CORTEX
DEFORMATION OF THE CORTEX

7 THE CORPUS CALLOSUM AND STEREOPSIS

THE CORPUS CALLOSUM
STUDIES OF THE PHYSIOLOGY OF THE CALLOSUM
STEREOPSIS
THE PHYSIOLOGY OF STEREOPSIS
SOME DIFFICULTIES POSED BY STEREOPSIS
STEREOBLINDNESS

8 COLOR VISION

THE NATURE OF LIGHT
PIGMENTS
VISUAL RECEPTORS
GENERAL COMMENTS ON COLOR
THEORIES OF COLOR VISION
THE GENETICS OF VISUAL PIGMENTS
THE HERING THEORY
COLOR AND THE SPATIAL VARIABLE
THE PHYSIOLOGY OF COLOR VISION: EARLY RESULTS
THE NEURAL BASIS OF COLOR CONSTANCY
BLOBS
CONCLUSION

9 DEPRIVATION AND DEVELOPMENT

RECOVERY
THE NATURE OF THE DEFECT
STRABISMUS
THE ANATOMICAL CONSEQUENCES OF DEPRIVATION
NORMAL DEVELOPMENT OF EYE-DOMINANCE COLUMNS
FURTHER STUDIES IN NEURAL PLASTICITY
THE ROLE OF PATTERNED ACTIVITY IN NEURAL DEVELOPMENT
THE BROADER IMPLICATIONS OF DEPRIVATION RESULTS

10 PRESENT AND FUTURE

FURTHER READING

SOURCES OF ILLUSTRATIONS

INDEX