Neurobiological Theory of Psychological Phenomena

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In memory of
my parents
STEPHAN and LISEL WASSERMANN
my grandfather
ADOLF WASSERMANN
and
GERTRUD KUBBE

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Preface

This monograph presents a coherent new type of neuropsychological theory, suggesting how brains could provide physical representations of many perceptual and cognitive phenomena. I believe that the difficulties which arose in this field of research are partly due to blind acceptance of some famous but questionable doctrines (see Chapters 3 and 4). The new theory rests on a different biological ideology, which I presented in synoptic seminars in 1974 at various universities and research establishments, including the Neurosciences Research Program (Boston), Yale, San Francisco, Irvine, La Jolla, the State University at Buffalo and the City of Hope Medical Center, Duarte. Since then flesh and bones have been added to the theory thanks to massive critical feedback. My model is not exhaustive in its explanations. In Chapter 3 I have concentrated on a few of the best-known perceptual phenomena and tried to explain these in detail in terms of the new neuropsychological theory. In Chapter 4 I have suggested how long-term and short-term engram formation can be explained via the theory. Chapter 5, which is more schematic, sketches how the model could account for important cognitive phenomena, including certain aspects of language perception and production. Although various important problems have been dealt with either in considerable detail or at least schematically other equally important problems have been left aside. I have aimed to exhibit the potentialities of the new approach by concentrating on key problems. Further applications of the theory will demand considerably more space.

H. Spemann, P. A. Weiss and others realised long ago that neuropsychology and developmental biology are likely to rest on closely related mechanisms. Neuropsychologists want to know the role played by highly species-specifically wired-in nervous systems in the achievement of complex behavioural tasks. My earlier theory (Wassermann, 1972, 1973) suggested how cells in general could become specified and linked into organs and structures under genetic control, and this theory has now been substantially modified and improved (in Appendix 1, where its gist is given synoptically) and has been applied to explain the apparent often highly specific wiring-in of nervous systems (Chapter 2). Much of the book, however, is concerned with the role which specifically wired-in nervous systems could play in producing a considerable variety of phenomena studied by behaviour scientists, notably experimental psychologists and students of language behaviour. It is in relation to these problems that I have put forward some extensive new hypotheses, suggesting novel machinery for information processing by nervous systems.

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Newcastle-upon-Tyne

G. D. W.

Abbreviations and Acronyms Used in the Book

Appearing in the Main Text

AI	artificial intelligence
AM	alternative matching
CNS	central nervous system
CUS	cell-unique specificity (or cell-uniqueness specifying, as appropriate)
CUS clone	a clone that generates uniquely specified coexisting cells
3D	three-dimensional
ECGN	extracellular guidance network
engUMMS	engram-representing unit molecular mapping system
ICM	iconic memory
InterCAC	intermodal concept-representing association complex
IntraCAC	intramodal concept-representing association complex
LTM	long-term memory
mRNA	messenger RNA
II mRNA	RNA precursor of a polypeptide chain of a II protein
NPM	neuropsychological model
PI	positional information
PIT	positional information theory
PP	proliferative potential
II protein	a protein conferring type II differentiation on a cell
SP	subpattern
STM	short-term memory
SUS	cell set-unique specificity (or cell set-uniqueness specifying, as appropriate)
SUS clone	a clone that generates cells of the same SUS
UMMS	unit molecular mapping system

Appearing in Appendix 1

<i>acMi</i>	an active microgene
<i>acMiL</i>	line-characterising active microgene (see PR 10, Appendix 1)
d—b-RNA	a RNA containing a ‘blocker’ RNA region linked to a derepressor RNA region

<i>Ma(c)</i>	the <i>c</i> th macrogene linkage class
<i>Mi</i>	microgene
PR	property
subclone	(see PR 3, Appendix 1)