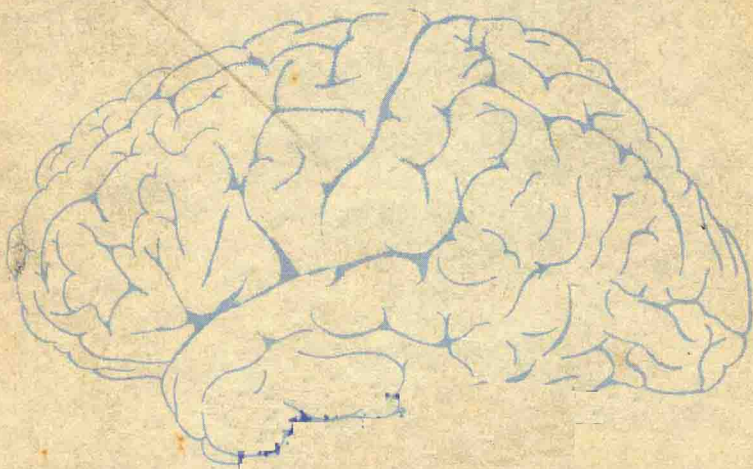


Cerebral Logic

Solving the Problem of Mind and Brain



Charles W. Neehanam, M.D., M.Sc., F.A.C.S.

Students of both mind and brain will find CEREBRAL LOGIC to be a fascinating, original and challenging analysis of an ancient dilemma. In his inquiry into the neurophysiology of consciousness, the author considers equally the disciplines of neurology, philosophy and psychology. The metaphysical and the material are merged to provide an important look at a problem which, if resolved, may provide nothing less than the key to a clearer understanding of the human condition.

Neurosurgeon
Tucson Medical Center
University Hospital
St. Joseph's and St. Mary's Hospitals
Neurological Associates of Tucson
Tucson, Arizona
Clinical Associate Professor of Neurology
University of Arizona, College of Medicine
Tucson, Arizona
Formerly Assistant Professor of Neurosurgery
UCLA School of Medicine
and Harbor General Hospital
Los Angeles, California

CHARLES C THOMAS • PUBLISHER

Springfield • Illinois • U.S.A.

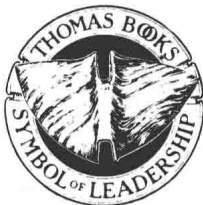
CEREBRAL LOGIC

Solving the Problem of Mind and Brain

By

CHARLES W. NEEDHAM, M.D., M.Sc., F.A.C.S.

*Neurosurgeon
Tucson Medical Center
University Hospital
St. Joseph's and St. Mary's Hospitals
Neurological Associates of Tucson
Tucson, Arizona
Clinical Associate Professor of Neurology
University of Arizona, College of Medicine
Tucson, Arizona
Formerly Assistant Professor of Neurosurgery
UCLA School of Medicine
and Harbor General Hospital
Los Angeles, California*



CHARLES C THOMAS • PUBLISHER

Springfield • Illinois • U.S.A.

Published and Distributed Throughout the World by

CHARLES C THOMAS • PUBLISHER

Bannerstone House

301-327 East Lawrence Avenue, Springfield, Illinois, U.S.A.

This book is protected by copyright. No part of it
may be reproduced in any manner without
written permission from the publisher.

© 1978, by CHARLES C THOMAS • PUBLISHER

ISBN 0-398-03754-X

Library of Congress Catalog Card Number: 77-17133

*With THOMAS BOOKS careful attention is given to all details of
manufacturing and design. It is the Publisher's desire to present books that
are satisfactory as to their physical qualities and artistic possibilities and
appropriate for their particular use. THOMAS BOOKS will be true to those
laws of quality that assure a good name and good will.*

Printed in the United States of America

R-2

Library of Congress Cataloging in Publication Data

Needham, Charles W

Cerebral logic.

Bibliography: p.

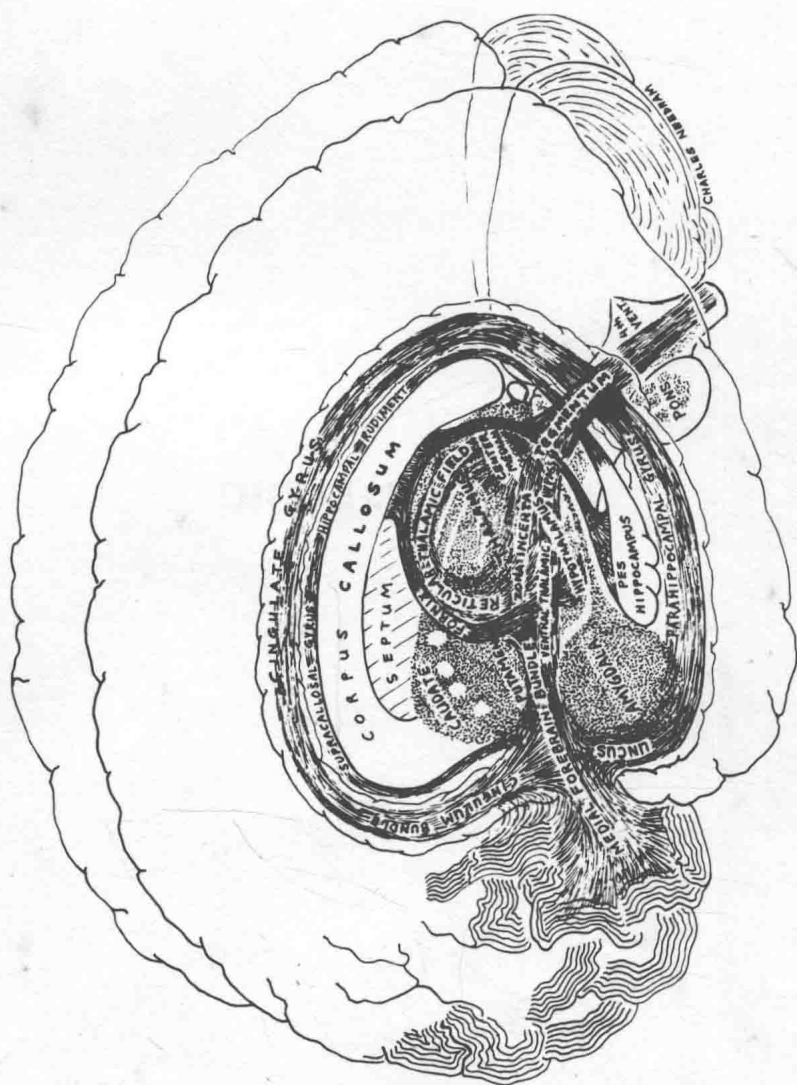
Includes index.

1. Mind and body. 2. Philosophy, Ancient.
3. Neuropsychology. I. Title. [DNLM:
1. Neurophysiology. 2. Psychophysiology.
3. Philosophy. WL102 N374c]

BF161.N4 128'.2 77-17133

ISBN 0-398-03754-X

CEREBRAL LOGIC



Neuronal societies of the brain: dispersion, aggregation, and lamination.

*This book is dedicated to my beloved
wife Connie and to our youngest son
Benjamin, who has given us so much joy.
I hope that one day he will come to
understand the beautiful thoughts of
the great philosophers.*

But for me it was enough if, in my own bed, my sleep was so heavy as completely to relax my consciousness; for then I lost all sense of the place in which I had gone to sleep, and when I awoke at midnight, not knowing where I was, I could not be sure at first who I was; I had only the most rudimentary sense of existence, such as may lurk and flicker in the depths of an animal's consciousness; I was more destitute of human qualities than the cave-dweller; but then the memory, not yet of the place in which I was, but of various other places where I had lived, and might now very possibly be, would come like a rope let down from heaven to draw me up out of the abyss of not-being, from which I could never have escaped by myself: in a flash I would traverse and surmount centuries of civilization, and out of a half-visualized succession of oil-lamps, followed by shirts with turned-down collars, would put together by degrees the component parts of my ego.

Marcel Proust

Swann's Way

A Remembrance of Things Past

PREFACE

THIS book is the result of five years of research and thought devoted to an extraordinarily difficult subject. As a neurological surgeon, I have had many opportunities to carefully study the relationship between disorders of the human brain and their associated disturbances in consciousness and mentation. I also took advantage of an immense literature about the relation of the mental and physical, both ancient and modern.

The mind-brain problem continues to be one of the great unsolved mysteries. It needs to be solved as a first step toward real understanding of the human condition. I have tried my best to maintain a state of mind open not only to science and clinical neurology but also to philosophy and logic. I have allowed the possibility that the psychological and the organic are not the separate realms which language itself divides. While a few others in neurology and neurological surgery have demonstrated their interest and abilities in the philosophical arena, I have found no evidence that any have applied the brilliant logic of Ludwig Wittgenstein to the resolution of the mind-brain dilemma.

The neurophysiology of consciousness became a reality for me during graduate work at the Montreal Neurological Institute of McGill University on the reticular activating system. The results of my labors to survey the influences of primitive brain structures upon arousal and sleep were published in *Brain Research* in an article called "Synchronizing and Desynchronizing Systems of the Old Brain" in 1968. I had the good fortune to work with the encouragement of Mr. Payne Thomas, who published my first book *Neurosurgical Syndromes of the Brain* in 1973.

I owe a profound debt to my loving wife, Connie. Her con-

stant faith in me has been my greatest strength.

Charles W. Needham

Tucson, Arizona

CONTENTS

	<i>Page</i>
<i>Preface</i>	vii
 <i>Chapter</i>	
I. THE GENERAL NATURE OF THE MIND-BRAIN	
PROBLEM	3
II. THE ORIGIN OF MENTALISTIC LANGUAGE IN	
ANTIQUITY	74
III. APPENDIX: NEURONAL SOCIETIES AND THE BIOGENESIS	
OF LOGIC	183
 <i>References</i>	 201
<i>Index</i>	207

CEREBRAL LOGIC

THE GENERAL NATURE OF THE MIND-BRAIN PROBLEM

We have to regard the relation of mind to brain as still not merely unsolved, but still devoid of a basis for its very beginning.

Sir Charles Sherrington¹

The second and much more exciting, even dramatic, discovery was made by Penfield — that stimulations of the temporal lobe in human beings may evoke experiences, pictures in the mind . . .

Sir Geoffrey Jefferson²

WHAT are pictures in the mind? How do they relate to the functions of the human brain? In searching for a beginning to the resolution of the mind-brain problem, it is essential to return to the very beginning of the problem as an historical event. No problem is effectively attacked without a clear understanding of how it came to be in the first place. The pathophysiology of its development into an unresolved dilemma must be examined before a solution is in sight. The mind-brain problem would never have arisen were it not for the invention of mentalistic language by the classical Greeks. Modern analyses of the mind-brain relationship have failed to provide a satisfactory explanation. They have not considered the origin of mentalistic language. It has been impossible to describe the mind-brain problem in nonmentalistic terminology, yet the role of mentalistic language in establishing the problem has not been the subject of coherent study. Just as each word of every language is essentially an invention which symbolizes some thing or some state of affairs, so too is mentalistic language an invention which symbolizes the elements of subjectivity.

The mind-brain problem is the dilemma posed by the attempt to explain the relation between mental events and the

physical processes of the human brain. Despite advances in psychology and neuroscience, mental events have not yet been demonstrated to be one and the same as cerebral events in the true sense of absolute identity. Specific mental conditions such as perception, voluntary action or praxis, memory, emotion, appetite, attention, and speech have been shown to possess broad correlative connections to the physiology of particular brain regions. It is still unclear as to how mental events differ from the physical events of cerebral excitation, if indeed they do differ. The dualism is still inexplicable. If psychophysical duality is more apparent than real, the basis for identification of the mental and the cerebral has yet to be described. The cerebral foundation of ordinary mental experience, not to mention the more bizarre phenomena of extrasensory perception and altered states of consciousness, remains beyond the grasp of modern neuroscience. In an age which prides itself in its capacity for the explanation of nearly every aspect of human experience, the inner nature of experience itself is still an enigma. At the most fundamental level we have yet to unlock the mystery of human nature. Modern psychology remains divisive rather than unifying. How do myriads of neuronal discharges within the living protoplasm of the human brain relate to our subjective memories, moods, thoughts, and dreams?

The mind-brain problem is not insoluble. It is not a real problem at all. It is a pseudoproblem. It is a misunderstanding of the logic of the language used to state the problem. Its resolution depends upon a logical analysis of that language. The solution of the mind-brain dilemma, like that of all the other riddles of the class called philosophical problems, is the same as its dissolution as a problem. All philosophical problems contain at least one philosophical term. The mind-brain problem is a classical example of a philosophical problem since "mind," "mental," and similar terms used to state the dilemma are of ancient philosophical vintage. The mind-brain, mind-body, and mind-matter problems actually date back to the origin of Western civilization, when the earliest ideas of the mind and mental states were first conceived. The traditional monistic and dualistic philosophical approaches never resolved the basic issue, despite the relatively recent addition of scientific

data and acumen. Modern philosophy has had to be transformed in a fundamental way before the mind-brain and other philosophical impasses could possibly be overcome. Modern philosophy has undergone such a revolutionary change as a result of the monumental work of the great twentieth century Austrian logician Ludwig Wittgenstein. He converted all philosophy into the analysis of the logic of language.³ Philosophy is the pursuit of meaning, while science is the accumulation and organization of fact. Wittgenstein demonstrated that all the traditional problems of philosophy can be solved or dissolved, since each involves a misunderstanding of the logic of its language. All the philosophical problems, and the mind-brain dilemma is a paradigm case, have always appeared to be insoluble only because they are pseudoproblems in the first place. Real problems are worked out by the scientific discovery of facts. Scientific problems never contain philosophical terms. The problems of chemistry contain only chemical terms, those of physics only physical terms, and so forth. The mind-brain problem, in whatever form it is put, always contains at least one philosophical term (e.g. mind, mental, psyche, consciousness, knowledge, sensation, emotion, etc.) which deprives it of a purely scientific resolution. Every one of these words has a philosophical rather than a strictly scientific origin.

Logic is the finest instrument philosophy ever developed. All philosophical problems are misconceptions about logic. The logic of language conveys meanings which may have nothing to do with the factual truth of the propositions which constitute language. The logic of language can convey other forms of truth which are not scientifically verifiable as facts. The mind-brain problem is a problem in logic. It cannot be solved by other means. A fact is a state of affairs which is verifiable by direct observation or by more elaborate scientific methods. The court of last resort for science in the resolution of any problem is always the objective event, the observation that can be publicly and repeatedly confirmed by trained observers. The observations of science, like all perceptions, always occur within a spatiotemporal framework. The perceived object is not merely a thing but is rather an event with determinate spatiotemporal coordinates. According to Einstein, spatiotemporal coordinates

are in turn a function of the velocity of matter, and this in turn is convertible by the well-known equation into energy. All this is implied by the use of the term "space-time." Facts are only verifiable within spatiotemporal confines. It is the act of verification itself which imposes dimensionality. A property of an object, such as its temperature, may not appear to involve dimensionality, but the temperature or any other property of an object cannot be scientifically specified without implied or overt reference to the spatiotemporal conditions under which the measurement or determination took place. The temperature of an object includes the specification of the spatiality of the object, as the sun, a block of ice, the human body, etc., and the time frame which translates all scientifically perceived objects into events occurring at the moment of measurement. Without spatiotemporal reference points, there is no scientific verification. If facts are not verifiable, they are assumptions or premises rather than facts. Verifiability is the absolute requirement for membership in the corpus of science. However, the private world of mental events is uniquely resistant to objective verifiability. To remedy this resistance, psychology has become a soft science. In contrast, physics barely exists without precise measurements. In reality there are no soft facts, so there can be no soft sciences worthy of the name of science. To the extent that a study includes subjective data which are not publicly verifiable, it is less reliable or less scientific.

Facts are the elements of science, but logic contains elements which science does not. Logic can be used to attack subjective data which are not publicly verifiable. Logic is not science, although it can be utilized by science. A logical statement can always be true but yet have no bearing on the actual facts! Such a statement is a tautology, such as "It either is or is not raining." This comment is always true, but never gives factual information about the weather. Despite its timeless truth, it is irrelevant to actual, verifiable facts. Truth can be either formal or factual. Both are encompassed by logic, but only factual truth is within the realm of science. Formal truth is logical but has no bearing on the factual truth of science. A tautology is a necessary truth, something that the great German logician

Liebniz regarded as always true "in all possible worlds" and not specifically in our own spatiotemporal universe. Another example of a tautology is "If Socrates was wise and witty, then Socrates was wise." This comment is necessarily true, but it does not inform us if Socrates actually was wise. Careful analysis of modern psychology reveals much that does not actually inform us. Modern psychology includes a collection of tautologous truths, unverified premises, contradictions, outright nonsense, as well as facts.

A tautology is the logical opposite of a contradiction, a statement which is always false. An example is "Round objects are square." Tautologies and contradictions never depend on factual material, since they are true or false by necessity. Facts are nontautologous and noncontradictory truths. Facts cover the range of potential truth subject to verification. If the verification process is faulty, so-called scientific fact may prove false. This was the case with phlogiston, once held by physicists to be the necessary agent for combustion. Scientific truth today can be error tomorrow. This is never the case for necessary truth, yet only facts inform us as to what actually is the case in specific instances. Logic deals with statements that can be verified as true or false, and it also deals with those whose truth or falsity is nondimensional or nonverifiable. Beyond this, the logic inherent in all language often conveys meanings which have nothing at all to do with truth or falsity, verifiable or not.

Beyond the assertion of certain truth or the tautology, and certain falsity or the contradiction, logic contains a third sort of statement called the proposition. An example is "It is raining." Propositions display the possible rather than the necessary. They are statements which are potentially verifiable. They may prove to be factually true or erroneous. Human thoughts are propositions. Human language is the totality of propositions. Ideas are the contents of propositions. When a word is said to contain an idea, it is only by virtue of the meaning conferred upon that word as it is used in a particular proposition. The proposition is either stated or implied by the context in which the word is employed.

Human language contains many more meanings than can