BATTLE FOR THE MIND

BOOKS BY WILLIAM SARGANT

INTRODUCTION TO PHYSICAL METHODS OF TREATMENT IN PSYCHIATRY
(with Eliot Slater)

BATTLE FOR THE MIND

A PHYSIOLOGY OF CONVERSION AND BRAIN-WASHING

BATTLE FOR THE MIND

by William Sargant

DOUBLEDAY & COMPANY, INC., GARDEN CITY, NEW YORK, 1957

Library of Congress Catalog Card Number 57-6294

Copyright © 1957 by William Sargant
All Rights Reserved
Printed in the United States of America
Designed by Patricia Walsh
First Edition

We have still much to learn as to the laws according to which the mind and body act on one another, and according to which one mind acts on another; but it is certain that a great part of this mutual action can *be reduced to general laws, and that the more we know of such laws the greater our power to benefit others will be.*

If, when, through the operation of such laws surprising events take place, (and) we cry out . . . "Such is the will of God," instead of setting ourselves to inquire whether it was the will of God to give us power to bring about or to prevent these results, then our conduct is not piety but sinful laziness.

GEORGE SALMON, D.D., 1859
A Sermon on the Work of the Holy Spirit[141]

ACKNOWLEDGMENTS

Our thanks are due to the following publishers and agents for permission to use short excerpts from the publications listed below:

Basic Books, Inc. – for *The Life and Work of Sigmund Freud,* Volumes I and II, by Ernest Jones.

Jonathan Cape, Ltd. and Little, Brown & Company – for *A Many Splendoured Thing,* by Han Suyin.

The Clarendon Press – for *Enthusiasm,* by R. A. Knox.

The Controller of Her Britannic Majesty's Stationery Office – for *Report of Enquiry into Conviction of Timothy John Evans* and *Supplementary Report,* by J. S. Henderson.

Dennis Dobson, Ltd. – for *Devilman's Jungle,* by Gustaf Bolinder.

E. P. Dutton & Company, Inc. – for *Seven Years in Tibet,* by H. Harrer.

The Estate of Sir James Fraser – for *The Golden Bough.*

Victor Gollancz, Ltd. – for *Reflections on Hanging,* by Arthur Koestler.

Harper & Brothers – for *Devils of Loudun,* by Aldous Huxley and *The God That Failed,* by Arthur Koestler.

McGraw-Hill Book Company, Inc. – for *Joan of Arc,* by Lucien Fabre, translated by Gerard Hopkins.

The Macmillan Company – for *Arrow in the Blue* and *The Invisible Writing,* by Arthur Koestler.

G. P. Putnam's Sons – for *Lost Splendour,* by Prince Felix Youssoupoff. Copyright 1953 by Prince Felix Youssoupoff.

Paul R. Reynolds & Son – for *Varieties of Religious Experience,* by William James.

Simon and Schuster, Inc. – for *The Accused,* by A. Weissberg.

Thames & Hudson, London & New York – for *Divine Horsemen,* by M. Deren and *Invitation to Moscow,* by Z. Stypulkowski.

Yale University Press – for *China Under Communism,* by Richard Walker.

FOREWORD

It must be emphasized as strongly as possible that this book is not concerned with the truth or falsity of any particular religious or political belief. Its purpose is to examine the physiological mechanisms involved in the fixing or destroying of such beliefs in the human brain. Some critics will perhaps doubt whether it is possible to separate two parts of a whole in this way. But if a greater understanding of the problem is ever to be achieved, continued attempts must be made to do so.

Having beliefs of my own, and owing much to a religious upbringing, I am particularly anxious to give as little offense as possible to readers who may hold similar or quite different religious tenets. Yet history records the angry outcry even when Newton tried to disentangle the simple mechanics of gravity from its religious aspects. A deeply religious man himself, he was accused of trying to destroy religious faith in others. He could answer only that his work was concerned, not with the ultimate question of why something happens, but with the immediate question of how it happens; and I must make the same plea for this very much humbler inquiry.

Many people have pointed out, quite rightly, that the ultimate test of both religious and political values is not definable in terms of *how it happens,* but of *what is achieved.*

My concern here is not with the immortal soul, which is the province of the theologian, nor even with the mind in the broadest sense of the word, which is the province of the philosopher, but with the brain and nervous system, which man shares with the dog and other animals. Yet it is through this material brain that emissaries of God or of the devil – dictators, policemen, politicians, priests, physicians, and psychotherapists of various sorts – may all try to work their will on man. It is not surprising therefore that arguments often arise as to who exactly is doing what. This study discusses mechanistic methods influencing the brain which are open to many agencies, some obviously good and some obviously very evil indeed; but it is concerned with brain mechanics, not with the ethical and philosophical aspects of a problem which others are very much more competent to discuss than I am. It must also be remembered that much of what is discussed here is still only a useful working hypothesis; a great deal of further research is needed before final conclusions are reached.

My choice of Wesley for special study in the technique of religious conversion was prompted by my own Methodist upbringing. I became convinced of the tremendous power latent in his methods, though these have now been abandoned by the Church which he built and strengthened by their use; and most people will agree with social historians who insist that his conversion of large areas of the British Isles helped to stave off political revolution at a time when western Europe and North America were in a ferment, or in actual revolt, largely because of the antireligious, materialistic philosophy with which Tom Paine, among others, was associated. John Wesley and his methods demand particular study at the present time from politician and priest alike, even if the hell-fire doctrine he preached may seem outmoded. I have had to go outside my own field of medicine for some of the material used in this book and apologize in advance for any inaccuracies due to this. But if progress and synthesis are ever to be achieved, in this age of increasingly departmentalized knowledge, someone has to risk leap-

ing over walls into other people's territory. And it must not be held against me that I do not discuss some types of purely intellectual conversion, but only those physical or psychological stimuli, rather than intellectual arguments, which seem to help to produce conversion by causing alterations in the subject's brain function. Hence the term "physiology" in the title.

I have to acknowledge the advice and help of more people than can be mentioned by name, who have visited or worked with me either at home or in the U.S.A. They are bound to find some of their viewpoints incorporated in my thinking, and I hope they would not wish it to be otherwise. In particular I have to thank Drs. Eliot Slater and H. J. Shorvon; some of our work done together in England during and after the war is reported in the earlier chapters of this book and has been already published in joint papers by scientific journals. All the material on war neuroses here quoted has appeared in such journals, and references are appended.

The Rockefeller Foundation made it possible for me to spend a valuable year at Harvard University and to see psychoanalytic teaching and treatment at close quarters. Let me emphasize that my discussion of psychoanalysis, when illustrating some aspects of modern conversion and brain-washing techniques, implies no denial of its very real value in the treatment of carefully selected patients. Another year spent, by invitation, at Duke University allowed me to study methods of religious revival, including the Christian snake-handling cults that flourish in the southern states. I also owe much to Drs. Howard Fabing and George Sutherland, with whom, while in the U.S.A., I frequently discussed the relation of Pavlov's work to problems of human behavior.

My thanks are also due to Robert Graves. It was he who persuaded me, while on a visit to Majorca, to continue with this book, helped me to prepare the final manuscript, and also supplied Chapter 8 and some of the other historical references in support of my arguments.

And without the help of my wife, and my secretary, Miss M. English, this book could never have been written at all.

William Sargant
London 1956

CONTENTS

	Foreword	11
	Introduction	19
1	Experiments in Animals	29
2	Animal and Human Behavior Compared	47
3	The Use of Drugs in Psychotherapy	65
4	Psychoanalysis, Shock Treatments, and Leucotomy	75
5	Techniques of Religious Conversion	91
6	Applications of Religious Techniques	123
7	Brain-Washing in Religion and Politics	145
8	Brain-Washing in Ancient Times	175
9	The Eliciting of Confessions	185
10	Consolidation and Prevention	219
11	General Conclusions	235
	BIBLIOGRAPHY	241
	INDEX	253

BATTLE FOR THE MIND

INTRODUCTION

Politicians, priests, and psychiatrists often face the same problem: how to find the most rapid and permanent means of changing a man's beliefs. When, toward the end of World War II, I first became interested in the similarity of the methods which have, from time to time, been used by the political, religious, and psychiatric disciplines, I failed to foresee the enormous importance now attached to the problem — because of an ideological struggle that seems fated to decide the course of civilization for centuries to come. The problem of the doctor and his nervous patient, and that of the religious leader who sets out to gain and hold new converts, has now become the problem of whole groups of nations, who wish not only to confirm certain political beliefs within their boundaries but to proselytize the outside world.[146]

Great Britain and the U.S.A. therefore find themselves at last obliged to study seriously those specialized forms of neurophysiological research which have been cultivated with such intensity by the Russians since the Revolution, and have helped them to perfect

the methods now popularly known as "brain-washing" or "thought control." In August 1954 the United States Secretary of Defense announced the appointment of a special committee to study how prisoners of war could be trained to resist brain-washing. He admitted the desirability of reviewing the existing laws, government agreements, and policies of military departments, with regard to prisoners captured by nations in the Soviet orbit. This committee reported back to the President in August 1955.[131]

In Great Britain, too, the necessity for more vigorous research into the techniques of rapid political conversion has also been widely recognized. Several years ago, for instance, Mrs. Charlotte Haldane pleaded that research should be undertaken into the psychological mechanism of the process by which she, the wife of a famous British scientist, had been converted to a belief in the official Russian interpretations of Marxian dialectics; and into that of her sudden reconversion to the Western point of view, after failing to detect the falsity of the Russian system for so many years. Koestler and many others have described very much the same experience in their own lives.[89]

Many people are also bewildered at the spectacle of an intelligent and hitherto mentally stable person who has been brought up for trial behind the Iron Curtain and prevailed upon not only to believe but to proclaim sincerely that all his past actions and ideas were criminally wrong. "How is it done?" they ask.

It is not always realized that this can be the political equivalent of that kind of religious conversion, after which ordinary decent people suddenly come to believe that their lives have not only been useless but merit eternal damnation because some religious particular has been neglected. The same psychological process may also be seen at work in a patient undergoing psychoanalysis: he can be persuaded that anomalies in his behavior have been caused by an intense hatred of his father — even though he has always acted in a devoted and affectionate manner toward him. How can people be induced to believe in what may contradict obvious fact?[146]

A general distinction should be made between the more gradual changes of outlook and behavior due to increasing age, experience, and reason, and the abrupt total reorientations of viewpoint, often

brought about by others, which involve the surrender of strongly held beliefs and the adoption of new beliefs often diametrically opposed to them.

This book will discuss some of the more important mechanistic and physiological aspects of this problem, and of how new ideas may be implanted and firmly fixed in the minds even of those unwilling at first to receive them. Interest in it was stimulated by chance circumstances eleven years ago. World War II provided medicine with rare opportunities for studying the breakdown of normal persons subjected to intense stresses. In England at the time of the Normandy invasion in June 1944, special arrangements had been made to deal with a new crop of acute military and civilian neuroses resulting from this operation. One day, while traveling to an emergency neurosis center soon after the start of the invasion, I stopped at an American neuropsychiatric hospital to visit a colleague, Dr. Howard Fabing. He had just been reading a book by the famous Russian neurophysiologist I. P. Pavlov, called *Conditioned Reflexes and Psychiatry,*[124] and strongly advised me to do the same at once. This book consisted of a series of lectures given by Pavlov not long before his death in 1936 at the age of eighty-six; but they had not become available in English until 1941. Stocks of the translation had been destroyed in the London blitz that same year, but Dr. Fabing had managed to secure a copy. Like several other neuropsychiatrists of World War II, he had found Pavlov's observations on animals extremely useful for the better understanding of certain behavior patterns observed when human beings break down under abnormal stress.[41]

Pavlov's clinical descriptions of the "experimental neuroses" which he could induce in dogs proved, in fact, to have a close correspondence with those war neuroses which we were investigating at the time. Also, many of the physical treatments that had gradually been developed by trial and error during the war, to relieve acute nervous symptoms, had obviously been anticipated by Pavlov as a result of his prolonged research on dogs.[124] It was now clear that what was needed was a much more careful study of certain of these findings, in their possible relation to psychiatry, than had recently been given them either in England or in America.

the methods now popularly known as "brain-washing" or "thought control." In August 1954 the United States Secretary of Defense announced the appointment of a special committee to study how prisoners of war could be trained to resist brain-washing. He admitted the desirability of reviewing the existing laws, government agreements, and policies of military departments, with regard to prisoners captured by nations in the Soviet orbit. This committee reported back to the President in August 1955.[131]

In Great Britain, too, the necessity for more vigorous research into the techniques of rapid political conversion has also been widely recognized. Several years ago, for instance, Mrs. Charlotte Haldane pleaded that research should be undertaken into the psychological mechanism of the process by which she, the wife of a famous British scientist, had been converted to a belief in the official Russian interpretations of Marxian dialectics; and into that of her sudden reconversion to the Western point of view, after failing to detect the falsity of the Russian system for so many years. Koestler and many others have described very much the same experience in their own lives.[89]

Many people are also bewildered at the spectacle of an intelligent and hitherto mentally stable person who has been brought up for trial behind the Iron Curtain and prevailed upon not only to believe but to proclaim sincerely that all his past actions and ideas were criminally wrong. "How is it done?" they ask.

It is not always realized that this can be the political equivalent of that kind of religious conversion, after which ordinary decent people suddenly come to believe that their lives have not only been useless but merit eternal damnation because some religious particular has been neglected. The same psychological process may also be seen at work in a patient undergoing psychoanalysis: he can be persuaded that anomalies in his behavior have been caused by an intense hatred of his father – even though he has always acted in a devoted and affectionate manner toward him. How can people be induced to believe in what may contradict obvious fact?[146]

A general distinction should be made between the more gradual changes of outlook and behavior due to increasing age, experience, and reason, and the abrupt total reorientations of viewpoint, often

brought about by others, which involve the surrender of strongly held beliefs and the adoption of new beliefs often diametrically opposed to them.

This book will discuss some of the more important mechanistic and physiological aspects of this problem, and of how new ideas may be implanted and firmly fixed in the minds even of those unwilling at first to receive them. Interest in it was stimulated by chance circumstances eleven years ago. World War II provided medicine with rare opportunities for studying the breakdown of normal persons subjected to intense stresses. In England at the time of the Normandy invasion in June 1944, special arrangements had been made to deal with a new crop of acute military and civilian neuroses resulting from this operation. One day, while traveling to an emergency neurosis center soon after the start of the invasion, I stopped at an American neuropsychiatric hospital to visit a colleague, Dr. Howard Fabing. He had just been reading a book by the famous Russian neurophysiologist I. P. Pavlov, called *Conditioned Reflexes and Psychiatry*,[124] and strongly advised me to do the same at once. This book consisted of a series of lectures given by Pavlov not long before his death in 1936 at the age of eighty-six; but they had not become available in English until 1941. Stocks of the translation had been destroyed in the London blitz that same year, but Dr. Fabing had managed to secure a copy. Like several other neuropsychiatrists of World War II, he had found Pavlov's observations on animals extremely useful for the better understanding of certain behavior patterns observed when human beings break down under abnormal stress.[41]

Pavlov's clinical descriptions of the "experimental neuroses" which he could induce in dogs proved, in fact, to have a close correspondence with those war neuroses which we were investigating at the time. Also, many of the physical treatments that had gradually been developed by trial and error during the war, to relieve acute nervous symptoms, had obviously been anticipated by Pavlov as a result of his prolonged research on dogs.[124] It was now clear that what was needed was a much more careful study of certain of these findings, in their possible relation to psychiatry, than had recently been given them either in England or in America.

So close were some of the similarities between these and canine neuroses that it seemed more improbable than ever that many current psychological theories about the origin of human neuroses and other abnormalities of behavior were correct; unless it be conceded that Pavlov's dogs had subconscious minds, and also superegos, egos, and ids. And the part played by alterations in the function of the human brain itself had, it also seemed, been too summarily dismissed by some in their attempts to explain the reasons not only for neurotic and criminal behavior but for all the constant mental turns, reconsiderations, and adjustments which produce so-called "normal" behavior in any given person as he reacts to his environment.

When, late in life, Pavlov began comparing the results of disturbances of brain function noted in his animals with those noted in human beings, this phase of his work was little studied outside Russia, and many British and American psychiatrists still neglect it, although the relevant books have now been long available in both countries. The fact is that Pavlov continues to be known principally for his laboratory experiments on animals, for which he was awarded the Nobel Prize; and most psychiatrists prefer a broader philosophical basis to their work than his simple mechanistic and physiological approach. Moreover there is a certain repugnance in the Western world to Pavlov's investigations. Cultural beliefs give man, in addition to his brain and nervous system, an independently acting metaphysical soul, which, it is assumed, helps to control his ethical behavior and dictate his spiritual values. In this strongly and widely held view, animals have brains but no souls, which makes odious any comparison between the behavior pattern of man and animals. And though studies of how animals' bodily systems function have admittedly been of great value in throwing light on the workings of the human machine, this view persists, even among scientists, almost as a test of moral respectability.

In the United Kingdom this prejudice against Pavlov has allowed many scientists to neglect his work; and in the United States the wave of Freudian psychoanalytic fervor which has swept the country, many years after its introduction and use in Europe, has had

the same effect. Too many psychiatrists and psychologists in both countries have, in fact, blinded their eyes to Pavlov's thesis, though his viewpoint was irreproachably scientific. For Pavlov always insisted that experimental facts, however limited in their range, which can be repeatedly tested and checked, should take precedence over broader and vaguer psychological speculations.

Psychiatric research in Great Britain has, however, become far more realistic since World War II. Drugs and other physical methods of treatment gave such undeniable results, in the treatment of acute civilian and military war neuroses, that physiological aids to psychiatry were given a high research priority, and this policy has persisted. Indeed, it was the use of drugs in psychotherapy that first prompted the present study of Pavlov's experimental methods of changing the behavior patterns in animals, and the mechanics behind historical techniques of human indoctrination, religious conversion, brain-washing, and the like.[150]

Early in the war, during the treatment of the acute neuroses resulting from the Dunkirk evacuation, the Battle of Britain, and the London blitz, the value of certain drugs had become obvious in helping patients to discharge their pent-up emotions about the terrifying experiences which had caused their mental breakdown.[51] This method had been used on a more limited scale in peace time practice by Stephen Horsley[72] and others. As the war progressed, and after it was over, experiments with a wide range of such drugs were continued and a good deal was learned about their properties.[144]

A drug would be administered to a carefully chosen patient — by injection into a vein, or inhalation — and as it started to take effect an endeavor would be made to make him relive the episode that had caused his breakdown. Sometimes the episode, or episodes, had been mentally suppressed, and the memory would have to be brought to the surface again. At other times it was fully remembered, but the strong emotions originally attached to it had since been suppressed. The marked improvement in the patient's nervous condition was attributed to the releasing of these original emotions. It was also found that the emotions which were most profitably re-

leased – or "abreacted," as the psychiatric term is – were those of fear or anger; little could be done by making, say, a melancholic patient weep and become more depressed.

Our first reading of Pavlov's book, in 1944, coincided with the learning of some more facts about these drug treatments. It was found that a patient could sometimes be restored to mental health not by his reliving a particular traumatic experience but by stirring up in him, and helping him to discharge, strong emotions not directly concerned with it. Thus, in some of the acute Normandy battle neuroses, and those caused by V-bomb explosions, quite imaginary situations to abreact the emotions of fear and anger could be suggested to a patient under drugs, though as a rule these were in some way related to the experiences which he had undergone. Much better results could often, indeed, be obtained by stirring up emotions about such imaginary happenings than by making the patient relive actual happenings in detail. For example, it might be suggested, under drugs, to a patient who had broken down as the result of a tank battle, that he was now trapped in a burning tank and must fight his way out. Though this situation had really never occurred, the fear that it might happen was perhaps a contributory cause of his eventual collapse.

Outbursts of fear or anger thus deliberately induced and stimulated to a crescendo by the therapist would frequently be followed by a sudden emotional collapse. The patient would fall back inert on a couch – as a result of this exhausting emotional discharge, not of the drug – but he would soon come round. It then often happened that he reported a dramatic disappearance of many nervous symptoms. If, however, little emotion had been released, and he had only had his intellectual memory of some horrible episode refreshed, little benefit could be expected. But a falsely implanted memory might create a larger emotional discharge than the real, and induce the physiological effects needed for psychological relief. A technique of deliberately stimulating anger or fear under drugs until the patient collapses in temporary emotional exhaustion was finally perfected with the help of Pavlov's findings. Especially important to this were some observations he made on the behavior of

his dogs after they had been almost drowned in the Leningrad flood of 1924; these will be discussed in later chapters.[160]

One afternoon, when this technique was being applied to the more normal victims of severe battle or bombing stress, I happened to visit my father's house and picked up one of his books at random. It was John Wesley's *Journal* of 1739-40. My eye was caught by Wesley's detailed reports of the occurrence, two hundred years before, of almost identical states of emotional excitement, often leading to temporary emotional collapse, which he induced by a particular sort of preaching. These phenomena usually appeared when he had persuaded his hearers that they must make an immediate choice between certain damnation and the acceptance of his own soul-saving religious views. The fear of burning in hell, induced by his graphic preaching, could be compared to the suggestion we might force on a returned soldier, during treatment, that he was in danger of being burned alive in his tank and must fight his way out. The two techniques seemed startlingly similar.

Modern Methodists are often confused when they read Wesley's detailed accounts of these successes; they do not consider that the reason for their preaching being ineffective, by comparison, may simply be because the present fashion is to address the intellect, rather than stir up strong emotion in a congregation.

It seemed possible, in fact, that many of the results which were being achieved by abreaction under drugs were essentially the same as those obtained, not only by Wesley and other religious leaders, but by modern "brain-washers," though different explanations would doubtless be given in every case. Also, it seemed as if Pavlov provided experimental evidence, in his changing of animal behavior, which helped to explain why certain methods of bringing about similar changes in man were successful. Without these experiences in a wartime neurosis center there would have been no thought of connecting the physiological mechanics used by Pavlov in his experiments on animals with Wesley's mass conversion of the common people in eighteenth-century England and of going on to the present study.[150]

In the autumn of 1944 a period of illness enabled several weeks

to be spent in following up these clues, studying case histories of sudden conversion, and the means of inducing belief in divine possession used by various religious bodies throughout the world. I spent part of 1947-48 in the United States, where an opportunity occurred of studying at first hand some of the revival techniques still practised in many parts of the country. These seemed relevant to this investigation because they are still extremely effective when used by skillful practitioners; in England they have practically died out.[145]

After ten years of intermittent study, the fruit of which was several articles, most of them published in scientific journals, a second period of illness enabled these to be rearranged and consolidated for the present book. The crude mechanics of the techniques studied form only part of the picture; but because their importance is so often overlooked by those who believe in reasoned argument as far more effective than all other methods of indoctrination, it does seem important that the Western world should be given some understanding of them.

To watch such methods in action, and observe their devastating effect on the minds of ordinary people, is such a bewildering and horrible experience that one is tempted to turn one's back on what is a matter of fundamental importance for our cultural future, and shout defiantly: "Men are not dogs!" – as indeed they are not. Dogs, at least, have not yet conducted experiments on men. Meanwhile, however, a large part of the world's population is not only being reindoctrinated but has had the whole medical system reorientated along Pavlovian lines – partly because the mechanistic and physiological approach to what is more commonly regarded in the West as the province of philosophy and religion has achieved such politically convenient results.

In succeeding chapters evidence will be provided for the general observations made above. It must be emphasized that this book is not primarily concerned with any ethical or political system; its object is only to show how beliefs, whether good or bad, false or true, can be forcibly implanted in the human brain; and how people can be switched to arbitrary beliefs, altogether opposed to those previously held. Too technical a style has been avoided, because if

politicians, priests, psychiatrists, and police forces in various parts of the world continue to use these methods, ordinary people must know what to expect and what the best means are of preserving their former habits of thought and behavior when subjected to unwelcome indoctrination.

No claim is made that this book contains any facts that are basically new. Every subject discussed is available for further detailed study in specialist journals and books, to which references are given. But the net has been flung wider than by most previous writers on the subject, in an attempt to connect and correlate observations from many apparently unrelated and unconnected contexts. The conclusion reached is that simple physiological mechanisms of conversion do exist, and that we therefore still have much to learn from a study of brain function about matters that have hitherto been claimed as the province of psychology or metaphysics. The politico-religious struggle for the mind of man may well be won by whoever becomes most conversant with the normal and abnormal functions of the brain, and is readiest to make use of the knowledge gained.

1 EXPERIMENTS IN ANIMALS

In the course of over thirty years of research Pavlov accumulated a mass of observations on various methods of building up behavior patterns in dogs and then breaking them down again. He interpreted his findings in mechanistic terms which have since been frequently disputed by psychologists and psychiatrists. Yet the findings themselves have been confirmed again and again. Horsley Gantt attributed the absence of any important errors in Pavlov's work to his "painstaking methods, his adequate controls, his habit of giving the same problem to several collaborators working in separate laboratories or institutes, with whom he checked results and supervised experiments . . ."[124]

Pavlov had won the Nobel Prize in 1904 for research on the physiology of digestion, before turning to study what he called the "higher nervous activity" in animals. What changed his line of inquiry was a sense that he could learn little more about digestive functions until he had investigated the workings of the brain and nervous system, which often seemed to influence digestion. He then became so deeply absorbed in the implications of this new study

that he concentrated on it until his death in 1936, at the age of eighty-six.

Pavlov was one of the Russian scientists of the old regime whose work Lenin thought valuable enough to encourage after the Revolution; and even though extremely critical of the Soviet regime, Pavlov continued to receive generous support from the government. Both inside and outside Russia he was admired for the courageous attitude he adopted, and only at the very end of his life did he become reconciled to living under a dictatorship. Ironically he is now regarded as a hero of the Revolution, and no mention is made in recent Soviet publications of his persistent opposition to the regime. Horsley Gantt, revisiting him in 1933, asked why his political attitude was now more conciliatory; and Pavlov, he says, replied half jokingly that at the age of eighty-three his heart could no longer stand the strain of infuriated outbursts against the authorities who were sponsoring him.[134] About this time, also, the Nazis had begun to threaten Russia, and Pavlov's great mistrust of Germany inclined him to abate his hostility to the Russian government. But though he was now relating his discoveries about animals to problems of human behavior, it is extremely doubtful whether he ever foresaw that this work could be used as an instrument of Soviet policy. Since he always demanded and obtained freedom of thought for himself, it is unlikely that he would have wished to curtail freedom of thought for others. He insisted on traveling abroad to maintain contact with his scientific colleagues, and won a great ovation when lecturing in England just before his death.

Pavlov cannot therefore be considered a typical scientist of the Soviet regime, even if much of his finest work had not been done before the Revolution. Yet the Communists must have found his mechanistic approach to the physiological study of behavior in dogs and men most helpful while pursuing their policy of indoctrination. In July 1950 a medical directive was issued in Russia for a reorientation of all Soviet medicine along Pavlovian lines[60] – probably partly because of the impressive results obtained by applying Pavlov's research to political ends. Yet outside Russia its implications still sometimes tend to be ignored.

As soon as Pavlov expressed a desire to apply his experimental

findings on animal behavior to problems of morbid psychology in human beings, the Soviet government placed a nearby psychiatric clinic at his disposal. His first public lecture on this topic was delivered in 1930: he called it "The Trial Excursion of a Physiologist in the Field of Psychiatry." It may be that these new interests date from an operation for gallstones which he underwent in 1927, because he then published his significant "A Post-operative Cardiac Neurosis Analyzed by the Patient: Ivan Petrov Pavlov.[124]

Pavlov's work seems to have influenced the techniques used in Russia and China for the eliciting of confessions, for brain-washing, and for inducing sudden political conversions. His findings, applicable to these, should be easily understood even by the nontechnical reader, without the need of spending too much time on the details of his actual experiments. Most of these findings are well reported in a series of Pavlov's later lectures translated by Horsley Gantt, and published in Great Britain and the United States in 1941 under the title *Conditioned Reflexes and Psychiatry*.[124] Professor Y. P. Frolov's enlightening book on these experiments, *Pavlov and his School* (1938), has also been translated and published in English.[51] Professor Babkin's more recent life of Pavlov,[4] however, makes little reference to some of his most important findings from the point of view of our study. And though Dr. Joseph Wortis in his *Soviet Psychiatry*,[192] published in the United States, emphasizes the importance in modern Russian medicine of Pavlov's experimental approach to psychiatric problems, few details are given of the last important phase of Pavlov's work. An official life of Pavlov, published in Moscow in 1949, written by E. A. Asratyn,[8] also contains many details of Pavlov's early experimental work on conditioned reflexes in animals, but very few details of his later work relevant to conversion and brain-washing techniques. At all events, no publication in English has hitherto explained these for the benefit of ordinary readers, but recently a good new translation of Pavlov's selected works has become available in English.[124a]

Thirty years of research convinced Pavlov that the four basic temperaments of his dogs approximated closely to those differentiated in man by the ancient Greek physician Hippocrates. Though blends of basic temperamental patterns appeared in Pavlov's dogs, they

could be distinguished as such, rather than as new temperamental categories.

The first of these four corresponded with Hippocrates's "choleric" type, which Pavlov named the "strong excitatory." The second corresponded with Hippocrates's "sanguine temperament"; Pavlov named it "lively," the dogs of this type being of a more balanced temperament. The normal response to imposed stresses or conflict situations by both these types was increased excitement and more aggressive behavior. But whereas the "choleric," or "strong excitatory," dog would often turn so wild as to be completely out of hand, the "sanguine" or "lively" dog's reactions to identical stresses were purposeful and controlled.

In the other two main temperamental types of dog, imposed stresses and conflict situations were met with more passivity, or "inhibition," rather than aggressive responses. The more stable of these two inhibitory temperaments was described by Pavlov as the "calm imperturbable type, or phlegmatic type of Hippocrates." The remaining temperament identified by Pavlov corresponds with Hippocrates's "melancholic" classification. Pavlov named it the "weak inhibitory" type. He found that a dog of this type shows a constitutional tendency to meet anxieties and conflicts by passivity and avoidance of tension. Any strong experimental stress imposed on its nervous system reduces it to a state of brain inhibition and "fear paralysis."

Yet Pavlov found that the other three types too, when subjected to more stress than they could cope with by usual means, responded in the end with states of brain inhibition. He regarded this as a protective mechanism normally employed by the brain as a last resort when pressed beyond endurance. But the "weak inhibitory" type of dog was an exception: protective inhibition occurred rapidly, and in response to lighter stresses — a difference of the utmost significance to this study.

Pavlov fully recognized the great importance of environment, as well as of constitution, in deciding the final behavior patterns of his dogs. He found that certain fundamental instincts, such as sex or the need for food, were constantly adapted to changes of environment by the formation of appropriate behavior patterns. A dog

without a brain cortex (which contains some of the more complicated connections between the main brain centers) might still swallow food placed within its mouth; but it needed a brain cortex, and means of forming complicated conditioned reflexes, if it were to learn that food would be given only after an electric shock of a certain definite strength, or after a metronome had been heard beating at one particular rate and no other.

In discussing the "weak inhibitory" type, Pavlov pronounced that though the basic temperamental pattern is inherited, every dog has been conditioned since birth by varied environmental influences which may produce long-lasting inhibitory patterns of behavior under certain stresses. The final pattern of behavior in any given dog will therefore reflect both its own constitutional temperament, and specific patterns of behavior induced by environmental stresses.

Pavlov's experiments led him to pay increasing care to the need of classifying dogs according to their inherited constitutional temperaments before he subjected them to any of his more detailed experiments in conditioning. This was because different responses to the same experimental stress or conflict came from dogs of different temperaments. When a dog broke down and exhibited some abnormal pattern of behavior, its treatment would also depend primarily on its constitutional type. Pavlov confirmed, for instance, that bromides are of great assistance in restoring nervous stability to dogs who have broken down; but that the doses of sedative required by a dog of the "strong excitatory" type is *five to eight times greater* than that required by a "weak inhibitory" dog of exactly the same body weight. In World War II the same general rule applied to human subjects who had temporarily broken down under battle and bombing stress and needed "front-line sedation." The required doses varied greatly according to their temperamental types.

Towards the end of his life, when he was experimentally applying his discoveries about dogs to research in human psychology, Pavlov gave increasing attention to what happened when the higher nervous system of his dogs was strained beyond the limits of normal response; and compared the results with clinical reports on various types of acute and chronic mental breakdown in human beings. He found that severer and more prolonged stresses could be applied to

normal dogs of the "lively" or "calm imperturbable" type without causing a breakdown than to those of the "strong excitatory" and "weak inhibitory" types.

Pavlov came to believe that this "transmarginal" (it has also been termed "ultraboundary" or "ultramaximal") inhibition which eventually overcame even the two former types – changing their whole behavior dramatically – could be essentially protective. When it occurred the brain might have no other means left of avoiding damage due to nervous stress. He found a means of examining the degree of protective transmarginal inhibition in any dog at any given time: by using his salivary gland conditioned-reflex technique. Though the dog's general behavior might seem normal at first sight, the amount of saliva being secreted would tell him what was beginning to happen in its brain.

In these tests the dog would be given a definite signal, such as the beating of a metronome at a certain rate or the passing of a weak electric current into its leg, before being given food. After a time the signal would provoke an anticipatory flow of saliva, without the need of letting the dog see or smell the food. A conditioned reflex having thus been established in the brain, between a signal and the expectation of food, the amount of saliva secreted could be precisely measured in drops, and any changes in the response of the brain to conditioned reflexes and induced patterns could be plainly registered.

Here let me digress by emphasizing the relevance of Pavlov's experiments on conditioned reflexes to the ordinary happenings of everyday human life. Much human behavior is the result of the conditioned behavior patterns implanted in the brain, especially during childhood. These may persist almost unmodified, but more often become gradually adapted to changes of environment. But the older the person, the less easily can he improvise new conditioned responses to such changes; the tendency then is to make the environment fit his, or her, increasingly predictable responses. Much of our human life consists also in the unconscious following of conditioned-reflex patterns originally acquired by hard study. A clear example is the way a car driver builds up numerous and varied conditioned responses before being able to negotiate a crowded city

street without paying much conscious attention to the process — this is often called "driving automatically." If the driver then gets into the open country, he will change to a new pattern of automatic behavior. The human brain is, in fact, constantly adapting itself reflexly to changes of environment; although, as with car driving, the first lessons in any given process may demand difficult, and even tedious, efforts of concentration.

Human and canine brains are obliged to build up a series of both positive and negative conditioned responses and behavior patterns. Most people in business and the armed forces learn by experience to behave negatively in the presence of their superiors; and positively, even perhaps aggressively, in that of their juniors. Pavlov showed that the nervous system of dogs develops extraordinary powers of discrimination in building up these positive and negative responses. He showed that a dog can be made to salivate when a tone of five hundred vibrations a minute is sounded, if this is a food signal; but not if the rate is only four hundred and ninety, and no food can therefore be expected.

Negative conditioned responses are no less important than the positive ones, since members of civilized societies must learn how to control normal aggressive responses almost automatically, though sometimes obliged to release them in a split second when a vital emergency arises. Emotional attitudes also become both positively and negatively conditioned: one learns an almost automatic revulsion from certain classes of people, and an automatic attraction to others. Even such words as Catholic and Protestant, worker and employer, Socialist and Conservative, Republican and Democrat, evoke very strong conditioned responses.

One of Pavlov's most important findings was exactly what happens to conditioned behavior patterns when the brain of a dog is "transmarginally" stimulated by stresses and conflict beyond its capacity for habitual response. He could bring about what he called a "rupture in higher nervous activity" by employing four main types of imposed stresses.

The first was simply an increased intensity of the signal to which the dog was conditioned; thus he would gradually increase the voltage of the electric current applied to its leg as a food signal.

When the electric shock became a little too strong for its system, the dog began to break down.

A second powerful way of achieving the same result was to increase the time between the giving of the signal and the arrival of food. A hungry dog might be conditioned to receive food, say, five seconds after the warning signal. Pavlov would then greatly prolong the period between a signal and the giving of food. Signs of unrest and abnormal behavior might become immediately evident in the less stable of his dogs. He found, in fact, that the dog's brains revolted against any abnormal prolongation of waiting under stress; breakdown occurred when a dog had to exert very strong or very protracted inhibition. (Human beings, too, often find prolonged periods of anxious waiting for an event more trying than the event itself when it finally comes.)

Pavlov's third way of producing a breakdown was to confuse them by anomalies in the conditioning signals given – continued positive and negative signals being given one after the other. The hungry dog became uncertain what would happen next and how to face these confused circumstances. This could disrupt its normal nervous stability – just as happens with human beings.

A fourth way of producing a breakdown was to tamper with a dog's physical condition by subjecting it to long periods of work, gastrointestinal disorders, fevers, or by disturbing its glandular balance. Though the three other means listed above had failed to produce a breakdown in a particular dog, this might be engineered later by using the same sort of stresses immediately after the removal of its sexual glands, or during an intestinal disorder. The advantage taken of debilitation, and other changes of bodily function in human beings, for their political and religious conversion will be discussed later. In some cases Pavlov's findings may have been exploited; in others, anticipated.

Pavlov found, not only that after castration or intestinal disorders a breakdown might occur even in temperamentally stable dogs, but also that the new behavior pattern occurring afterward might become a fixed element in the dog's way of life, though it had long recovered from the debilitating experience.

In the "weak inhibitory" type of dog, new neurotic patterns thus implanted could often be readily removed again: doses of bromide might be enough to achieve this – though they did not alter the dog's fundamental weakness of temperament. But in "calm imperturbable" or "lively" dogs who needed castration, for instance, before they could be nervously disrupted, Pavlov found that the newly implanted pattern was more often ineradicable, once the dog had recovered its normal physical health. He decided that this was due to the natural toughness of the nervous systems in such dogs. The new patterns of behavior had been difficult to implant without a temporarily induced debilitation; now they might be held with as much tenacity as the old.

The relevance of this last experiment to similar changes of behavior in humans hardly needs to be emphasized: toward the end of a long period of physical illness, or after a period of severe debilitation (sometimes produced by enforced fasting), people of "strong character" are often known to make a dramatic change in their beliefs and convictions. If they then recover strength they may remain true to the new orientation for the rest of their lives. Case histories of people "converted" in times of famine, or war, or in prison, or after harrowing adventures at sea, or in the jungle, or when brought to destitution by their own self-will, are frequent. The same phenomenon is often observed in both psychotic and neurotic patients who have suffered from glandular operations, fevers, loss of weight and the like, and only then developed their abnormal patterns of behavior: if they had strong previous personalities, these new patterns may persist long after physical recovery.

Pavlov established that the ability of a dog to resist heavy stress would fluctuate according to the state of its nervous system and its general health. But once protective "transmarginal" inhibition has been induced, some very strange changes in the functioning of the dog's brain took place, and these changes could not only be measured with some precision by the amounts of saliva secreted in response to conditioned food stimuli, but were not liable, as when human beings have analogous experiences, to subjective distortions: there was no question, that is to say, of the dogs' trying to explain

away or rationalize their behavior after having been subjected to these tests.

Three distinct and progressive stages of "transmarginal" inhibition were identified by Pavlov in the course of his experiments. The first he called the "equivalent" phase of cortical brain activity. In this phase, all stimuli, of whatever strength, resulted only in the same amounts of saliva being produced. The observation is comparable to the frequent reports by normal people in periods of intense fatigue, that there is very little difference between their emotional reactions to important or trivial experiences. And though the feelings of a normal, healthy person will vary greatly according to the strength of the stimuli experienced, nervously ill people often complain that they become unable to feel sorrow and joy as acutely as before. As the result of fatigue and debilitation, in fact, a man may find to his chagrin that the excitement at receiving a legacy of ten thousand dollars is no higher than if it were one of a dime; his condition then probably approximates to the "equivalent" phase of exhausted cortical activity identified by Pavlov in his dogs.

When even stronger stresses are applied to the brain, the "equivalent" phase of transmarginal inhibition may be succeeded by a "paradoxical" phase, in which weak stimuli produce livelier responses than stronger stimuli have done. The reason for this is not far to seek: the stronger stimuli are now only increasing the protective inhibition; but the weaker ones still produce positive responses. Thus the dog refuses food accompanied by a strong stimulus, but accepts it if the stimulus is weak enough. This paradoxical phase can also occur in human behavior when the emotional stress is heavy, as will be shown in a later chapter. On such occasions, the individual's normal behavior has been reversed to a degree that seems quite irrational, not only to a detached observer, but to the patient himself – unless either of them happens to have studied Pavlov's experiments on dogs.

In the third stage of "protective" inhibition, which Pavlov called the "ultraparadoxical," positive conditioned responses suddenly switch to negative ones; and negative ones to positive. The dog may then, for instance, attach itself to a laboratory attendant whom it has previously disliked, and try to attack the master whom it has pre-

viously loved. Its behavior, in fact, becomes exactly opposed to all its previous conditioning.

The possible relevance of these experiments to sudden religious and political conversion should be obvious even to the most skeptical: Pavlov has shown by repeated and repeatable experiment just how a dog, like a man, can be conditioned to hate what it previously loved, and love what it previously hated. Similarly, one set of behavior patterns in man can be temporarily replaced by another that altogether contradicts it; not by persuasive indoctrination alone, but also by imposing intolerable strains on a normally functioning brain.

Pavlov also showed that when transmarginal inhibition began to supervene in a dog, a state of brain activity similar to that seen in human hysteria might result. This can cause an abnormal suggestibility to the influences of the environment. His case histories frequently include reports on hypnoidal or hypnotic states in dogs. Clinical reports on the behavior of human beings under hypnosis, as well as in various conditions of hysteria, abound in descriptions of abnormalities corresponding with those noted in Pavlov's "equivalent," "paradoxical," and "ultraparadoxical" phases of nervous breakdown in dogs. In states of human fear and excitement the most wildly improbable suggestions can be accepted by apparently sensible people; as in August 1914, a rumor that Russian soldiers were traveling through England "with snow still on their boots" swept the country, and was so circumstantial that for a while it affected German strategy; or as in the earlier stages of World War II, rumor continually reported the English renegade William Joyce ("Lord Haw-Haw") as having mentioned in a broadcast that the church clock of a particular village — the name of which always varied with the telling — was three minutes slow.

Summary of Above Findings

1. Dogs, like human beings, respond to imposed stresses or conflict situations according to their different types of inherited temperament. The four basic types correspond with those described as "humors" by the ancient Greek physician Hippocrates.

2. A dog's reactions to normal stress depend, not only on its in-

herited constitution, but also on environmental influences to which it has been exposed. These alter the details of its behavior, but do not change the basic temperamental pattern.

3. Dogs, like human beings, break down when stresses or conflicts become too great for their nervous system to master.

4. At the point of breakdown their behavior begins to vary from that normally characteristic of their inherited temperamental type and previous conditioning.

5. The amount of stress or conflict that a dog can master without breaking down varies with its physical condition. A lowering of resistance can be brought about by fatigue, fevers, drugs, and glandular changes.

6. When the nervous system has been stimulated "transmarginally" (that is to say, beyond its capacity to respond normally) for long periods, a dog's responses eventually become inhibited, whatever its temperamental type may be. In the two less stable types, the "weak inhibitory" and the "strong excitatory," breakdown will also occur sooner than in the two stronger types, the "lively" and the "calm imperturbable."

7. This "transmarginal" inhibition is protective and results in altered behavior. Three distinguishable phases of increasingly abnormal behavior occur:

a. The so-called "equivalent" phase, in which the brain gives the same response to both strong and weak stimuli.

b. The so-called "paradoxical" phase, in which the brain responds more actively to weak stimuli than to strong.

c. The so-called "ultraparadoxical" phase, in which conditioned responses and behavior patterns turn from positive to negative; or from negative to positive.

8. When stresses imposed on the nervous system of dogs result in transmarginal "protective" inhibition, a state of brain activity can also occur resembling hysteria in man.

Pavlov learned a great deal by observing the effect on his dogs of accidental occurrences, as well as of planned experiments. A crucial occasion was the Leningrad flood in 1924. We have already reported how in the "equivalent," "paradoxical," and "ultrapara-

doxical" phases conditioned responses can be disorganized and reversed. It was the Leningrad flood that gave him the clue as to how the brain might also be wiped almost clean, at least temporarily, of all the conditioned behavior patterns recently implanted in it. Just before his death, Pavlov told an American physiologist that the observations made on this occasion had also convinced him that every dog had its "breaking point" – provided that the appropriate stress was found and properly applied to its brain and nervous system.[37]

Pavlov had implanted a whole set of positive conditioned behavior patterns in a group of dogs – before these were one day accidentally trapped by floodwater, which flowed in under the laboratory door and rose gradually until they were swimming around in terror with heads at the tops of their cages. At the last moment a laboratory attendant rushed in, pulled them down through the water, and out of their cage doors to safety. This terrifying experience made some of the dogs switch from a state of acute excitement to one of severe transmarginal protective inhibition, as described earlier in this chapter. On retesting them afterward, it was found that the recently implanted conditioned responses had also now all disappeared. However, other dogs, which had faced the same ordeal merely by registering increased excitement were not similarly affected, and the implanted behavior patterns had persisted.

Pavlov eagerly followed up the clue. In addition to the abnormalities induced in the "equivalent," "paradoxical," and "ultra-paradoxical" phases by lesser degrees of protective inhibition, lay a further degree of inhibitory activity on which he had accidentally stumbled, capable, it seemed, of disrupting for the time being all recently implanted conditioned responses. Most dogs which had reached this stage could later have their old conditioned behavior patterns restored, but it might need months of patient work. Then Pavlov let a trickle of water run in under the door of the laboratory. All the dogs, and especially those who had had their patterns abolished, were so sensitive to the sight that they could always be affected again by this means, although apparently normal again in

other respects.[51] That some of the still-sensitized dogs had resisted total breakdown did not shake Pavlov's conviction that appropriate stresses, properly applied, could have profound effects on all of them.

Application of these findings about dogs to the mechanics of many types of religious and political conversion in human beings suggests that, for conversion to be effective, the subject may first have to have his emotions worked upon until he reaches an abnormal condition of anger, fear, or exaltation. If this condition is maintained or intensified by one means or another, hysteria may supervene, whereupon the subject can become more open to suggestions which in normal circumstances he would have summarily rejected. Alternatively, the "equivalent," or the "paradoxical" and "ultraparadoxical" phases may occur. Or a sudden complete inhibitory collapse may bring about a suppression of previously held beliefs. All these happenings could be of help in bringing about new beliefs and behavior patterns. The same phenomena will be noted in many of the more successful modern psychiatric treatments, discovered independently of one another. All the different phases of brain activity, from an increased excitement to emotional exhaustion and collapse, can be induced either by psychological means, or by drugs, or by shock treatments produced electrically, or by simply lowering the sugar content of the patient's blood with insulin injections. And some of the best results in the psychiatric treatment of neuroses and psychoses occur from the inducing of states of protective inhibition. This is often done by continuing artificially imposed stresses on the brain until a terminal stage of temporary emotional collapse and stupor is reached, after which it seems that some of the new abnormal patterns may disperse, and the healthier ones can return or be implanted afresh in his brain.

So far, the results of acute strain and breakdown in the nervous system have been discussed, rather than its day-to-day functioning. Now Pavlov believed that the higher centers of the canine and human brain were in a constant flux between excitation and inhibition. Just as one has to inhibit intellectual activity by sleeping perhaps for eight hours, in order to maintain it at adequate strength

for the remaining sixteen of the twenty-four, so smaller areas of the brain cannot be kept functioning normally except by a frequent switching on and off. Pavlov wrote:[124]

If we could look through the skull into the brain of a consciously thinking person, and if the place of optimal excitability were luminous, then we should see playing over the cerebral surface a bright spot with fantastic, waving borders, constantly fluctuating in size and form, and surrounded by a darkness, more or less deep, covering the rest of the hemispheres. p. 26.

Pavlov was here speaking only figuratively. Things are not so simple as that, and recent research suggests that the picture seen would be far more complex; but he was emphasizing that when one area of the brain is in a state of excitation, other areas can become inhibited as a result. It is impossible to concentrate consciously and deliberately on two different lines of thought at the same time. Attention switches quickly between one and the other, as often as required. Shakespeare wrote that no man "can hold a fire in his hand by thinking on the frosty Caucasus." Pavlov challenged this dictum by showing, as it were, that if one's nervous system can become sufficiently aroused by concentrated and ecstatic visions of the Caucasus, the pain stimuli of the burned hand may be inhibited. Sherrington, the great English physiologist, is said to have remarked that Pavlov's findings on this head helped to explain how the Christian martyrs could die happily at the stake.[51]

Pavlov was able to show that focal areas of inhibition in the brain – producing, for example, a temporary hysterical loss of memory, of eyesight, or the use of limbs in man – may be complemented by large areas of excitation in other parts of the brain. This provides a physiological basis for Freud's observations that repressed emotional memories often lead to a condition of chronic anxiety about apparently unconnected matters. The pathological condition may also disappear when the repressed memory is restored to consciousness so that the local inhibition disappears, and so does the complementary excitation elsewhere.

Pavlov noted that when one small cortical area in a dog's brain reached what he called "a state of pathological inertia and excita-

tion" which became fixed, repeated "stereotypy" of certain movements would follow. He concluded that if this cerebral condition could affect movement it might also affect thought, stereotypically; and that a study of such small cortical areas in the brains of dogs might account for certain obsessions in human thinking. As a simple example: it might explain why many people are plagued by tunes persistently running in the head, and others by distressingly lascivious thoughts that neither prayer nor the exercise of will power seem able to dispel – though they may suddenly disappear for no ascertainable reason.

In the last years of his life Pavlov made another important observation about these "states of pathological inertia and excitation": he found that these small areas were subject to the "equivalent," "paradoxical," and "ultraparadoxical" phases of abnormal activity under stress which he had thought applicable only to much larger areas of the brain. This discovery caused him a pardonable exhilaration: it might well explain physiologically, for the first time, certain phenomena also observed in human beings when they begin to act abnormally. It is a well-known characteristic of mentally unhinged people to include others in their obsessions. Thus, if a man who has always been sensitive to criticism loses control of his senses, he is likely to complain that, wherever he goes, everyone slanders and talks against him. And women who have always been nervous of sexual attack will often be convinced by internal sensations that some known or unknown person has actually interfered with them. Pavlov thought, in fact, that what psychiatrists call the phenomenon of "projection" and "introjection" – when a persistent fear or desire is suddenly projected outward or inward into seeming actuality – might be given a physiological explanation in terms of local cerebral inhibition.

Pavlov found that some dogs of stable temperament were more than usually prone to develop these "limited pathological points" in the cortex when at the point of breaking down under stress. New behavior patterns resulted from them: it might be a compulsive and repetitive pawing at the experimental stand – such as also follows interference with glandular function or some form of physical debiliation. Once acquired by a dog of stable temperament, patterns

of this sort are, he found, very difficult to eradicate. Which may help to explain why, when human beings of strong character suddenly "find God," or take up vegetarianism, or become Marxists, they often tend to become confirmed fanatics with one-track minds: a small cortical point has, perhaps, reached a state of permanent pathological inertia.

Two years before his death Pavlov wrote prophetically:[124]

I am no clinician. I have been, and remain, a physiologist and, of course, at present so late in life would have neither the time nor the possibility to become one. . . . But I shall certainly not be erring now if I say that clinicians, neurologists and psychiatrists, in their respective domains, will inevitably have to reckon with the following fundamental patho-physiological fact: the complete isolation of functionally pathological (at the aetiological moment) points of the cortex, the pathological inertness of the excitatory process, and the ultra-paradoxical phase. p. 161.

He was right. Not only clinicians, neurologists, and psychiatrists, but the ordinary people the world over have felt the impact of his simple type of mechanistic research – some of them to their cost. Further work may modify some of the conclusions: but he has provided simple and sometimes convincing physiological explanations of much that the Western world still tends to shroud in vaguer psychological theory.

It is admittedly unpleasant to think of animals being deliberately subjected to painful stress, for the sake of scientific research. Even though Pavlov was no sadist and as interested in curing his dog's nervous breakdowns as causing them, some of his experiments would hardly be tolerated in England today. But, as the work has been done carefully, and reported accurately, we should not let any legitimate feelings blind our eyes to its value in human psychiatry or to its possible significance in the political and religious fields.

2 ANIMAL AND HUMAN BEHAVIOR COMPARED

We have repeatedly heard it argued that comparisons between the behavior of man and animals, such as those made in Chapter 1, are invalid; because man has a soul, or at least a far more highly developed brain and intelligence. Yet, since experiments on the digestive and glandular systems of animals have proved helpful in framing the fundamental laws which govern these systems in the human body, why not experiments on the higher nervous system? If the analogy between the human and canine digestive and glandular systems had been disallowed, and animal experimentation forbidden, general medicine might still be in the same backward state as modern psychiatry; the fact being that psychological theory has too often taken the place of scientific experiment as one of the main means of accounting for normal and abnormal patterns of human behavior.

This chapter, it is hoped, will show that Pavlov's experiments on dogs are so remarkably applicable to certain problems of human behavior that the remark "Men are not dogs" becomes at times almost irrelevant. The behavior of the human brain, when subjected during World War II to strains and stresses, provided a

remarkable opportunity for testing Pavlov's analogical conclusions. It will therefore be convenient to make a résume of some of our own published wartime observations and others recorded and discussed in journals and books by Sir Charles Symonds,[177] Swank,[174] Grinker,[65] and others.

In June 1944, for instance, many shell-shocked patients were being admitted to emergency hospitals in England, both from the Normandy beachhead and from blitzed London. Some of these showed all the usual symptoms of anxiety and depression observed in the peacetime psychiatric practice. Others were in a state of simple but profound exhaustion, generally accompanied by a very marked loss of weight. Still others made gross and unco-ordinated, yet regular, jerking and writhing movements, which were accentuated by temporary loss of speech or a stammer, or perhaps an explosive form of talking. One group of patients had reached various degrees of collapse and stupor.[150] It was in these acute cases that Pavlov's *Conditioned Reflexes and Psychiatry*,[124] which we were then studying for the first time, proved most enlightening: parallels between their behavior and that of Pavlov's dogs when subjected to experimental stresses leaped to the eye.

Roy Swank and his colleagues have, since 1945, published a series of papers based on their study of some five thousand combat casualties in the Normandy campaign, nearly all of whom were Americans.[174, 175, 176] His detailed findings point to the overwhelming influence of the fear of death, and of continued stress, on the development of combat exhaustion. He also emphasizes that the

first reaction of the men to combat was fear . . . By far the greater number of men controlled their fears, gained knowledge of combat and became confident, "battle-wise" troops.

It was only

after a period of efficient combat which varied with the men and the severity of the combat, [that] the first evidence of combat exhaustion appeared.

The "protective inhibition" reported by Pavlov in his study of dogs throws light on what then followed:

The men noticed a state of constant fatigue, not relieved by several days of rest. They lost their ability to distinguish the various noises of combat. They became unable to tell friendly from enemy artillery and small bombs, and their location.

Excitatory symptoms could also become uncontrolled. Thus:

They became easily startled and confused, lost their confidence and became tense. They were irritable, frequently "blew their tops," over-responded to all stimuli; for example, they would "hit the dirt" on the slightest provocation whereas, before this, caution was reserved for selected appropriate stimuli.

Swank reports the final dramatic change from excitation to inhibition, also described by Pavlov in his dogs.

This state of general hyper-reactivity was followed insidiously by another group of symptoms referred to before as "emotional exhaustion." The men became dull and listless, they became mentally and physically retarded, preoccupied and had increasing difficulty in remembering details. This was accompanied by indifference and apathy, and by a dull, apathetic facies . . . The uniformity of the histories when subsequently checked was an indication that, for the most part, these complaints were not exaggerated or fabricated.

He points out that, before being subjected to such stresses

. . . the average combat soldier was (probably) more stable than the average civilian, since obviously unstable individuals had been excluded prior to combat . . . By and large, the men under consideration were from "high morale units" and were willing soldiers. It seemed evident that "shirking" played a small part and was almost entirely confined to men with short combat records.

Sir Charles Symonds, discussing his medical experiences in the Royal Air Force during the same war, similarly concluded that the tension resulting from a prolonged exercise of courage was a most important element in the development of emotional exhaustion.[177] These were our findings too, after we had dealt with several thousands of civilian and Service patients admitted to specialized neurosis units in the Emergency Medical Service hospitals.

The most interesting of all Swank's findings concerned the time rate of breakdown under continued battle stresses.

Combat exhaustion may appear in as few as fifteen or twenty days, or in as many as forty or fifty days, instead of in approximately thirty days, as it did in the majority of men. One thing alone seems to be certain: practically all infantry soldiers suffer from a neurotic reaction eventually, if they are subjected to the stress of modern combat continuously and long enough.

In November 1944 Swank still felt that an occasional soldier, "perhaps less than 2 per cent," belonged to the group capable of withstanding combat stress for an inordinate length of time. But we find him reporting in 1946:

This seemed true . . . in November 1944. Since then we have concluded that all normal men eventually suffer combat exhaustion in prolonged continuous and severe combat. The exceptions to this rule are psychotic (insane) soldiers, and a number of examples of this have been observed.

Since certain techniques of religious and political conversion can be made quite as fearful, and as exhausting to the brain as active combat experiences, the importance of Swank's findings must be very heavily stressed. His statistical and clinical facts should be brought home especially to those who like to believe that the avoidance of breakdown in battle, or under brain-washing, is simply a matter of exercising sufficient will power and courage. On the contrary, the continued exercise of will power and courage may in certain circumstances exhaust the brain and hasten a final collapse. When dogs co-operate in experiments testing their tolerance to stress, they are all the easier to break down: the loyal efforts they make prove their own undoing.[172]

Normally, it seems, the human nervous system, like the dog's, is in a state of dynamic equilibrium between excitation and inhibition. But if subjected to excessive stimulation, it can pass into the same states of excessive excitation or excessive inhibition which Pavlov described in dogs. The brain then becomes incapable, for the time being, of its usual intelligent functioning. Numerous examples of

this phenomenon have been reported in the medical literature: as when, for instance, hitherto normal front-line soldiers have passed into an intense excitatory state, running at random across no man's land, or dashing suicidally and uselessly into machine-gun fire. One man was reported in 1945 to have advanced twice under fire to help a friend whose leg had been blown off, but each time became so inhibited on arrival that he found himself unable to give first aid. Then he was suddenly overcome by acute excitement, banged his head repeatedly against a tree, and rushed wildly about calling for an ambulance; when the ambulance eventually arrived, he had himself forcibly strapped into it. Another soldier, after the death of a friend, tried to tackle a German tank singlehanded; he had to be held down by his comrades and dispatched to a psychiatric center.[150] Uncontrolled cerebral excitation of this sort seems to be generally marked by an inhibition of normal judgment.

The state of "protective" inhibition, noted by Pavlov in dogs subjected to acute stress, also appears to be found in combat casualties; they often develop stupor, or loss of memory, loss of the use of limbs, fainting attacks, etc. Others become literally paralyzed with fear. Others succumb to simple nervous exhaustion, and these are usually men of stable personality who, in addition to mental stress, have been deprived of food and sleep for long periods. Sir Edward Spears has described its occurrence in World War I:

These were very bad times, when the trench, choked with dead and wounded, collapsed under the bombardment, when men worked with frenzy to dig out a comrade, pulled him out with his face collapsed, then dug no more. At such times often had come a stupor, a kind of overpowering sleepiness, merciful but which the officer had to conquer . . .[165]

In some cases, the inhibition was limited to small focal regions in the brain. One patient, for instance, is reported as stammering only at the mention of an officer who had called him a coward. Dumbness, succeeded by stammering during recovery, was common. Such frequent disturbances of what Pavlov termed "man's secondary signaling system" may be explained, as he suggested, by its greater sensitivity to excessive stimulation, consequent on its more recent

evolutionary development. Other forms of focal brain inhibition were seen in patients with fixed, rigid faces, complaining of a lump in the throat; or with a bent back and weak, but not completely paralyzed, legs. Such complete paralysis was uncommon, though the gait was often slowed down. Pavlov noted a similar progressive inhibition in dogs submitted to bombardment of stimuli; it started in the mouth and the fore parts of the body, and took some time to reach the hind legs.[150]

Patients often showed areas of both focal excitation and focal inhibition. There might be rigidity or inhibition of facial movements or speech, combined with severe tremors of the body and hands. Or a paralysis of speech might be combined with neck jerkings. Acute anxiety was often marked by inability to swallow. The upper part of the body might shake violently while the lower part remained still. A set or grinning face might be accompanied by tremors, jerks, and writhings of other parts of the body.

Sudden changes from excitation to inhibition, or contrariwise, were sometimes reported in these "fluctuating" cases. One man, for instance, had lain trembling in a ditch, half paralyzed with fear, when his company was ordered to attack. But as soon as his officer taunted him with: "A girl would put up a better show," he suddenly became wildly excited, shouted "Come on boys!" leaped out of the trench to the attack, and then fainted. Other soldiers ran about shouting in panic, this phase being followed by a sudden dumbness. One man had fallen down paralyzed and speechless in a village street which was under bombardment; but when picked up by his comrades, suddenly began to shout and struggle.[150]

It is important to note that in many cases of breakdown under intolerable stress, reported by various writers, no motive of immediate gain could be discerned. On the contrary, it often occurred just when normal behavior would have been much more likely to secure the victim's personal safety. These sudden states of total inhibition or collapse after severe stresses recall Pavlov's "transmarginal" phase in dogs. Other examples of this extreme form of inhibition were observed when men arrived at the hospital in almost complete hysterical stupor. Similar inhibitory states were later induced experimentally, when we made patients relive their battle-

or bombing experiences, under drugs, and they grew very excited.

These abnormal mental states may be succeeded in humans, as in Pavlov's dogs, by what he termed a "dynamic stereotypy" — that is, a new functional system in the brain which requires increasingly less work by the nervous system to maintain it. The repetitive pattern of movements or thoughts thus exhibited by some patients did not yield easily to simple methods of treatment, such as removal to hospital and rest. Further strong stimuli might be needed to disperse the new and highly abnormal patterns now implanted. But one group of patients reacted better to heavy sedation with drugs than to restimulation; among them some in states of confused excitement, who had heard imaginary noises and voices and were now developing fresh fantasies. Unlike the typical peacetime patient who suffers from similar hallucinations, they quickly improved after a period of deep sleep and complete rest induced by sedatives — as Pavlov's "strong excitatory" type of dog had also done when given large doses of bromide soon after an acute breakdown.

Such responses to stress, of course, occurred only in a small proportion of soldiers and civilian-defense workers in the blitz. The remainder were able to enjoy periods of rest, between their ordeals, long enough to fend off a collapse; breaking point being reached only after repeated or long continued periods of stress. The exception was when a sudden enormous strain had been imposed on the brain and nervous system; for example, a very near miss in a bomb explosion. In such cases, soldiers and civilians alike, although behaving to all outward appearances in a deliberate and conscious manner, might retain very little memory, if any, of their subsequent behavior, because transmarginal inhibition had abruptly supervened; later, they might with equal suddenness regain consciousness and worry about where they had been during the two or three previous hours. Some memories of this lost period might return spontaneously later, or be recovered under sedatives which relaxed the inhibition.

The "equivalent" phase of transmarginal inhibition, described by Pavlov in his experiments on dogs, also seemed frequent among our patients in the war. Normally energetic and active people would sit about complaining that nothing interested them any longer, that

they had ceased to feel joy or sorrow whatever might happen. This phase would gradually pass off after rest and treatment but, in some cases, persisted for a long time.

Fascinating examples of human behavior corresponding with Pavlov's "paradoxical" phase were also seen. Before reading the accounts of his experiments on dogs, we were at a loss to understand a case like the following. A patient of normal previous personality had been subjected to very severe bombing stress. When asked to hold out his hands and let the doctor see whether they had a tremor, he obeyed; but suddenly found himself unable to lower them again while he was being watched. This worried him, but what he found worse, he said, was that he could lower them if he stopped trying to do so, or thought about something else; he might, for instance, automatically lower them to feel in his pocket for a matchbox. In fact, the strong stimulus directed to making him do something which he wanted produced no response, yet a smaller undirected stimulus remained effective. In a short time this condition, to his great relief, passed off. We also had many patients suffering from severe fright-paralysis of the limbs; the harder the man tried to move them, the more paralyzed they became. Yet if he stopped worrying about the difficulty, he might suddenly find it would improve. This paradoxical phase seems to occur as frequently in mental as in physical experience. A simple instance is a condition which most brain-workers are liable to, while overworking: they try to remember names or words but cannot do so until they have stopped trying.

Both in peace and war normally aggressive people may all at once develop uncharacteristic feelings of cowardice, and feel for a while the uselessness of going on. And people who normally enjoy life the most may suddenly feel the strongest desire to die. Sudden unexplained aversions to people previously loved or admired are also met with in these paradoxical and ultraparadoxical phases; so is extremely aggressive behavior, alternating unpredictably with abject submission.

During the blitz a series of bombs fell in the grounds of our hospital near London, and several civilian patients were killed by one direct hit. The hospital contained many patients already under

treatment for acute war neuroses, and paradoxical reversals of behavior under the stress now kept appearing and disappearing. A bomb explosion might make a patient suddenly unable to move an arm, as described above. He was then given an intravenous injection of barbiturate to relax the functioning of his brain – whereupon he would immediately recover the use of his arm. But he might also recover it, without the help of drugs, when he calmed down again after the raid. Many of these sudden switches from aggression to submission, or vice versa, also occurred with no obvious reason for the change.

Pavlov's findings, that severe focal excitation on one area of a dog's brain could cause profound reflex inhibition of other areas, seemed most applicable to these instances of human behavior. Patients would be admitted with trembling hands and blank, exhausted, or "bomb-happy" faces. Yet they might then presently come to the doctor and demand their discharge to return to their civilian or military duties. Usually the doctor would suppose that the patient was "shooting a line," and tell him to stop being foolish and to go back to his ward. But it was plain to the doctor who had studied Pavlov's experiments that such requests could be prompted by a temporary fixation on the idea of having to get out of hospital and back to duty at all costs; and that it had caused a reflex inhibition of all thoughts about his deplorable physical and nervous state – which would certainly prevent him from undertaking any work whatsoever. If he was then quietly told that his return to duty must be postponed, and given the reasons for this, he might suddenly realize again how things really were and become more co-operative. The expression "bomb-happy" was a useful coinage: it perfectly described how a bombing with its consequent fear reactions could destroy the power of integrated thinking about the past, present, or future in survivors who had caught the full brunt. Yet sedatives correctly administered on the spot or in specialized centers and hospitals could quickly restore them to normal habits of thought; which suggested that the symptoms elsewhere ascribed to moral cowardice or simple malingering had often been produced merely by the temporary failure of normal brain function.[142]

It is important to observe that such states of abnormal behavior

in hitherto normal people, though rapidly dispersable under prompt and proper sedation, would also disperse, after a time, of their own accord. In a few weeks or months little external evidence of such behavior remained. Fewer really incapacitating war neuroses in persons of previous mental stability appear to persist ten years after World War II than after World War I. Yet, as with Pavlov's dogs after the Leningrad flood, sensitivity to what brought about their nervous disruption is doubtless still latent in men who seem well readjusted to ordinary civilian life. Any event which reminds them of their original neurosis may affect them as strongly as the sight of water flowing in under the laboratory door affected Pavlov's dogs.

Further evidence of the applicability of Pavlov's canine findings to problems of human psychology was found in the detailed response of our patients to treatment. Pavlov found heavy sedation extremely valuable in helping dogs which had broken down under imposed stresses. He obtained entirely different responses to treatment from dogs classified according to the four basic temperaments; and widely varying doses of sedatives were needed for the "strong excitatory" and the "weak inhibitory" dog of the same body weight. We found the same thing in patients given emergency front-line sedation when they broke down under severe bombing stresses; they could be classified in the same groups and the amount of sedative would vary considerably.

The value of emergency heavy front-line sedation in preventing acute neuroses from becoming chronic had been repeatedly observed quite early in the war.[25, 142] But the need for differential dosage was not yet generally appreciated, and in most centers fairly standardized doses were prescribed for all types of persons breaking down under battle or blitz stresses. But as soon as Pavlov's findings became available and we reconsidered this point, we decided that the nervous system of man responded to extreme stresses in much the same way as that of dogs.

Under severe and prolonged stresses, people of a strong excitatory or weak inhibitory temperament would, as already described, reach states of uncontrolled excitement or paralyzed inhibition. The other two temperamental types – namely, the "lively," or controlled excitatory, able to fight back, giving as much punishment as he took;

and the "phlegmatic" type, seemingly unmoved by most ordinary stresses – also occurred in men as well as in dogs. The predominance of "inhibitory" symptoms when the victim finally breaks down (an important matter when we come to consider political conversion and brain-washing) was shown by a 1942 finding and report that, around the time of Dunkirk and the London blitz, no less than 144 out of 1,000 consecutive admissions to a neurosis center for civilian and military patients near London had suffered from temporary losses of memory.[152] Such loss of memory is often a simple inhibitory response of the brain to overwhelming stresses it cannot deal with by any other means; and a peacetime psychiatrist rarely meets more than one or two cases of this particular hysterical complaint in the course of a year.

The need for varying the sedation dosages in humans, according to whether they were very "strong excitatory" or "weak inhibitory," became very clear in the following kinds of circumstances. Most soldiers who broke down on the Normandy beachheads were, at first, given immediate front-line sedation, and only those who did not respond to this treatment were returned to neurosis centers in England. By then, three to seven days of sleep had already been induced by heavy doses of sedation. The patients sent back for treatment in our hospitals were found to have an abnormally high percentage of psychotics or neurotics in their family histories. Many had themselves suffered from pre-war nervous breakdowns and consulted other psychiatrists; their symptoms usually suggested the "weak inhibitory" type of Pavlov's classification. But when the casualty clearing stations on the beachheads temporarily overflowed, patients were sent to us before a reasonable period of heavy sedation could be allowed them. These showed far more acute and severe excitatory reactions than the former batch; but many of them responded well to the large doses of sedatives prescribed, and could soon return to at least modified duties. Yet the same doses administered to the "weak inhibitory" patients had (as in Pavlov's dogs) served only to aggravate the inhibition, so that many arrived with paralyses or inhibitory stammers, or even in deep hysterical stupors.[150] Experience shows that inhibitory responses in men of this temperament can, in fact, be helped by sedation, but only with

much smaller doses than those benefiting the "strong excitatory" types. Pavlov[124] had explained this phenomenon as follows:

The best therapy against neuroses, in agreement with the findings of this clinic, are bromides . . . But the dose should be regulated accurately—for the strong type five to eight times greater than for the weak type. p. 92.

And again:

Formerly we came to an erroneous conclusion here; not regulating the dose of bromide correspondingly to the type, we thought that its administration in weak animals was never helpful, and that in large doses it was injurious . . . a most important part of the therapy is the exact dosing corresponding to the precise type of nervous system. p. 96.

The tendency of physical debilitation to hasten a breakdown under imposed stresses had been noted by Pavlov in his dogs; and the same phenomenon was observed again and again in our patients. Those with previously stable temperaments could be distinguished from the unstable types by noting whether or not they had lost weight before first reporting sick. During the blitz, civilians would often start complaining of neurotic symptoms, and be unable to understand why they had developed such severe anxieties about bombing when they had hitherto remained unaffected by it for weeks or months. In such cases it was frequently found that they had lost from fifteen to thirty pounds in weight before this ever-increasing sensitivity to bombing stimuli became noticeable. But once these abnormal reactions set in after a severe loss of weight, they could not necessarily be dispersed by fattening the patient up again, though this was done in the general interests of his health, and were as likely as not to remain fixed.

The most stable types might collapse only after a loss of thirty pounds in weight, caused by lack of nourishing food, lack of sleep, and similar debilitating factors characteristic of wartime. But patients who reported similar symptoms without any loss of weight, and had therefore put up less fight, were likely to be chronically neurotic types, unlikely to respond to any routine treatment.[149]

Very many of the more spectacular reactions to war stresses could be labeled as "anxiety hysteria." Indeed, one of the commonest final reactions to stress in patients of previously stable temperament, as opposed to the unstable, was the development of hysterical responses. Pavlov gave the same label to similar responses in his dogs at the point of breakdown under imposed stresses, and constantly diagnosed hypnoidal or hypnotic states in them. The frequency of hysterical reactions to severe imposed stresses in both humans and animals is of the greatest significance here. Descriptions of hysteria in all psychiatric textbooks record bizarre symptoms which do not become always understandable except by analogy with Pavlov's mechanistic experiments on dogs. The mental aberration characteristic of hysteria is often similar to a form of protective inhibition, and so is hysterical paralysis. Even in peacetime hysteria, something approaching the "bomb-happy" phase of acute war neurosis can be discerned.

Once a state of hysteria has been induced in men or dogs by mounting stresses which the brain can no longer tolerate, protective inhibition is likely to supervene. This will disturb the individual's ordinary conditioned behavior patterns. In human beings, states of greatly increased suggestibility are also found; and so are their opposites, namely, states in which the patient is deaf to all suggestions, however sensible. Hysteria has produced sudden and unexplained panics in most wars; often among troops famous for their battle record. Among the finest fighters of the ancient world were Caesar's veteran legionaries, and from the bravest of these he chose his eagle-bearers. Yet after ten to thirteen years of continuous campaigning in Gaul they also could break down suddenly. Suetonius[169] records two cases of hysterical eagle-bearers running away on different occasions. When Caesar tried to stop them, the first attempted to strike him with the sharp butt of the eagle, the second left the eagle in his hand and rushed on. But these are extreme cases; hysteria was also evidenced in the susceptibility to rumors of Londoners during the blitz. Brain exhaustion led them to believe stories about "Lord Haw-Haw's" broadcasts from Germany which they would have at once rejected as untrue when in a more relaxed and less exhausted state. The anxiety engendered by the fall of France,

the Battle of Britain, and the blitz created a state in which large groups of persons were temporarily conditioned to accept new and strange beliefs without criticism. The mechanism of increasing states of suggestibility will be discussed repeatedly in later chapters, since this is one of the means of indoctrinating ordinary people both religiously and politically.

Critical faculties may become inhibited in these states of anxiety hysteria. "He whom the gods wish to destroy, they first make mad." Thus some soldiers and civilians in acute states of breakdown cannot be reassured by any remark, however sensible; others accept reassurances, however foolishly phrased. Police forces in many parts of the world rely on this inhibition of critical faculties and normal judgment to obtain full confessions from prisoners subjected to debilitation and emotional stresses, without the need to injure them physically (see Chapter 9). The same phenomenon can also be turned to curative use by psychiatrists, as will be shown in due course. It enables them to suggest new attitudes of life, and new patterns of behavior, in the hope that they will replace harmful ones.

Pavlov has drawn attention, in his lectures, to many other similarities between canine and human neuroses. The reason that varieties of neurotic behavior in time of war have been stressed here, is because they have been so accurately reported by so many psychological "fieldworkers," and because they occurred among ordinary types of persons rather than among the predominantly neurotic and psychotic personality types who are admitted to psychiatric hospitals in peacetime. Pavlov was also presumably dealing with ordinary dogs. In both cases the brain was being subjected to unavoidable stresses. The dog isolated on his experimental stand, the soldier in his trench or lonely foxhole, and the civilian in a fire brigade or rescue squad, all had to take whatever came to them, and their ordeals were similar. In peacetime society an opportunity for escape is generally given those who find themselves in situations that make too great demands on their nervous system; hence the rarity among average people of strikingly abnormal behavior under stress. And the civilian population, even in modern warfare, usually comes off better than the soldier; during the blitz, for instance, Londoners

who had begun to develop anxiety symptoms during bombing could often arrange to be evacuated or obtain a period of rest. But for the soldier it was generally a case of "They must conquer or die who have no retreat."

In inducing experimental neuroses in his dogs, Pavlov found it necessary, as a rule, to secure their co-operation. In human beings, neuroses are also commonest among those who try to overcome the stresses to which they are exposed. Like the dog on the experimental stand who refuses to co-operate in an experiment, soldiers who run away before the first shot is fired may keep their nervous systems intact, and thus avoid severe breakdown, until they are caught up by difficulties which they have hitherto escaped. There is something to be said for the Chinese Taoist philosophy, which enjoins the avoidance of stress, as opposed to the philosophies of aggressive daring that still persist in Europe and North America.

Pavlov's findings also illuminate many varieties of abnormal behavior noted in common forms of nervous and mental sickness. William Gordon[59] published a very interesting paper on this subject in 1948. He pointed out that the mature brain cortex builds up systems of positive and negative conditioned responses by which the individual adapts himself to his environment, always basing his present behavior on past experience; and that mental health is determined by the efficiency of such adaptation. In so severe a mental disorder as schizophrenia a partial or complete reversal of most previous conditioning is observed. Gordon, like Pavlov, believes that schizophrenia results from the "ultraparadoxical" phase of brain activity. He points out that schizophrenics are often described as having lost all interest in their former pleasures and pursuits and then suddenly developing depraved, suicidal or antisocial behavior. This change can sometimes be explained by showing that the patient now responds positively to his former negative conditioning, and negatively to his former positive conditioning.

How devastating a sudden reversal of one's positive and negative conditioning can be is described by Gordon in a series of apt illustrations. The human being develops eating habits in which a number of stimuli involving smell, vision, hearing, and taste all acquire strong positive conditioning, while others acquire equally strong

negative responses. Some smells, for instance, may make a human mouth salivate – as with Pavlov's dogs – in anticipation of food; others cause nausea and a temporary loss of appetite. But mentally sick patients will suddenly start eating foods to which they previously had a repugnance, and refusing other foods which they used to enjoy.

Children are trained to urinate and defecate at definite times and in appropriate places. As Gordon points out, the sight or touch of the chamber pot becomes a strongly *positive* conditioned stimulus in the young child; whereas clothes, bedding, floors, and furniture become *negatively* charged. But when the patient falls mentally sick it is often observed that clothes, bedding, floors, etc., become positive for urination and defecation, and that it is almost impossible to make him use the lavatory pan, commode, or bedpan provided, because these now elicit negative responses. Gordon also emphasizes the apparent "purposefulness" and "deliberateness" of the new activities. Numerous other instances occur in very varied fields of human behavior. Faulty conditioning in childhood, or a sudden reversal of conditioning, brought about by nervous or mental sickness later in life, can cause havoc to the sexual function, which may become shamelessly erotic in the previously inhibited, or totally inhibited in those of normal tendencies.

Obsessional thinking becomes particularly distressing when the "paradoxical" and "ultraparadoxical" phases of brain activity supervene. The most conscientious of mothers can suddenly be obsessed with a fear that she may do harm to the child whom she loves more than all the world. People most afraid of dying can become obsessed with the idea that they may throw themselves from a window or on the live rail of an electric railway. They realize the abnormality of these thoughts, but the more they struggle against them, the stronger they tend to grow. The Christian Church has always been greatly exercised with the problem of how to exorcise evil thoughts which persist against one's will. One way, sometimes recommended, is not to bother about having evil thoughts; there is another, which is to use prolonged prayer *and* fasting until a point of temporary debilitation is reached, when a priest or holy man may be able to alter the behavior patterns in the penitant's mind.

In a letter written to a brother Jesuit in May, 1635, Father Surin, an exorcist of the nuns of Loudun, describes in a religious setting what seem to be distressing "paradoxical" and "ultraparadoxical" brain disturbances brought on by the strain and anxiety of his psychotherapeutic exertions:[105]

The extremity in which I find myself is such that I have scarcely one free faculty. When I wish to speak, my mouth is closed; at mass I am suddenly stopped; at table I cannot convey the morsel to my lips; at confession I forget in a moment all my sins; and I feel that the devil comes and goes, as in his own house, within me. Directly I awake, he is with me at prayer; he deprives me of my consciousness when he pleases; when my heart would expand itself in God, he fills it with rage; when I would watch, he sets me asleep; and . . . boasts that he is my master. pp. 313-314.

It is not the purpose of this book to document all the possible occurrences in human beings of "equivalent," "paradoxical," and "ultraparadoxical" phases with particular case histories. This chapter has, however, suggested that, though "men are not dogs," it would be foolish indeed to disregard entirely experimentation on the higher nervous activity of dogs as irrelevant to human psychology, or to the question of how a man's thoughts and beliefs can be effectively changed.

3 THE USE OF DRUGS IN PSYCHOTHERAPY

In the summer of 1940 we were already prescribing barbiturates, both in strong doses orally administered as sedatives for overwrought Dunkirk survivors, and in small intravenous doses to produce a semidrunken state which helped them to release some of their inhibited emotions of terror, anger, frustration and despair.[151] The value of the treatment, which had been in limited use before the war, was confirmed during the subsequent London blitz.[143] It has since come to be called "drug abreaction"; the term "abreaction" dating from the time of Breuer and Freud's early studies in the treatment of hysteria, when they observed that some patients were helped by "just talking it out." Freud had found that "affectless memories, memories without any release of emotion," were almost useless; meaning that unless a doctor could get his patients to relive the emotions originally associated with a repressed experience that had caused a neurosis, the mere fact of his remembering the experience would not constitute a cure. Sadler consequently defined "abreaction" as "a process of reviving the memory of a repressed unpleasant experience and expressing in speech and action the emotions related to it, thereby relieving the personality of its influence."[139]

In World War I much the same abreactive treatment had been successfully used, but for the most part with hypnotism, not drugs; and it was then established that the experience responsible for a neurosis might also be one which the patient remembered intellectually, but the emotional associations of which he had repressed. Freud came to accept this finding as it became more and more obvious that neurotic symptoms could be caused by even well-remembered incidents in a patient's past.

In both World Wars abreaction, whether under drugs or hypnosis, had a definite place in the treatment of acute combat neuroses. Millais Culpin[26] wrote:

Once the man's conscious resistance to discussing his war-experiences was overcome, great mental relief followed the pouring out of emotionally charged incidents. It was as if the emotion pent up by this conscious resistance had by its tension given rise to symptoms. The memory, usually of a nature unsuspected by me, then came to the surface, its return being preceded perhaps by congestion of the face, pressing of the hands to the face, tremblings, and other bodily signs of emotion.

In 1920 William Brown[16] had suggested that emotional abreaction was often a far more efficient means of curing a war neurotic than simple suggestion under hypnosis. "Suggestion removes the symptoms, but abreaction removes the cause of the symptoms by producing fully adequate re-association." It is hoped to show, however, that suggestion may also have an important part to play in effecting cures by abreaction.

Published reports on the value of drug abreaction in the handling of Dunkirk and blitz neurosis casualties caused this treatment to become widely adopted in Great Britain. Further interest was then aroused among American psychatrists by Grinker and Spiegel's later use, in 1942, of the same treatment in North Africa though they renamed it, somewhat confusingly, "narcosynthesis."[65] Moreover, Harold Palmer, a British psychiatrist, had been getting interesting results in the same theater of war by the use of ether instead of barbiturates;[121] improving on a technique for the treatment of

hysterical symptoms first reported by Penhallow at Boston in 1915,[125] and used by Hurst and his collaborators during the First World War.[77]

When, in 1944, we also began using ether to induce abreaction, as recommended by Palmer, instead of barbiturates, we immediately noticed a great difference in our patients' behavior. In most cases ether released a far greater degree of explosive excitement, which made their recital of events extremely poignant or dramatic.[160] Another most striking observation was that sudden states of collapse, after emotional outbursts induced by ether, were far more frequent than after those induced by hypnosis or barbiturates.

It then occurred to my colleague Dr. H. J. Shorvon and to myself that this collapse phenomenon, which we were now repeatedly observing, might correspond to Pavlov's "transmarginal inhibition," which occurs when the cortex has become momentarily incapable of further activity. We remembered how, in some of Pavlov's dogs, the Leningrad flood had accidentally abolished the conditioned behavior patterns implanted by him, and how this allowed other patterns to take their place. Was the same thing happening in some of the patients who had collapsed? If so, we might also expect others to become more suggestible or show reversal of previous patterns of behavior and thought, because a "paradoxical" or "ultra-paradoxical" phase of brain activity was being produced. This proved to be so in some cases at least.[160]

Under ether certain patients could easily be persuaded to relive experiments of terror, anger, or other excitement. Some of them might then collapse from emotional exhaustion and lie motionless for a minute or so, unmoved by ordinary stimuli; and, on coming round, would often burst into a flood of tears and report that their outstanding symptoms had suddenly disappeared. Or they would describe their minds as now freed of the terror aroused by certain obsessive pictures; they could still think of these, if they wished, but without the former hysterical anxiety. When simple excitement at the recital of past experiences did not reach the phase of transmarginal inhibition and collapse, little or no change or mental improvement might be observed in the patient; if, however, the ab-

reactive treatment was repeated, and drugs were used to increase the amount of emotional stimulation until collapse supervened, sudden improvement could occur.

Such a drastic technique was not always necessary. Some patients, for instance, suffering from a recent loss of memory, required only a small dose of barbiturate injected intravenously, to relax their brains; and this would send the memory flooding back without further effort. Ether proved most useful in cases where this treatment was not enough; for instance, where abnormal behavior had become so organized and fixed as to resemble the "stereotypy" described by Pavlov in his dogs. Such conditions could become persistent, disabling, and resistant to simpler curative measures. But the massive excitement aroused under the ether, ending in a state of transmarginal inhibition and collapse, could disrupt the whole vicious self-sustaining pattern of behavior and induce a rapid return to more normal mental health.

Reports, originally published in 1945, on two cases of this sort, will serve as an illustration.[150] A soldier in his twenties had been admitted to an aid post on the Normandy beachhead, weeping, speechless, and paralyzed. He had had four years' Army service as a truck driver before this and never reported sick with nerves until he had been suddenly converted into an infantryman and sent up to the front line, where mortar fire and shelling produced a rapid breakdown. Proving unresponsive to a fortnight's sedation treatment in France, he was evacuated to England; and, on admission to our war emergency hospital, still appeared to be mentally slow, tense, and apprehensive. More sedatives were given, followed a week later by insulin treatment designed to increase his weight. Yet his mental condition did not change. He walked slowly, with bent back and rigid features, and his apprehensiveness and slowness of thinking made it difficult for us to get his story out of him.

At this stage an intravenous barbiturate was administered and he was asked to describe what had happened. The drug made him much more relaxed mentally, and he described being under mortar fire for eight days in the same section of the front line. Then he had been taken across a river into a wood and ordered to the attack.

In the wood he had become increasingly nervous and began to tremble and shake. Several men were killed by mortar fire near him; whereupon he lost his voice, burst into tears, and became partially paralyzed. Eventually two wounded men helped him back to an ambulance. "I felt sort of stunned. I laid down crying. I could not speak. I could cry and make sounds." But the barbiturates induced very little emotion as he gave this recital, and no change was observed in his condition either immediately afterward or on the next morning.

That afternoon, however, he was given another abreaction, and this time ether was used instead of a barbiturate. When taken over the same ground again, he told the story this time with far greater emotion, and at last became confused and exhausted, tried to tear off the ether mask, and overbreathed in a panic-stricken way until the treatment was stopped. When he came to and rose from the couch, an obvious change had occurred in him. He smiled for the first time and looked relieved. A few minutes later he said that most of his troubles had gone away with the ether. A week later he was still saying: "I'm a different fellow. I feel fine." This improvement was being maintained a fortnight afterward.

Another case illustrates a similar dispersal of a brain "stereotypy" by the use of ether.[150] Here, however, it will be seen that the use of ether in itself was not sufficient to induce complete abreaction; after a preliminary failure the flame of the patient's excitement was deliberately fanned until he was brought to the necessary point of collapse. The "stereotypy" of his behavior pattern then broke up and he greatly improved.[150]

This soldier had spent four and a half years in the Army as a driver-mechanic and had landed in Normandy a fortnight after D day. His symptoms came on gradually after he had been in action for several weeks. He, too, was given a week's sedation treatment in France, did not respond, and found himself evacuated to hospital in England. He was now depressed and apathetic, complaining of dizziness and inability to stand the noise of gunfire or aircraft. He could not rid his mind of the thought that his friends had been killed in France. What kept recurring in his imagination was a

scene in which one of his comrades had died with a hole through his head; the chin of another had been blown off; and blood was spurting from the hand of a third.

Though given further sedation, and insulin treatment to restore his weight, he complained a fortnight later that he felt worse than ever — the scene in which his friends had been killed or injured persisted in his imagination. He was then given ether to make him relive this scene, and he got emotionally excited enough to say he thought that the next head to go would be his own; but he did not reach the phase of collapse. On regaining consciousness, he wept and said he felt no better. He could "still see it all in his mind." So he was given a second ether treatment. This time he was made to relive another frightening experience which had taken place some days before the one now fixed in his mind. He had been subjected to mortar fire and dive-bombing in a churchyard, and when the therapist suggested to him under ether that he was back there again, he began clawing at the couch, imagining that he was in a ditch. The therapist deliberately played on his fears by giving him realistic comments on the ever-worsening situation until, reaching a climax of excitement, he suddenly collapsed and lay almost as if dead. Transmarginal inhibition had supervened. This time, on regaining consciousness, he smiled and said: "Everything has gone. Everything is different. I feel more open, Doctor. I feel better than I did when I came here."

When asked if he remembered his friend's face being blown off, he grinned and said: "I seem to have forgotten about it. France is not worrying me now." When again questioned about this incident, he said: "Yes, and the fellow with the hole in his head, but it has lifted from my mind." When asked why this had happened, he answered: "I can't explain it." He then discussed the whole scene quite freely and without the usual display of emotion. Later in the day he said: "I feel a lot better. It has gone out of my system. I know all about it, and it doesn't stick in me. It doesn't affect me in the same way." He then began to improve rapidly.

The most remarkable feature in this case was that the experience chosen as a means of stirring up enough excitement to destroy his abnormal behavior patterns was not the particular one which had

been haunting him. In other words the emotional explosion cleared away a whole chapter of recent emotional history and its associated behavior patterns which had been building up due to the patient's growing inability to stand up under continued battle stress.

The longer that abnormal patterns of behavior persist, the more difficult, naturally, they are to remove again by such simple methods as those just described. But a third case shows that a six-months' "stereotypy" of thought, accompanied by depression and hysteria, can sometimes be relieved in the same way.

A woman in her fifties stated on admission to hospital, in 1946: "I keep on going funny, and seeing different incidents, with rocket-bombs, that I have been through."[160] She had been a full-time air-raid warden in a heavily bombed London area, throughout the war. The main neurotic symptoms had not set in until 1945, when her job was drawing to a close. Her helmet had then been blown off by a severe rocket explosion, and something had hit the back of her head. A lump came up, but she disregarded it and continued to help in the work of rescue. "I saw terrible sights; plenty of people cut to pieces under the debris." Fifty people, in fact, had been either killed or injured. A few months later the incident began to haunt her. As soon as she closed her eyes to take a rest she saw people cut and bleeding. The same sort of pictures plagued her dreams. This had been going on for six months before she entered the hospital. She was depressed and worried, unable to concentrate; she had also lost considerable weight and complained of giddiness, feelings of unreality, disturbed sleep, and a weakness in the legs which had practically immobilized her. A neighbor said that from being a very energetic and bright person, she had become listless, forgetful, and "flat."

Under ether she relived the rocket-bomb incident with great emotion and intensity, describing how she was buried under the debris with her husband, until rescued by her brother. She interrupted her recital by frantically shouting for her husband. "Where are you? Where are you?" She repeated this several times at the top of her voice, at the same time groping with her fingers as though searching for him among the debris. The climax came when she described his rescue, at which point she suddenly fell back, col-

lapsed and inert. On regaining consciousness, she found she had complete use of her limbs, and a clear mind, with no fears or visions. The improvement was maintained, and insulin treatment restored her weight.

Nevertheless, we did not always find it essential, in abreaction, to make a patient recall the precise incident which precipitated the breakdown. It would often be enough to create in him a state of excitement analogous to that which caused his neurotic condition, and keep it up until he collapsed; he would then start to improve. Thus, imagination would have to be used in inventing artificial situations or distorting actual events – especially where the patient, while remembering the real experience which had caused the neurosis, or reliving it under drugs, had not reached the transmarginal phase of collapse necessary for disrupting the new morbid behavior pattern. Among the patients from whose cases the above important finding could be deduced was a soldier in a tank regiment whom we could bring to the point of emotional collapse, under ether, only by persuading him that he was trapped in a burning tank and must try to get out at all costs. This had never actually happened, though it must have been a persistent fear of his throughout the campaign.

Some neurotic patients are clearly helped toward recovery when forgotten memories are brought back to consciousness. Both Freud and Pavlov, in their researches on the working of, respectively, the human and the canine brain, suggest that repressed emotional incidents may create severe generalized anxiety in some temperamental types. And Janet had also emphasized the importance of re-exciting patients while trying to bring back such memories to consciousness.[83] Yet our experience in World War II suggested that the arousing of crude excitement might often be of far greater curative virtue than the reliving of any particular forgotten or remembered experience. Indeed, the amount of excitement stirred up seemed to be the determining factor in the success or failure of many attempts to disrupt newly acquired morbid behavior patterns. Emotion that did not carry him to the point of transmarginal inhibition and collapse might be of little use – which is a finding of close relevance to the main theme of this book, namely, the physiology of religious and political conversion. Of equal relevance to

the same theme were the increases of suggestibility, and the sudden reversals of behavior witnessed in neurotic patients when the "ultra-paradoxical" phase of inhibition had presumably been reached: negative conditioned responses becoming positive, and positive, negative.

One more point must be made in this context: many patients who have been subjected to repeated abreactions during a period of months and even years, on the psychotherapeutic couch, are known to become increasingly sensitive to the therapist's suggestions. He may then be able to change their previous behavior patterns without too much difficulty: they respond more willingly when he attempts to implant new ideas in them, or new interpretations of old ideas, which they would have rejected without hesitation before they developed a "transference" to him.

To be plain: it is hoped to show that there are remarkable basic similarities between, first, the behavior of many neurotic patients during and after abreaction; next, the behavior of ordinary people subjected to fear-provoking sermons by a powerful preacher; and lastly, the behavior of political suspects in police stations and prisons where confessions are elicited and habits of "right thinking" implanted. Moreover, normal groups can be stimulated in peacetime by preaching, or mob oratory, as surely as neurotic individuals can be by drugs during abreactive treatment in a wartime hospital. Subsequent chapters will review a variety of methods used in different contexts to achieve similar effects. Yet let one finding be emphasized without further delay: some types of people are peculiarly resistant to abreaction under hypnotism or drugs, and to the more peaceful religious and political methods of conversion. The overconscientious and meticulous person, for instance, who feels obliged to dot every i, cross every t, and mind all his p's and q's, rarely becomes too excited even under ether; and some melancholic patients are also too deeply depressed to let their pent-up emotions be discharged by drug stimulation.

"Abreaction" under drugs is perhaps too solemn-sounding a phrase for a familiar phenomenon: when a man has something to get off his chest, which has been worrying him, he is likely to take several stiff drinks and expect them to loosen his tongue for him.

Conversely, drink is used in business, in journalism, and the intelligence services, to force indiscreet admissions from people who find it difficult to keep a secret. And after successes on the battlefield or football field, many tongue-tied victors use drink to discharge their repressed emotions in a socially acceptable manner. *In vino, veritas.*

Emotions can also be discharged by vigorous dancing. It was with wild hysterical dances that Britain greeted the Armistice in 1918. Negro jazz came as a godsend to the war neurotics of the period – the waltz and the two-step were not invented for the release of strong emotions – and the curative treatment lasted well into the twenties. Some primitive tribes use dancing for the same purpose. Abreaction by drink – first beer, later wine – and wild rhythmic dancing, was also the object of the ancient rites in honor of Dionysus; but the Greeks had their own word for it – *catharsis* or "cleansing." Abreaction is a time-worn physiological trick which has been used, for better or worse, by generations of preachers and demagogues to soften up their listeners' minds and help them take on desired patterns of belief and behavior. Whether the appeal has more often been to noble and heroic deeds, or to cruelty and folly, is a matter for the historian rather than the physiologist to decide.

4 PSYCHOANALYSIS, SHOCK TREATMENTS AND LEUCOTOMY

It seems then, that the efficacy of abreactive techniques, though ascribed in the past to various agencies invoked by the abreactor, often depends on powerful physiological forces unchained in the process. To realize this, one has only to consider how many sufferers from inhibitory neuroses have been helped by sudden nonspecific emotional shocks. People have been relieved of hysterical blindness by a sudden loud clap of thunder; others have recovered the use of their legs after a strong emotional fright induced by a sudden blow on the head.

In Great Britain during the last ten years fairly intensive research has been in progress on the value of different drugs available for psychotherapy; especially those capable of inducing cerebral excitement in various types of neurotic illness. Nitrous oxide (dental gas),[133] high $CO_2 + O_2$ mixtures,[110] such drugs as methedrine (similar to benzedrine, but given intravenously),[161] and various combinations of all these have been tested.[144] As already mentioned, ordinary peacetime neuroses do not yield to treatment so dramatically as those that were treated during the Normandy fighting and the London blitz. Only in the exceptional case, where a

hitherto stable person has been unbalanced by a severe psychological shock or intolerable stress, is wartime experience repeated. Yet peace yields plentiful examples of what happens when the normal, or abnormal, brain is subjected to constant abreactive treatment; and these may help towards a better understanding of brain-washing and the traditional techniques of religious conversion.

Animal experimentation, it must be once more repeated, showed that when the brain was stimulated beyond the limits of its capacity to tolerate the stresses imposed, protective inhibition finally supervened. When this happened, not only could previous behavior patterns implanted in the brain be suppressed; but former positive conditioned responses could become negative, and vice versa. Similarly, the administration of too exciting, or too frequent, brain stimuli may sometimes cause human victims to reverse their previous patterns of behavior. And others are likely to become more suggestible, accepting whatever they are told, however nonsensical, as the inescapable truth.

All these effects can be observed when peacetime psychiatric patients are subjected to repeated abreactions with or without drugs. And the more ordinary the previous personality, the readier may be his response and more confident his talk about "seeing things in a new light." After some particularly severe abreaction a patient will sometimes "box the compass" in his views on religion or politics, or in his attitude to family and friends; or these attitudes may chop and change with alarming rapidity. Suggestibility can be enhanced, temporarily at least, by repeated abreaction. The patient may come to accept various types of simple reassurance from the psychotherapist, which he would never have accepted from his lawyer, or minister, or family physician, when in a more quiet frame of mind.

Moreover, just as Pavlov's dogs remained sensitive to the original cause of their mental disruption — namely, water seeping in underneath the laboratory door during the Leningrad flood — so patients tend to become highly sensitized to the therapist who causes them repeated emotional upheavals. Psychoanalysts have called this the formation of positive or negative transference toward themselves. Here again Pavlov provides a possible physiological explanation for

what has hitherto been explained in more complex psychological terms. It is precisely by inducing the "transference" phenomenon that Freud and his psychoanalytical school explain the success of their treatment methods. Though it is now generally admitted that not all mental illnesses are due to sex trauma, they still in practice encourage the patient to harp on early sexual excitements and associated sex guilt feelings, and thus help to arouse in him the emotions necessary for successful abreaction.

Some techniques of psychotherapy do, in fact, show that methods of political and religious conversion have their counterparts in ordinary psychiatric practice, and that the patient can be made to "see the light," whatever the particular doctrinaire light may be, without recourse to drugs or specially induced debilitation, or any other artificial aid to abreaction. Drugs speed up the process by bringing about the required physiological changes in brain function; but these can also be produced by the use of repeated psychological stimuli.

A patient under psychoanalytic treatment, for instance, is made to lie on a couch, where daily for months, and perhaps years, he is encouraged to indulge in "free association of ideas." He may also then be asked: "What does 'umbrella' mean to you?" — "Uncle Toby." "What does 'apple' mean to you?" — "The girl next door." These answers may perhaps also be found to be of sexual significance. He has to go back over his past sexual peccadilloes, and relive other incidents which aroused intense anxiety, fear, guilt, or aggression, especially in childhood. As the analysis proceeds, and emotional storms perhaps mount, the patient becomes more and more sensitized to the analyst. So-called "transference situations," both positive and negative, are built up physiologically; often assisted in the early stages of treatment by the fatigue and debilitation resulting from the anxiety aroused. The patient's tension and dependence on the analyst may be greatly increased. A stage is finally reached when resistance weakens to the therapist's interpretations of a patient's symptoms, and he may start to accept them much more readily. He now believes and acts upon theories about his nervous condition which, more often than not, contradict his former beliefs. Many of the individual's usual patterns of behavior

may also be upset by this process, and replaced by new ones. These changes are consolidated by making the patient's behavior as consistent as possible with the new "insight" gained. Attempts are then made, before treatment ends, to reduce the patient's emotional dependence on the therapist. As one patient personally analyzed by Freud remarked to me:

"For the first few months I was able to feel nothing but increasing anxiety, humiliation and guilt. Nothing about my past life seemed satisfactory any more, and all my old ideas about myself seemed to be contradicted. When I got into a completely hopeless state, he [Freud] then seemed to start to restore my confidence in myself, and to piece everything together in a new setting."[146]

Psychoanalytic treatment is much slower in bringing about what more violent or intensive methods often achieve in the psychiatric, political or religious field. And although some therapists are loath to admit that their form of treatment can ever amount to a conversion experience, this seems a most likely explanation for what may happen not only to some of their patients but even to themselves when undergoing analysis for training purposes. For, if the treatment has been successful, they can become firmly indoctrinated with Freudian principles to the exclusion of most others. They may even have dreams of the particular Freudian orientation expected by their teachers, to confirm their faith. What is more, the same type of person (or even the very same patient) who attends a Jungian analyst, often completes his psychoanalysis with a Jungian type of "insight," after having dreamed Jungian "collective subconscious" dreams. Evidence for this has been provided by a well-known psychiatrist. He told the writer how, as a much younger man, he came to England in the twenties and there submitted to the experiment of three months' analysis from a Freudian, followed by three months' analysis from a Jungian practitioner. His contemporary notes show that dreams he had under Freudian treatment varied greatly from those he had under Jungian treatment; and he denies having experienced the same dreams before or since. Among the aims of therapy, in fact, seems to be a disruption of the patient's previous behavior patterns helped by the arousal of strong emo-

tions. The increased suggestibility of the patient may help the therapist, not only to change his conscious thinking, but even to direct his dream life. Analysis is often considered complete only when the therapist's points of view have been thoroughly absorbed, and resistance – or so-called "negative transference" – to the therapist's interpretations of past events has broken down.

The ability to dream special types of dreams for a particular therapist is also seen among more primitive peoples. Bengt Sundkler in *Bantu Prophets in South Africa*[171] points out how Bantu native Christian pastors place very great importance on making those seeking conversion, or having recently been converted, dream the right kind of "stereotyped" dreams. He reports that

. . . some missionaries have felt humiliated and even scandalized because of the stress laid upon dreams by Africans. Missionaries are almost shocked that such an important spiritual revolution as conversion would seem to be due in many cases to some absurd dream rather than the conscious decision of the will. . . . The most striking symbols recurring in the (stereotyped) dreams quoted by Allier are: light, shining cloths, group of Christians on the other side of the river calling the dreamer to pass over. . . . Characteristic (also) are the clear and distinct impressions as recorded by the dreamer. The length, or rather shortness, of the green grass as seen in heaven is always commented upon. Minute detail in dress and outfit is often pointed out. p. 267 and 270.

Sundkler gives many interesting details about the artificial production of such dreams:

Some Zionists know of what they refer to as the "gift of dreams . . ." Others again have to be trained and schooled in dreaming in order to achieve the right stereotyped dream . . . Prophet X attached much value to the dreams of his neophytes. After an initial general confession of sins, he would tell them to go home for three days and later return to relate to him all they had dreamed during that time. They would not fail to have very significant dreams, he assured them. The one great thing waited for and expected in the dreamer is the revelation of Jehovah, or the Angel, or Jesus, always appearing in shining white robes. p. 272.

It is also pointed out that, as in other psychotherapeutic disciplines, the stereotyped dreams produced have as their corollary the giving of "stereotyped and standardized interpretations," and that:

In the name of the "freedom of the Holy Spirit" the sect thus exercises a totalitarian control over the individual, which does not even shun the hidden depths of the person's subconscious mind. The individual is malleable and the sect is moulding him into a standard type. p. 273.

It is not surprising that the ordinary person, in general, is much more easily indoctrinated than the abnormal. Even intensive psychoanalysis may achieve very little in such severe psychiatric disturbances as schizophrenia and depressive melancholia, and can be almost equally ineffective in certain settled states of chronic anxiety and obsession. A person is considered "ordinary" or "normal" by the community simply because he accepts most of its social standards and behavior patterns; which means, in fact, that he is susceptible to suggestion and has been persuaded to go with the majority on most ordinary or extraordinary occasions.

People who hold minority opinions, even though these may be posthumously proved correct, are often called "mad," or at least "eccentric" during their lifetime. But that they can hold either advanced or demoded views distasteful to the community as a whole, shows them to be far less suggestible than their "normal" contemporaries; and no patients can be so difficult to influence by suggestion as the chronic mentally ill. Ordinary persons also have much greater powers of adaptation to circumstance than most eccentrics or psychotics. During the London blitz ordinary civilians became conditioned to the most bizarre and horrifying situations; they would go calmly about their work, though well aware that neighbors had been buried alive in bombed houses around them. They realized that to worry about the victims when nothing more could be done to extricate them, would lead to their own nervous collapse. In fact, those who broke down during the London blitz were for the most part abnormally anxious or abnormally fatigued persons who could no longer adapt themselves to the unusual horrors and stresses.

This point cannot be too strongly emphasized in its relevance to

the phenomenon of political or religious conversion. It is a popular fallacy that the average person is more likely to resist modern brainwashing techniques than the abnormal. If the ordinary human brain had not possessed a special capacity of adaptation to an ever-changing environment – building up ever-changing conditioned reflexes and patterns of responses, and submitting for the time being when further resistance seemed useless – mankind would never have survived to become the dominant mammal. The person with deficient powers of adaptation and excessive rigidity in behavior or thought, is always in danger of breaking down, entering a mental hospital, or becoming a chronic neurotic.

It is also noteworthy that stage hypnotists, to demonstrate their powers of suggestion, make a practice of choosing from among the most ordinary volunteers who offer themselves. The hearty and well-built young soldier or the easygoing athlete is likely to prove an easy subject. Hypnotists are, however, careful to attempt nothing with the suspicious and anxious neurotic.

The higher incidence of hysterical phenomena among ordinary people under the acute stresses of war, compared with that among the same sort of people under the minor stresses of peacetime, or among chronically anxious and neurotic people either in peace or war, is further evidence (if any were needed) for the point we have been making, namely, that among the readiest victims of brainwashing or religious conversion may be the simple, healthy extrovert.

MODERN SHOCK TREATMENTS AND LEUCOTOMY

Before being able to change behavior patterns of thought and action in the human brain with speed and efficiency, it apparently is in many cases necessary to induce some form of physiological brain disturbance. The subject may have to be frightened, angered, frustrated, or emotionally disturbed in some way or another, because all such reactions are likely to cause alterations in brain function which may increase his suggestibility or make him liable to forego his normal conditioning. Psychotherapeutic techniques that involve merely talking to the patient generally prove ineffective in curing

severer states of mental disorder, even when strong emotions can be aroused. In most such severe cases of mental illness, normal behavior patterns have already been disrupted, and abnormal ones either established or on the way to being so. Far better results may then be achieved by a combination of psychotherapy with one or another of the newly introduced modern shock treatments, or with operations on the brain. The history of psychiatric treatment shows, indeed, that from time immemorial attempts have been made to cure mental disorders by the use of physiological shocks, frights, and various chemical agents; and such means have always yielded brilliant results in *certain types of patient*, though also applied indiscriminately and deleteriously to patients who could not respond to that particular treatment.

During the last twenty years a variety of shock treatments have been used, each discovered independently of the others. But the similarity between their effects is fascinating when viewed in the light of Pavlov's physiological experiments on dogs, and the findings made on combat casualties in World War II. It has already been shown that some of the most rapid and dramatic cures under drug abreaction and other psychotherapeutic treatments, occur when states of excitement produced in the brain go on to reach the phase of protective inhibition and collapse, and the brain is thereby freed of some of its recently acquired patterns of behavior and thought. Electric shock treatment, which has proved most helpful in dispelling certain states of severe mental depression, is simply the artificial inducement of an epileptic fit. This is done by passing an electric current through the brain, the strength of the current being no greater than is necessary to cause the fit.[19] A series of four to ten fits, given once or twice weekly, may shorten such attacks of depression to a few weeks only, where the illness would probably have lasted a year or two, or even longer. Yet, unless a full epileptic fit is produced, this electrical treatment is without effect. A so-called "sub-shock," meaning an electric shock which causes no convulsion in the brain, is worse than useless. A full convulsion means that the brain goes on convulsing to the point when it can do so no longer, but becomes temporarily exhausted and inhibited. There

are similarities between a convulsion and a very severe emotional abreaction, under drugs, that are striking.

It is very difficult indeed to make severely depressed patients abreact and discharge pent-up emotions under drugs. And the emotions then are not aggressive, as when stronger temperamental types are treated, but consist largely of self-abasement and self-blame. However, after a series of electrically induced convulsions, this abnormal condition, which shows evidence of "paradoxical" or "ultra-paradoxical" brain activity, soon breaks up. The patient begins to show a normal aggressiveness against the world again, rather than against himself, ceases to feel responsible for everything that has gone wrong, and may even round angrily on the doctor who is treating him. At this point he again becomes amenable to ordinary forms of suggestion and psychotherapy. The mind being, as it were, freed from its inhibitory strait jacket, his delusions of guilt and impending catastrophe disperse and fade away.

A significant clue to the problem was provided by a depressed American patient who was attending revival meetings in an endeavor to cure herself of severe mental depression associated with feelings of religious guilt. She found she could not work up sufficient enthusiasm to participate in the group excitement which was transfiguring almost everyone else present — until a course of electric shock treatment enabled her to do so. This suggested that certain states of abnormal brain activity respond far more readily to repeated electrically induced convulsions than to abreaction with or without drugs similarly designed to produce a temporary disturbance of brain function. Both methods, however, may turn out to work on the same physiological principles. Attendance at revival meetings had relieved another American patient from two previous attacks of depression, but not from a third much severer attack. This responded only to electrical shock treatment.[145]

Already before World War II, schizophrenia, especially in the early stages of the disease, was being successfully treated by insulin shock therapy.[140] The method is to give a patient large doses of insulin to lower the amount of sugar in his blood, thus producing a state of mental confusion and excitement. For an hour or more, per-

haps, he lies in a semiconscious state, twitching, jerking, and perhaps talking incoherently, until a deep coma supervenes. When using this treatment for the relief of schizophrenia, the psychiatrist may keep the patient in coma for half an hour. Sugar is then administered by means of a stomach tube or intravenous injection, and he quickly wakes up. Symptoms may disperse after a course of such treatments given daily and with little additional psychotherapy. So here is one more treatment involving an initial stage of often uncontrolled brain excitement, and ending in temporary brain inhibition and stupor.

Both electric shock and insulin shock treatments tend to disperse recent abnormal behavior patterns, though seldom proving efficacious in cases where these are too long established. The useful fields of these various treatments are now becoming more clearly differentiated; for instance, it is generally recognized that severe cases of early schizophrenia may respond best to the most complicated insulin therapy, combined sometimes with electric shock treatment; whereas states of mental depression perhaps brought about by prolonged petty anxiety, can often be cured by electric shock alone; and war neuroses, again, with depressive symptoms caused by more violent mental stress, may respond to much less severe abreactions under drugs.[147]

Among the different types of patient who do not respond at all readily either to psychotherapy or any of the modern shock treatments is the obsessional neurotic, who feels the urge to carry out certain repetitive actions—as Dr. Johnson had to touch certain finger posts when he walked down Fleet Street. These are often harmless: an Oxford Classical professor of the twenties anxiously asked the late Dr. William Brown whether his compulsion always to walk up and down the room when he lectured, in sequences of seven steps, was dangerous. Brown, with his tongue in his cheek, put his mind at rest: "When you find yourself walking in multiples of seven, come to me again! Simple sevens are all right."[64] There are, indeed, progressive degrees of obsession. A mother, for instance, may worry continually that she may have dropped an open safety pin in a milk bottle, and that the bottle will be returned to the dairy but not washed properly, and that the next child who

drinks milk from the bottle will swallow the safety pin. She may be perfectly aware of the wildly improbable nature of this repetitive fear, but nevertheless feel compelled to examine every empty milk bottle five or six times before the milkman collects it. In all other respects she may be a sensible and efficient housewife. Others, with minor symptoms of the same illness, make sure before going to bed that all gas taps are turned off and all doors properly locked, repeating the process two or three times. They are likely, of course, to rationalize their behavior by saying that "all sensible people make several security checks; it is worth the trouble."

Obsessional neurotics are also inclined to be excessively careful of their appearance and the tidiness of their houses, to wash their hands unnecessarily often and to be meticulously rigid in their brain patterns. Neighbors can usually set their clocks by the time when the obsessional neurotic walks down the street to work and returns again. This is the type of person who boasts that in thirty years he has never been late for work, and never more than a minute or two early. He is, however, likely to plague his spiritual adviser with minor worries and compulsive religious doubts which he cannot dispel. The obsessional neurotic is usually unsuggestible, and the despair of the psychotherapist or stage hypnotist.

When he finally becomes so chronically anxious and compulsive that he is a burden to himself and his associates, sometimes little can be done for him by psychiatry – short of a brain operation called "leucotomy" – which will presently be discussed. This resistance to treatment will be found extremely relevant when the mechanism of conversion and brain-washing are discussed in later chapters. Some obsessional patients have undergone psychoanalytic treatment for as many as fifteen years, on and off. They tend to include their treatment in the same obsessional pattern, hoping that one day some subconscious memory will finally be unearthed and explain everything.

A study of obsessional neuroses, however, shows how stubbornly certain types of brain can cling to their established behavior patterns. Abreactive treatments are often without effect, and an obsessional patient may be given as many as twenty or thirty electric convulsion treatments; but though these latter result in mental con-

fusion, and he may even temporarily lose much of his memory for recent events, as soon as the treatment is over and memory begins to flood back, old obsessions are liable to return in full force.

The more disquieting symptoms of an obsessional neurosis very often disappear gradually by themselves in the course of time, and may only be acute while associated with depression. If this can be made to lift, the obsessional neurotic will be benefited by electric shock treatment. But when subjected to simple psychological abreaction, even if depression is not present, he generally finds it impossible to "let himself go." If suffering from bomb shock, for example, he may discuss meticulously whether the explosion occurred at five or ten minutes past three in the afternoon. He will also interrupt attempts to excite him transmarginally by an insistence on absolute accuracy in whatever he is saying, and is proof against suggestion even under ether. If, therefore, a simple medical means of breaking up chronic obsessions is ever discovered, one of the final weapons will have been forged for the armory of the religious and political conversion practitioners. Meanwhile, their methods are much more successful with the healthy-minded majority. They often fail with the eccentric unless they can first physically debilitate and exhaust him to a point when his beliefs become less firmly held and he sees that his only hope of survival lies in submission; he may then sometimes be totally switched and reindoctrinated. Many human eccentrics may approximate to Pavlov's stronger dogs, who acquired new behavior patterns only when they had first been debilitated by castration, fever, or gastric disorders which made them lose a great deal of weight. Once reindoctrinated, they were fattened up, and the new behavior patterns became as firmly fixed as the old; indeed, Pavlov could not get rid of them again.

Obsessional symptoms in humans often occur after a debilitating loss of weight, a severe fever, or some operation or disease that alters glandular function. Attempts are now made sometimes to treat such patients by putting them on a weight-reducing diet, or giving them drugs to make them lose their appetite: hoping that the resulting debilitation will help disperse the obsessional behavior patterns which were acquired in similar circumstances.[146] The history of religion contains many records of sinful obsessional think-

ing being relieved by purges, vomitories, or starvation, after simpler methods had failed. But, though it was found that every dog had his discoverable breaking point, and the same truth may be presumed in human beings, even debilitation cannot be relied upon to alter obsessional patterns of thought and behavior, once they have become firmly established by time.

In a clinical account of religious and political conversion it is impossible to avoid classifying the human subjects according to basic temperamental types, each of which may call for a different type of physiological and psychological treatment. The stronger the obsessional tendency, for instance, the less amenable will the subject be found to some of the ordinary techniques of conversion; the only hope is to break him down by debilitation and prolonged psychological and physiological measures to increase suggestibility. Individual or mass hypnosis is also ineffective when used on several types of neurotics and psychotics; as a rule it can be confidently used only where there is evidence of suggestibility present.

In the present state of medical knowledge the only hopeful treatment of some chronic obsessional, chronic schizophrenic, and chronic anxious or depressive patients, who respond to no form of shock therapy, psychotherapy, or drug treatment is a surgical one to which, as a rule, recourse is only had when all else fails: the newer modifications of the operation called "prefrontal leucotomy." These can have such interesting effects that they deserve mention in this context.

The operation, in its now many varied forms, throws considerable light on the cerebral mechanisms by which patterns of human thought and behavior are implanted or eradicated. It was first introduced in 1936 by the Portuguese neurologist Moniz,[113] who received the Nobel Prize for his success in enabling so many chronically ill patients to leave mental hospitals and return to their work and families; and the aftereffects of such operations on the thought processes have been carefully studied in the case of British patients who have undergone it up to ten years ago, or more. Some fifteen thousand patients have had such operations in Great Britain alone.

Leucotomy is reserved for patients suffering from severe and persisting states of anxiety and tension, produced in some cases by

real and unpleasant facts, and in others by hallucinations or delusions; but in either case resisting dispersion by nonsurgical treatments. The operation, especially in its recently improved and modified forms, can greatly diminish the tension, while not always eradicating the thoughts that created it. One can, in fact, by this means diminish excessive anxiety arising from both normal and abnormal thinking, without affecting other thought processes or the intelligence itself to any marked degree; and with a reasonable chance that a favorable result will be permanent. The operation has been greatly refined in recent years, and now causes far less change in the general personality.[148]

To watch the progress of such patients after operation is to realize that, once their anxiety about a real or imaginary idea has been diminished, the idea itself has a tendency to diminish in importance. A patient may, for example, be confined in a mental hospital because he is obsessed by the delusion that he has an abnormally shaped face which everyone who sees it will laugh at. After leucotomy he may still believe in his abnormal face, but cease to regard it as such a social disability. This will enable him to leave hospital, return to work, and carry on as many people do who have real facial disfigurements. And, a few months later, it may be found that the delusional idea about the face has also vanished or become much less important to him for want of the continued emotional reinforcement of his anxiety about it.

It is said that leucotomy tends to make people matter-of-fact and conventional so that they lose their personality. And it is true that the result is, in general, to make them more ordinary members of a group, open to suggestion and persuasion without stubborn resistance; for they will have ceased to feel as deeply about their ideas and can therefore think more logically, and examine new theories without emotional bias. As an instance: one patient with a Messianic delusion had proved wholly unamenable to intensive psychoanalytic treatment, but after leucotomy was now able to discuss his Messianic claims with an intelligent male nurse and let them be argued away. Genuine religious conversions are also seen after the new modified leucotomy operations. For the mind is freed

from its old strait jacket and new religious beliefs and attitudes can now more easily take the place of the old.

Religious feelings in man may be destroyed if *too extensive* an operation is performed in the frontal lobes. Rylander[136] has described such patients in Sweden, while Ström-Olsen and Tow[167] have noted others in this country. One of Rylander's patients was

. . . a Salvation Army worker, a very high-ranking officer. She married a clergyman. For years she lay in hospital, constantly complaining that she had committed sins against the Holy Ghost. She complained of it for weeks and months, and her poor husband did his best to distract her, but without success. Then we decided to operate upon her . . . After the dressing had been taken off, I asked her, "How are you now? What about the Holy Ghost?" Smiling, she answered, "Oh, the Holy Ghost; there is no Holy Ghost."

However, using more modern types of operations, and much more limited cuts in the frontal lobes, symptoms of anxiety and obsessional rumination can be lessened without producing too many undesirable effects on ordinary religious beliefs. John Pippard[129] after a careful examination of over a hundred patients who had been followed up for from one and a half to five years after operation, reported recently:

. . . The religious attitude is not directly affected by rostral (modified) leucotomy, but is liable to be affected in the reintegration of the personality after operation, as indeed it may be in the reintegration after psychotherapy or other treatment. . . . Personality deficits are negligible after 95 per cent. of rostral leucotomies which have given good symptomatic relief, compared with only 44 per cent. of standard (more extensive) leucotomies. Positively undesirable changes were present in only 2 of 114 cases, compared with 29 per cent. of standard leucotomies.

Whether it be a mistake to convert mentally agonized persons into ones who have not such overwhelmingly strong feelings one way or another, will, of course, always remain a moot point for some people. At all events, the success of leucotomy is a reminder

of the uselessness of the merely rational approach to many patients suffering from fixed ideas; and of the consequent unhappy recourse, throughout history, to lunatic asylums, prisons, concentration camps, gallows or the stake as a means of removing from society all individuals who cannot otherwise be made to accept the beliefs accepted by the more ordinary and suggestible majority.

5 TECHNIQUES OF RELIGIOUS CONVERSION

In approaching this subject we shall try to find out what it is that is common to many religions in the methods of sudden conversion employed by their priests and evangelists. We shall endeavor to bring this into relation with what we know of the physiology of the brain. We must beware of being distracted by what it is that is being preached. The truths of Christianity have nothing to do with the beliefs inspired by the rites of pagan religions or of devil worshipers. But the physiological mechanisms, of which use has been made by religions on each side of this gulf, will bear the closest examination.

The leaders of successful faiths have never, it may in fact be said, dispensed entirely with physiological weapons in their attempts to confer spiritual grace on their fellow men. Fasting, chastening of the flesh by scourging and physical discomfort, regulation of breathing, disclosure of awesome mysteries, drumming, dancing, singing, inducement of panic fear, weird or glorious lighting, incense, intoxicant drugs — these are only some of the many methods used to modify normal brain function for religious purposes. Some sects pay more attention than others to a direct stirring up of emotions

as a means of affecting the higher nervous system; but few wholly neglect it.

The evidence already presented suggests that the physiological mechanisms which make possible the implantation or removal of behavior patterns in men and animals are analogous; and that when the brain breaks down under severe stress the resultant behavior changes, whether in man or in an animal, depend both on the individual's inherited temperament and on the conditioned behavior patterns which he has built up by a gradual adaptation to environment.

It has also been pointed out that those who wish to disperse wrong beliefs and undesirable behavior patterns and afterward implant saner beliefs and attitudes, are more likely to achieve success if they can first induce some degree of nervous tension, or stir up sufficient feelings of anger or anxiety to secure the person's undivided attention and possibly increase his suggestibility. By increasing or prolonging stresses in various ways, or inducing physical debilitation, a more thorough alteration of the person's thinking processes may be achieved. The immediate effect of such treatment is usually to impair judgment and increase suggestibility; and though when the tension is removed the suggestibility likewise diminishes, yet ideas implanted while it lasted may remain. If the stress or the physical debilitation, or both, are carried one stage further, it may happen that patterns of thought and behavior, especially those of recent acquisition, become disrupted. New patterns can then be substituted, or suppressed patterns allowed to reassert themselves; or the subject may begin to think and act in ways that precisely contradict his former ones. Some temperamental types seem relatively impervious to all emotional stresses imposed on them. Others retain their beliefs, once firmly implanted, with a tenacity that defies the severest psychological and physiological shock treatments, and even brain operations especially designed to disrupt them. But such resistance is unusual.

With these facts in mind one can hope to understand more clearly the physiological mechanisms at work in some types of sudden religious conversions; hence the repetitive summary. Methods of religious conversion have hitherto been considered more from psy-

chological and ultraphysical angles rather than from physiological and mechanistic ones; but the techniques employed often approximate so closely to modern political techniques of brain-washing and thought control that each throws light on the mechanics of the other. It is convenient to start with the better documented history of sudden religious conversion, which has this in common with political conversion, that an individual, or group of individuals, may adopt new beliefs or patterns of behavior as a result of illuminations bursting upon the mind suddenly and with great intensity, often after periods of intense emotional stress. But since political prisons publish no available clinical reports on the physiological changes noted in those whom they have subjected to intolerable mental stress, it will be convenient to quote those observed in analogous combat casualties and then compare them with those observed in sudden religious converts. Two conveniently parallel texts are John Wesley's *Journal* of 1739, and Grinker and Spiegel's report on their treatment of acute war neuroses in North Africa in 1942.

Grinker and Spiegel[65] describe the effects of abreaction of war experiences under barbiturate drugs as follows:

The terror exhibited . . . is electrifying to watch. The body becomes increasingly tense and rigid; the eyes widen and the pupils dilate, while the skin becomes covered with a fine perspiration. The hands move convulsively. . . . Breathing becomes incredibly rapid or shallow. The intensity of the emotion sometimes becomes more than they can bear; and frequently at the height of the reaction, there is a collapse and the patient falls back in the bed and remains quiet for a few minutes . . .

Wesley reports under the date April 30, 1739:[188]

We understand that many were offended at the cries of those on whom the power of God came; among whom was a physician, who was much afraid there might be fraud or imposture in the case. Today one whom he had known many years was the first who broke out "into strong cries and tears." He could hardly believe his own eyes and ears. He went and stood close to her, and observed every symptom, till great drops of sweat ran down her face and all

her bones shook. He then knew not what to think, being clearly convinced it was not fraud nor yet any natural disorder. But when both her soul and body were healed in a moment, he acknowledged the finger of God. Vol. II, p. 186.

Grinker and Spiegel report:

The stuporous become alert, the mute can talk, the deaf can hear, the paralysed can move, and the terror-stricken psychotics become well-organized individuals.

Wesley can also record:

I will show you him that was a lion till then, and is now a lamb; him that was a drunkard, and is now exemplarily sober; the whoremonger that was, who now abhors the very "garment spotted by the flesh." Vol. II, p. 202.

The main difference lies in the philosophical explanations given for the same impressive results. Wesley and his followers attributed the phenomenon to the intervention of the Holy Ghost: "It is the Lord's doing and it is wonderful in our eyes." Grinker and Spiegel, on the other hand, believed that their results demonstrated the correctness of Freud's theories in which they themselves believed. As will be shown later, almost identical physiological and psychological phenomena may result from religious healing methods and conversion techniques, equally in the most primitive and the more highly civilized cultures. They may be adduced as convincing proofs of the truth of whatever religious or philosophic beliefs are invoked. But since those beliefs are often logically irreconcilable with each other, and since the similarity of the physiological and psychological phenomena produced by their invocation are all that they may have in common — we find ourselves confronted with a mechanistic principle deserving of the most careful examination.

Just as we have hitherto selected Pavlov's experiments on dogs to illustrate one aspect of our larger problem, and war neuroses of World War II to illustrate another, so here John Wesley's methods and results will be selected as typical of those seen in an effective and socially valuable religious setting. Nobody can doubt their re-

ligious efficacy or social value; for his preaching converted people by the thousands, and he also built up an efficient system for perpetuating these beliefs.

Harold Nicolson, writing in 1955, says:[119]

Finally a revivalist of genius appeared in the person of John Wesley. On the death of Wesley in 1791, heathenism returned for a short while to England. The Church almost reverted to the condition which Bishop Butler denounced in 1736. . . . Bishop Butler did not foresee the great flame that John Wesley was so shortly to kindle or that, after a temporary reaction, the Evangelicals would receive from Wesley's hand a torch that was to smoke and flicker for some eighty years.

It is now generally admitted that he made great numbers of ordinary English people think less about their material well-being than their spiritual salvation, thus fortifying them, at a critical period of the French Revolution, against dangerous materialistic teachings of Tom Paine. The powerful influence of the Methodist revival still permeates England in the form of its "nonconformist conscience" . . . Moreover, it was descendants of those who fostered this powerful religious movement in England who later pioneered the great trade-union movement of the present era.

The eighteenth century, like the twentieth, considered itself an "Age of Reason"; the intellect was, in fact, held to be far more important than the emotions when habits of thought and behavior needed to be dictated. Wesley's great success was due to his finding that such habits were most easily implanted or eradicated by a tremendous assault on the emotions. Most Wesleyan ministers now confess themselves bewildered when they read the detailed reports of his conversions after blinding their eyes to the tremendous power still latent in the technique he employed. All evidence goes to show that there can be no new Protestant revival while the policy continues of appealing mainly to adult intelligence and reason, and until Church leaders consent to take more advantage of the normal person's emotional mechanism for disrupting old behavior patterns and implanting new.

Wesley's own efforts as a preacher were relatively ineffective

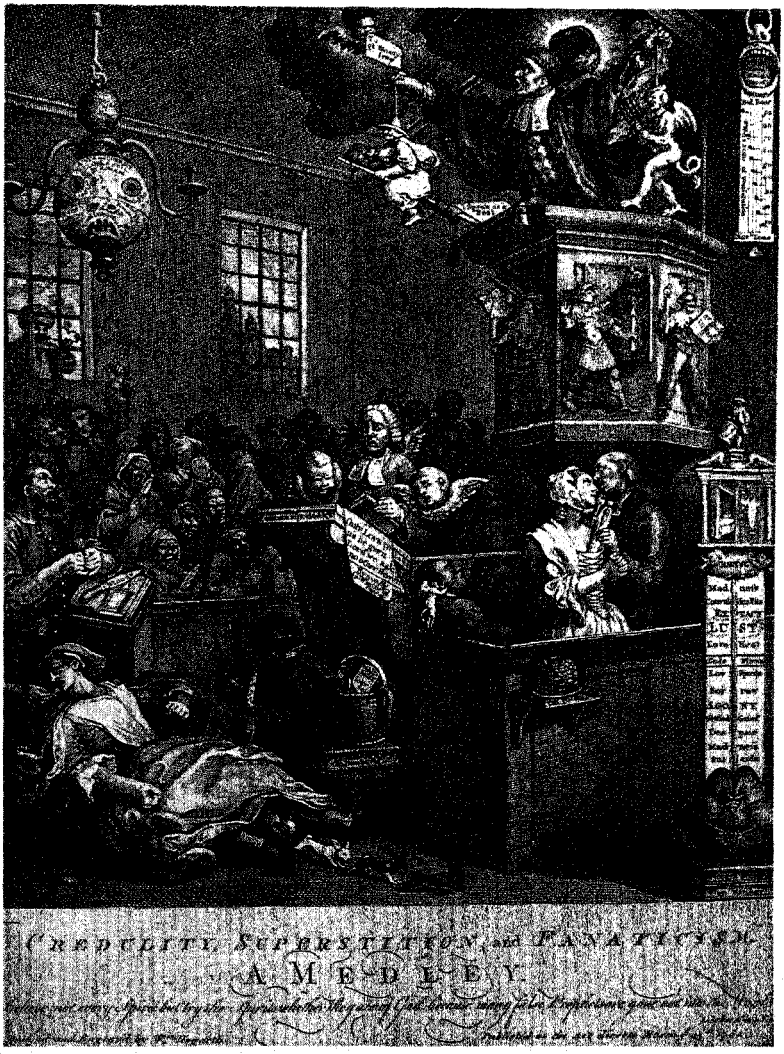
until his own heart became "strangely warmed" at a meeting in Aldersgate Street in 1738. He had previously gone for help in a state of severe mental depression, to Peter Bohler, a Moravian missionary, having returned a total failure from being the pastor of the newly founded colony of Georgia. Hitherto he had always believed that spiritual salvation could be achieved only by the performance of good works, as opposed to faith alone. His sudden conversion transformed him into one who puts faith beyond everything, enabling him to cast all his fears aside; and he found a sudden ally in his brother Charles, who had been with him in Georgia and whom Peter Bohler had also been trying to change. Charles was likewise suffering from acute mental depression, induced both by his own Georgia experiences and by physical debilitation after a second attack of pleurisy. These sudden conversions of both brothers, with an interval of only three days between them, to a belief in the certainty of salvation by faith, rather than by good works, are probably described in one of Charles Wesley's famous hymns:

Long my imprisoned spirit lay
Fast bound by sin and nature's night;
Thine eye diffused a quickening ray —
I woke, the dungeon flamed with light;
My chains fell off, my heart was free,
I rose, went forth, and followed Thee.

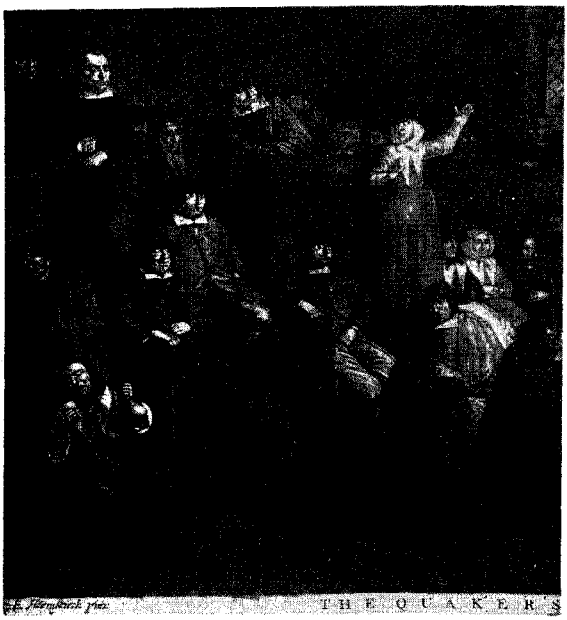
The reader may find some difficulty in realizing the immense contemporary importance of the religious problem which Peter Bohler had helped the Wesley brothers to solve. To put faith before works implied a total reorientation of their religious position: as radical as the change from political conservatism to communism would be today.

Once habituated to the new pattern of thought, John Wesley set about implanting it in others. With the help of his brother Charles, whose hymns were addressed to the religious emotions rather than the intelligence, he hit upon an extremely effective technique of conversion — a technique which is used not only in many other successful religions but in modern political warfare.

First of all Wesley would create high emotional tension in his



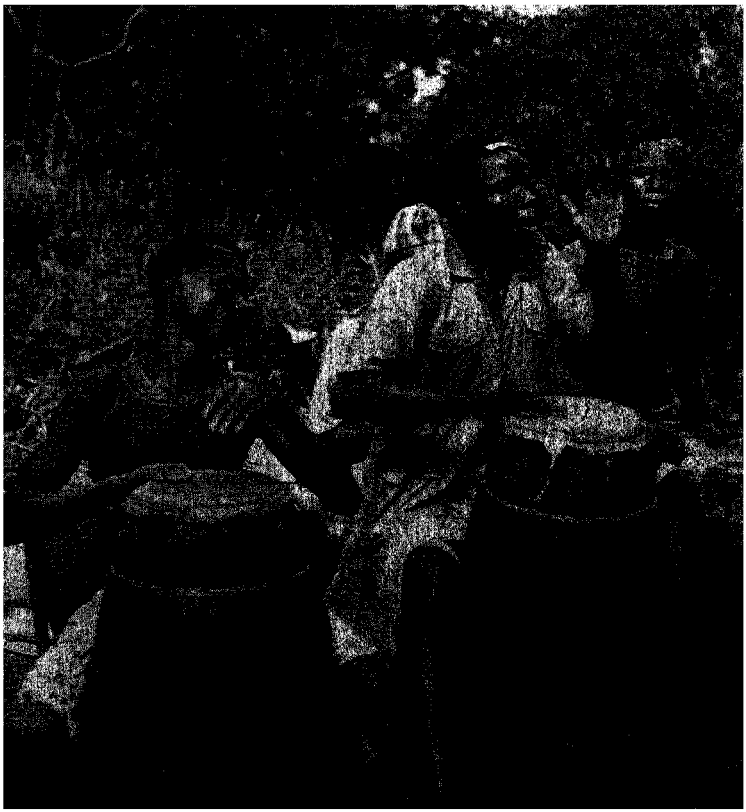
A contemporary satire by Hogarth (1762) on Wesley's method of preaching. (British Museum)



ABOVE: Early print by Heemskerck of a Quaker Meeting, showing quaking. (British Museum) BELOW: A Hogarth contemporary print (1747) of Wesley (or one of his preachers) going in the death cart with a condemned man to Tyburn. (British Museum)

The following series of photographs show some of the physiological mechanisms of conversion discussed in this book. They are seen in a wide variety of religious settings in quite different parts of the world, and they are helping to implant or maintain quite different types of religious beliefs.

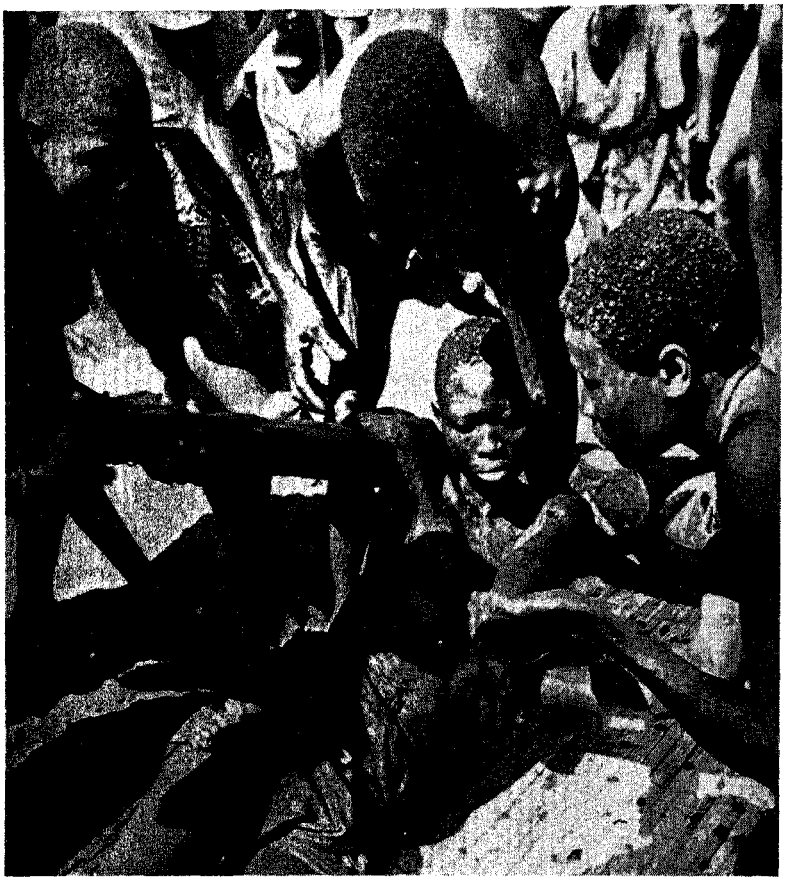
BELOW: In primitive religions, rhythmic drumming is very commonly used to stimulate group excitement and emotional release. (Following photos by Paul Hartmann from *Dieux d'Afrique* by Pierre Verger.)



ABOVE: Rhythmic dancing and hand clapping is also common. LEFT: Priests, too, may help to whip up the excitement.

RIGHT: Acute states of excitement may then occur in participants, which are often attributed to the intervention of a god. BELOW: The final phase of exhaustion and collapse may then supervene.

Transmarginal exhaustion and collapse.



Transmarginal exhaustion and collapse.

potential converts. He found it easy to convince large audiences of that period that a failure to achieve salvation would necessarily condemn them to hell fire for ever and ever. The immediate acceptance of an escape from such a ghastly fate was then very strongly urged, on the ground that anybody who left the meeting "unchanged" and met with a sudden fatal accident before he had accepted this salvation would pass straight into the fiery furnace. This sense of urgency increased the prevailing anxiety which, as suggestibility increased, could infect the whole group.

Fear of everlasting hell, which was as real to Wesley's own mind as the houses and fields in which he preached, affected the nervous system of his hearers very much as fear of death by drowning did Pavlov's dogs in the Leningrad flood. Ronald Knox quotes this autobiographical account from John Nelson (later one of Wesley's most able lieutenants) describing his own conversion:[88]

As soon as he (Wesley) got upon his stand, he stroked back his hair, and turned his face towards me where I stood, and I thought fixed his eyes upon me. His countenance struck such an awful dread upon me, before I heard him speak, that it made my heart beat like the pendulum of a clock; and when he did speak, I thought his whole discourse was aimed at me. Knox: *Enthusiasm*, p. 513.

Wesley learned in time that to capture an audience he had first to gauge its intelligence and emotional capacity. He reports that on a tour of Ireland in 1765:[188]

I rode to Waterford, and preached in a little court, on our "great High-Priest that is passed into the heavens" for us. But I soon found I was got above most of my hearers: I should have spoken of death or judgment. On Tuesday evening I suited my discourse to my audience . . . and deep attention sat on almost every face. Vol. V, p. 134.

He fills his *Journal* with day-to-day notes on the results of his preaching. For example:

While I was speaking one before me dropped down as dead, and presently a second and a third. Five others sunk down in half an

hour, most of whom were in violent agonies. The "pains" as "of hell came about them, the snares of death overtook them." In their trouble we called upon the Lord, and He gave us an answer of peace. One indeed continued an hour in strong pain, and one or two more for three days; but the rest were greatly comforted in that hour, and went away rejoicing and praising God. Vol. II, pp. 226-7.

About ten in the morning, J— C—, as she was sitting at work, was suddenly seized with grievous terrors of mind, attended with strong trembling. Thus she continued all the afternoon; but at the society in the evening God turned her heaviness into joy. Five or six others were also cut to the heart this day, and soon after found Him whose hands made whole; as did one likewise who had been mourning many months, without any to comfort her. Vol. II, pp. 227-28.

This took place at Bristol; but in Newgate Prison, where many who had heard him preach were soon due to die by public hanging, his message was, not unnaturally, even more effective:

Immediately one, and another, and another sunk to the earth; they dropped on every side as thunderstruck. One of them cried aloud. We besought God in her behalf, and He turned her heaviness into joy. A second being in the same agony, we called upon God for her also; and He spoke peace unto her soul . . . One was so wounded by the sword of the Spirit that you would have imagined she could not live a moment. But immediately His abundant kindness was showed, and she loudly sang of His righteousness. Vol. II, p. 184.

With such preaching methods it is not enough to disrupt previous patterns of behavior by emotional assaults on the brain; one must also provide an escape from the induced mental stress. Hell fire is presented only as the result of *rejecting* the offer of eternal salvation won by faith. Emotionally disrupted by this threat, and then rescued from everlasting torment by a total change of heart, the convert is now in a state to be helped by dwelling upon the complementary gospel of love. The punishment for backsliding from a

state of grace must always be kept in mind; but once conversion has taken place, love rather than further fear can be used to consolidate the gain. On December 20, 1751, Wesley wrote:[183]

I think the right method of preaching is this. At our first beginning to preach at any place, after a general declaration of the love of God to sinners, and His willingness that they should be saved, to preach the law, in the strongest, the closest, the most searching manner possible.*

After more and more persons are convinced of sin, we may mix more and more of the gospel, in order to beget faith, to raise into spiritual life those whom the law hath slain. I would not advise to preach the law without the gospel, any more than the gospel without the law. Undoubtedly, both should be preached in their turns; yea, both at once, or both in one. All the conditional promises are instances of this. They are law and gospel mixed together. Tyerman, Vol. II, p. 130.

Political brain-washing similarly points to a new path to salvation, after fear, anger and other strong emotions have been excited as a means of disrupting the old bourgeois thought patterns. If the communist gospel is accepted, love may also be substituted for fear; but severe penalties or relapse await deviationist backsliders.

As Pavlov's experimental findings in dogs and experiences in the treatment of war neuroses would lead one to expect, the effect of getting too emotionally involved, either positively or negatively, with Wesley's preaching was to increase markedly the likelihood of being converted. It often happened, quite unexpectedly for the person concerned, that when he had been roused to the greatest pitch of indignation and anger by the proceedings, he suddenly broke down and accepted every belief demanded of him. For it has been shown in previous chapters that anger, as well as fear, can induce disturbances of brain function which make a person highly suggestible; and reverse his conditioned behavior patterns, or even wipe the "cortical slate" clean.

Thus Wesley reports on Sunday, July 1, 1739:

*The "law" in this context includes the certainty that hell fire awaits the unsaved sinner.

The first that was deeply touched was L—— W——, whose mother had been not a little displeased a day or two before, when she was told how her daughter had exposed herself before all the congregation. The mother herself was the next who dropped down, and lost her senses in a moment; but went home with her daughter, full of joy, as did most of those that had been in pain. Vol. II, p. 232.

And on Friday, June 15, 1739, he had also reported:

Some sunk down, and there remained no strength in them; others exceedingly trembled and quaked; some were torn with a kind of convulsive motion in every part of their bodies, and that so violently that often four or five persons could not hold one of them. I have seen many hysterical and many epileptic fits; but none of them were like these in many respects. I immediately prayed that God would not suffer those who were weak to be offended. But one woman was offended greatly, being sure they might help it if they would — no one should persuade her to the contrary; and was got three or four yards when she also dropped down, in as violent an agony as the rest. Vol. II, pp. 221-22.

Again, on July 30, 1739:

One of these had been remarkably zealous against those that cried out and made a noise, being sure that any of them might help it if they would. And the same opinion she was in still, till the moment she was struck through, as with a sword, and fell trembling to the ground. She then cried aloud, though not articulately, her words being swallowed up. In this pain she continued twelve or fourteen hours, and then her soul was set at liberty. Vol. II, p. 248.

These phenomena were commonest when Wesley first began preaching after his own conversion and when he addressed congregations unused to his methods. But he was recording them more than thirty years later, still convinced that, to be effective, "sanctification" should be sudden and dramatic. He had originally rejected this theory when made by Peter Bohler, but in rereading his New Testament, found that the effective conversions reported in it had, in fact, been sudden ones.

Wesley took the trouble to check his results scientifically:[82]

In London alone, I found 652 members of our Society who were exceedingly clear in their experience, and whose testimony I could see no reason to doubt. And everyone of these (without a single exception) has declared that his deliverance from sin was instantaneous; that the change was wrought in a moment. Had half of these, or one-third, or one in twenty declared it was gradually *wrought in* them, *I should have believed this, with regard to* them, *and thought that* some *were gradually sanctified and some instantaneously. But as I have not found in so long a space of time, a single person speaking thus, I cannot but believe that sanctification is commonly, if not always, an instantaneous work.* Tyerman's *Life of Wesley,* Vol. I, pp. 462-63, quoted by W. James, p. 227.

This did not mean, of course, that a period of intense anxiety, depression, self-questioning, and indecision, often enhanced by physical debilitation due to a variety of causes, had not preceded the "sanctification." Such "softening-up" processes can all contribute to the disturbances of brain function which occur when stresses become too great and a protective mechanism starts to come into play. Wesley's appeal was most successfully made to the poor and uneducated; but we find him reporting in 1742:[188]

I could not but observe that here the very best people, so-called, were as deeply convinced as open sinners. Several of these were now constrained to roar aloud for the disquietness of their hearts and these generally not young (as in most other places), but either middle aged or well stricken in years. Vol. III, p. 52.

In 1758 a powerful revival started at Everton. Cambridgeshire farm workers are by no means an easily excited group, but the Reverend John Berridge had also stumbled on the mechanics of the sudden conversion process.[163] Though accused by his religious detractors at the nearby Cambridge University of exhorting his audience to "Fall! Won't you fall! Why don't you fall! Better fall here, than fall into hell!" he had no hesitation in inducing the final state of collapse in his converts, for the number of "groaners, sighers, tumblers and convulsionists" also caused dismay at the University. In *Simeon and Church Order,* Charles Smyth[163] reports him as writing:

And now let me make one Reflection. I preached of Sanctification very earnestly for six Years in a former Parish, and never brought one Soul to Christ. I did the same at this Parish for two Years, without any Success at all; but as soon as ever I preached Jesus Christ, and Faith in His Blood, then Believers were added to the Church continually; then People flocked from all Parts to hear the glorious Sound of the Gospel, some coming six Miles, others eight, and others ten and that constantly . . . p. 163.

He told them

. . . *very plainly, that they were Children of wrath, and under the Curse of God, though they knew it not;* . . . *labouring to beat down Self-Righteousness; labouring to show them that they were all in a lost and perishing State, and that nothing could recover them out of this State, and make them Children of God, but Faith in the Lord Jesus Christ.* p. 162.

By this method, Southey writes: "this man produced a more violent influenza of fanaticism than had ever followed upon Whitfield's or Wesley's preachings."[163]

Some persons tend to minimize the importance of psychological factors, emotional doubts, physical debilitation, and the like, in religious conversions, and to emphasize them when excusing the victims of similarly induced political conversion. But successful "brain-washing" also demands the rousing of strong emotions, and these need not have particular relevance to the new faith, provided that they are sufficiently disruptive. For example, Arthur Koestler's *Arrow in the Blue*[90] describes his conversion to militant Communism in these words:

Though I had been steadily moving towards the Communist position for more than a year, the final decision to become an actual member of the Party was again a sudden one . . . *This time the event that clinched the issue was of a more profane nature. More precisely, it was a whole series of grotesque events, crowded into one December evening in 1931.* p. 303.

Koestler goes on to explain how, one Saturday afternoon, he went to fetch his car from a garage where it had been under repair for

nearly three weeks. Delighted to get it back, he drove straight from the garage to a friend's flat where a poker party was in progress. Koestler loved poker, was not an expert at it, but seldom lost heavily. That afternoon, however, he lost the equivalent of several months' salary; far more than he could afford.

Dejected, I drove to an after-dinner party of the radical bohemia, where I promptly got drunk, as under the circumstances was only to be expected. The party lasted till two or three in the morning, and I paid no attention to the fact that it had turned very cold, and that I had no anti-freeze in my radiator. When I left, the engine-block of the newly-repaired car had burst and a thick icicle was sticking out of one of the cylinder-heads – a sight to make any motorist weep, even if the car was not his own. p. 304.

More trouble was still to come:

On seeing my dismay, a girl who had been at the party and who had always got on my nerves, offered me the hospitality of her nearby flat; this again leading to the consequences which were to be expected. I woke up in the morning with a super-hangover mixed with self-reproach, anxiety and guilt, next to a person whom I disliked, financially broke, and with a bust-up car. p. 304.

Koestler comments:

In my experiences the "language of destiny" is often couched in vulgar slang. The series of grotesque misadventures on that Saturday night looked as if they had been arranged by a crude jester; but the face of a clown, bending close against your own, can be very frightening. By the time I got back to my flat my decision was made, though I hardly felt it to be mine; it had made itself. Pacing up and down in my bedroom, I had the sudden impression that I was looking down from a height at the track along which I had been running. I saw myself with great clarity as a sham and a phoney, paying lip-service to the Revolution which was to lift the earth from its axis, and at the same time leading the existence of a bourgeois careerist, climbing the worm-eaten ladder of success, playing poker and landing in unsought beds. pp. 304-5.

The pattern of Koestler's life underwent a total change, and he remained a loyal Communist until six years later, when he experienced an equally intense reconversion. In *The God That Failed*[89] the phenomena were seen to follow a series of emotional shocks, when captured and imprisoned during the Spanish Civil War.

The experiences responsible for this change were fear, pity, and a third one, more difficult to describe. Fear, not of death, but of torture and humiliation, and the more unpleasant forms of dying . . . and finally, a condition of mind usually referred to in terms borrowed from the vocabulary of mysticism, which would present itself at unexpected moments and induce a state of inner peace which I have known neither before nor since . . . p. 75.

In the *Invisible Writing*[91] he also says:

On the day when Sir Peter [*Chalmers*] *and I were arrested, there had been three occasions when I believed my execution was imminent. . . . On all three occasions I had benefited from the well-known phenomenon of a split consciousness, a dreamlike, dazed self-estrangement, which separated the conscious self from the acting self — the former becoming a detached observer, the latter an automaton, while the air hums in one's ears as in the hollow of a seashell. . . . Much worse was another episode on the same day; being photographed for the rogues' gallery against a wall in the street, hands tied, in the midst of a hostile crowd.* p. 350.

This last incident had revived claustrophobic panic feelings experienced during a surgical operation in his childhood. Koestler reports:

This, together with the other events of the same day, and of the next three days with their mass executions, had apparently caused a loosening up and displacement of psychic strata close to rock bottom — a softening of resistances and rearrangement of structures which laid them temporarily open to that new type of experience that I am leading up to. p. 350.

These clinical observations become still more interesting when he gives in nonreligious terms the same mystical experience that

floods the literature of religious conversion. The fact is that mystical experiences, like sudden conversions, do not always arise from purely religious influences and stresses; they can sometimes be induced by chemical means — such as, for instance, mescaline, ether, and laughing gas. Koestler's detailed accounts of his two conversions, and the quasi-mystical experiences that accompanied the second of these, show how varied are the emotional and physiological stresses that can help toward conversion. His stresses include a severe alcoholic hangover, a broken-down car, heavy financial loss, a disagreeable sexual entanglement; civil war, capture, threats of sudden death by shooting, and the revival of a childhood panic. In each case the new troubles were heaped on the old until their combined weight perhaps proved more than could be tolerated by his nervous system, and a change in brain patterns then seems to have occurred.

Koestler's *The Invisible Writing*[91] should be read for a full description of his nonreligious mystical or dreamlike type of experience in prison:

Then I was floating on my back in a river of peace, under bridges of silence. It came from nowhere and flowed nowhere. Then there was no river and no I. The I had ceased to exist. p. 352.

The coming-back to the lower order of reality I found to be gradual, like waking up from anaesthesia. . . . Whether the experience had lasted for a few minutes or an hour, I never knew. In the beginning it occurred two or even three times a week, then the intervals became longer. It could never be voluntarily induced. After my liberation it recurred at even longer intervals, perhaps once or twice in a year. But by that time the groundwork for a change of personality was completed. p. 352.

Experiences of this sort can be induced by a wide range of stresses on the brain. What is more, feelings of divine possession, and subsequent conversion to a religious faith can be helped on by the use of many types of physiological stimuli. It should be more widely known that electrical recordings of the human brain show that

it is particularly sensitive to rhythmic stimulation by percussion and bright light, among other things, and certain rates of rhythm can build up recordable abnormalities of brain function and explosive states of tension sufficient even to produce convulsive fits in predisposed subjects. Some people can be persuaded to dance in time with such rhythms until they collapse in exhaustion. Furthermore, it is easier to disorganize the normal function of the brain by attacking it simultaneously with several strong rhythms played in different tempos. This may lead on to protective inhibition, either rapidly in the "weak inhibitory" temperament or after a prolonged period of excitement in the "strong excitatory" one.

Rhythmic drumming is found in the ceremonies of many primitive religions all over the world. An accompanying state of mounting excitement and dancing is also maintained until the same point of physical and emotional collapse has been reached.[184] Alcohol and other drugs are often used to heighten the excitement of religious dancers, and this too hastens the breakdown, after which feelings of their being freed from sin and evil dispositions, and starting life anew may occur. Belief in divine possession is very common at such times, and so is the mystical trance — essentially similar to that experienced by so many Christian and other saints in cramped cells or under martyrdom, and vouchsafed to Koestler when threatened with shooting by the Franco forces.

The voodoo cult in Haiti shows with what ease suggestibility can be increased by subjecting the brain to severe physiological stresses. Voodoo has numerous deities, or *loa*, some of them African tribal gods brought to the West Indies by slaves, some of them saints whom Catholic priests later taught the slaves to invoke. The loa are believed to descend and take possession of a person, usually while he or she is dancing to the drums. The possessed person then behaves as the particular deity should behave; the different habits of loas being a matter of tradition. As with soldiers who continue to fight after being temporarily stunned by an explosion, or football players who get kicked on the head in the early stages of an exciting match, the possessed have no recollection, when they come to themselves again an hour or so later, of what has seemed to others an intelligent and effective performance.

The case of men and women who have been worked up into a state of suggestibility by voodoo drumming shows the power of such methods. Though apparently unconscious, they carry out all the detailed behavior expected of the particular deity by which they believe themselves possessed. A voodoo priest increases excitement and suggestibility by altering the loudness and rhythms of the drums, just as in a religious snake-handling cult, which I observed myself in the United States, the preacher used the tempo and volume of singing and hand clapping to intensify the religious enthusiasm, and emotional disruption was finally induced by thrusting live poisonous snakes into their hands. After a terminal collapse into stupor, both groups of participants may awake with a sense of spiritual rebirth.

In 1949 Maya Deren went to Haiti on a Guggenheim Fellowship to study and film Haitian dancing. In the *Divine Horseman*[33] she has published a detailed account of the physiological and psychological effects of the drumming on her own brain, ending in her apparent possession by Erszulie, the goddess of love. She tells how the drums gradually induced uncontrollable bodily movement, until as a climax she felt "possession" coming on her:

My skull is a drum; each great beat drives that leg, like the point of a stake, into the ground. The singing is at my very ear, inside my head. This sound will drown me! "Why don't they stop! Why don't they stop!" I cannot wrench the leg free. I am caught in this cylinder, this well of sound. There is nothing anywhere except this. There is no way out. The white darkness moves up the veins in my leg like a swift tide rising, rising; is a great force which I cannot sustain or contain, which, surely, will burst my skin. It is too much, too bright, too white for me; this is its darkness. "Mercy!" I scream within me. I hear it echoed by the voices, shrill and unearthly: "Erszulie." *The bright darkness floods up through my body, reaches my head, engulfs me. I am sucked down and exploded upward at once. That is all.* p. 260.

She also tries to convey some of the strange feelings and impressions that came upon her while dancing in a trance around the

peristyle of the voodoo meetinghouse, behaving as the goddess Erszulie is supposed to behave on such occasions:

If the earth is a sphere, then the abyss below the earth is also its heavens; and the difference between them is no more than time, the time of the earth's turning. If the earth is a vast horizontal surface . . . p. 260.

Such feelings expressed in ordinary language are incomprehensible and even nonsensical to readers who have never experienced the "paradoxical" and "ultraparadoxical" phases of brain activity induced by intolerable stress; "white darkness," for instance, makes no more sense to them than would the intense mystical joy excited by flagellation.

Maya Deren enjoyed feelings of spiritual rebirth as she recovered from her trance:

How clear the world looks in this first total light. How purely form it is, without, for the moment, the shadow of meaning. . . . As the souls of the dead did, so have I, too, come back. I have returned. pp. 261-62.

These experiences, which changed her plans for the future, as well as her outlook on voodoo, also show what may happen to those who try to fight rather than avoid these mechanistic processes by too strong an exercise of will power. The emotion expended in the effort sometimes hastens their breakdown. Maya Deren describes how she was caught in this way. Just before her possession, she had felt herself becoming "vulnerable" to the drumming and turned her back on the dancers, but then rejoined them from a proud sense of professional duty:

For I now know that, today, the drums, the singing, the movements — these may catch me also. . . . To run away would be a cowardice. I could resist; but I must not escape. And I can resist best, I think to myself, if I put aside the fears and nervousness; if, instead of suspecting my vulnerability, I set myself in brazen competition with all this which would compel me to its authority. . . . p. 256.

But in the end she found herself forced to submit:

With a great blow the drum unites us once more upon the point of the left leg. The white darkness starts to shoot up; I wrench my foot free but the effort catapults me across what seems a vast, vast distance, and I come to rest upon a firmness of arms and bodies which would hold me up. . . . With every muscle I pull loose and again plunge across a vast space and once more am no sooner poised in balance than my leg roots. So it goes: the leg fixed, then wrenched loose, one long fall across space, the rooting of the leg again—for how long, how many times I cannot know. pp. 259-60.

The best way to avoid possession, conversion, and all similar conditions is to avoid getting emotionally involved in the proceedings. Too fierce an anger or contempt for the voodoo priest, or for the religious snake handler, may be as dangerous as to quake with fear when one or the other inaugurates a meeting. Horace Walpole's emotionally detached attitude to John Wesley's preaching, quoted by Knox,[88] was the one most likely to preserve him from sanctification:

. . . as evidently an actor as Garrick. He spoke his sermon, but so fast, and with so little accent, that I am sure he has often uttered it, for it was like a lesson. There were parts and eloquence on it; but towards the end he exalted his voice, and acted very ugly enthusiasm. p. 513.

But would Walpole have been able to maintain this attitude if Wesley had visited Strawberry Hill with a force of Army drummers — some of whom might be his sanctified converts — to overwhelm him with ruffles and double flams?

Pavlov showed that when new behavior patterns were implanted in his dogs, they could become sensitized to the particular stimuli associated with this change. It can be the same with human beings. Maya Deren experienced seven or eight attacks of possession, from which it sometimes took her as much as four hours to regain consciousness. She found it more and more easy to respond to the drums and the dancing, and emphasizes in her account the sense of "being overwhelmed by a transcendent force."

Anyone who has succumbed to the voodoo drums and dances, or to snake handling, but is ignorant of the physiological processes involved, may believe that the feelings of sanctification or possession are due solely to the god or gods invoked. This is what they were told to expect, and the softening-up process may have made them suggestible to the most varied types of dogma.

In West Africa, the original home of voodoo, M. Jean Rouch, the French social anthropologist who is also an expert on the culture of the Songhay tribe, has recently made a remarkable documentary film showing Songhay migrants back to the Ivory Coast from a visit to the Gold Coast. They are performing a dance learned from a Gold Coast cult group who believe in spirit possession and who help to arouse the necessary enthusiasm and suggestibility by drumming. One interesting feature of the film is that the devotees come to believe that they are possessed not by loa of ancient tradition, but by the personalities of important living beings. They even believe that the governor general of the Gold Coast and senior officers of the West African Rifles make a spiritual entry into them and mime their gestures realistically; also, oddly enough, the spirit influences include a railway engine, conceived as a demon, since many Songhays become casual workers on the Gold Coast railway. In the film the dancers are seen traveling onward the next day, sober and obviously benefited by their abreactive experience.[21]

All such methods of implanting or fortifying beliefs may have somewhat similar results. When Maya Deren is discoursing on the spiritual values of voodoo she might well be compared to a patient trying to discuss, in a reasonable and restrained manner, a now successfully completed psychoanalysis:

I would say that . . . it incorporates values with which I am in personal agreement, displays an organizational, psychic and practical skill which I admire, and accomplishes results of which I approve. I would further say, that I believe that the principles which Ghede and other loa represent are real and true. . . . It was this kind of agreement with, and admiration for, the principles and practice of Voodoun which was and is my conscious attitude towards it. pp. 823-24.

A comparison between the methods already described and those used by some primitive tribes all over the world to initiate and condition adolescent boys into religious societies should also be mentioned, because the underlying physiological principles do appear to have certain similarities. In such cases, however, the new attitudes to be implanted will be more consistent with their previous experience and general tradition of culture than in some of the other instances given in this chapter. Gustaf Bolinder, in *Devil-man's Jungle,*[10] describes how West African boys are taken away from their parents to an encampment in the woods, where all their clothes are removed and they are subjected to conditions of severe physical hardship. The procedure is suitably fear-provoking. First, they are given a medicine which, they are told, will certainly kill them sooner or later if they ever reveal the secrets of the society or the details of the ceremonies they are about to undergo. Next comes the ritual bath. At dusk they are lined up and told:

A life outside Poro is scarcely worth living. He who is not a member wanders about in the darkness. It is only through Poro that you realize what it is that you have to live for. He who wishes to become a member of Poro must say goodbye to life as he has lived it hitherto and be born afresh. p. 44.

In an increasingly terrified state, they now see the secret society's most frightening mask approaching them, with

staring eyes and bushy eyebrows, huge jaws like a crocodile in which his teeth shine red with blood. He is bearded like an old man and he has horns and feathers on his head and a shapeless figure – a cloak of fibres that has no resemblance to anything human. p. 44.

For the boys it is a real demon, but they are not allowed to utter a sound. They are laid side by side on the ground; then each in turn is seized by the demon's assistants and, almost unconscious with fright, lifted up and put between his jaws. They are then rescued and immediately given extremely painful ritual tattooing. The ceremony is accompanied by loud noises on wooden instruments.

Gradually the half-conscious novices recover their senses. They

feel convinced that the demon has made an end of them, but Poro has raised them to new life. p. 45.

A few days after the tattoo scars have healed the boys begin a prolonged training in the camp, intended to make them useful members of the tribe and the society in which they are now adepts. Childhood habits are dispersed. They learn, among other things, the correct attitude which they must in future adopt to their superiors, and increase their hardihood and fortitude by taking part in strenuous tests of endurance. Sex training is given them, with education in primitive handicrafts, carpentry, fishing, and the like: all of which amounts to a new conditioning process as members of their tribe and secret society.

Here again an overwhelming emotional stimulus carries the subject to the point of emotional collapse and increased suggestibility. And here again the fear-provoking stimulus is offset by a means of salvation – the benign Poro – to which the boy clings in his reconditioning process. Gustav Bolinder also reports:

Certain exercises are used to try and efface remnants of personal individuality or unorthodox ideas; these begin with monotonous movements of the body and conclude with mystical rites. The prime factor here is the dance, a dance anything but static; rather suggestive in its uniformity. . . . Round the tree the novices dance slowly with bowed heads. Now the booming wooden drums have taken up the accompaniment. Without a pause, slow and uniform, the dance continues hour after hour. In the end the novices are only semi-conscious, treading mechanically in the same everlasting rhythm. They are no longer on earth – they have become merged in the unity of the mighty forest demon and feel spiritually uplifted. p. 50.

Sir James Frazer in *The Golden Bough*[49] gives further examples of such initiation rites. He shows that some tribes in northern New Guinea, and many Australian tribes also, make circumcision an essential feature of the tribal initiation, and the initiation "is conceived by them as a process of being swallowed and disgorged by a mythical monster, whose voice is heard in the humming sound of

the bull-roarer." (The bull-roarer, also used by the ancient Greeks and called the *rhombos*, is a wooden instrument which, when whirled around the head on a cord, makes a sound like a roaring bull or a rising gale.) Various terrifying ways of being swallowed are then described; but the initiate is inevitably rescued. In one tribe

. . . he has now to undergo the more painful and dangerous operation of circumcision. It follows immediately, and the cut made by the knife of the operator is explained to be a bite or scratch which the monster inflicted on the novice in spewing him out of his capacious jaw. While the operation is proceeding, a prodigious noise is made by the swinging of bull-roarers to represent the roar of the dreadful being who is in the act of swallowing the young men. p. 694.

The same reconditioning process then takes place:

After they have been circumcised, the lads must remain for some months in seclusion, shunning all contact with women and even the sight of them. They live in the long hut which represents the monster's belly. When at last the lads, now ranking as initiated men, are brought back with great pomp and ceremony to the village, they are received with sobs of joy by the women, as if the grave had given up its dead. pp. 694-95.

One interesting detail about the use of such methods is Frazer's statement that several tribes in New Guinea use the same word for the rhombos, or bull-roarer, as for the monster who is supposed to swallow the novices, and whose fearful roar is represented by its noise. A close association of ideas may be established between the sound of the rhombos and the powerful ghost or ancestral spirit who swallows and disgorges the novice at his initiation. The rhombos or bull-roarer becomes, in fact, "his material representative on earth."

This use of the rhombos as a constant reminder of the power and presence of the god or ancestral spirit recalls Pavlov's discovery that most of the dogs which were nearly drowned in their cages during the Leningrad flood (see Chapter 2, p. 41), and had their

conditioned behavior patterns broken up by it, became highly sensitized to the sight of that trickle of water under the laboratory door. He could get at them afterward by merely emptying a bucket of water outside.

In highly civilized Christian countries today, a similar attempt is sometimes made to invest God's representatives on earth with as much religiously toned emotion as possible. But, in order to safeguard infants and young children against damnation, the rite of baptism, originally reserved for adults and a powerful ceremony indeed, is now carried out a few weeks or months after birth. Confirmation has, in general, taken the place of baptism as an initiatory rite, and among Protestants still provides a strong emotional stimulus for boys and girls at the age of puberty; but in Latin countries the "First Communion" also tends to be taken too early for full emotional effect. It seems certain that such stimuli should be made emotionally disturbing to produce their desired effect — even severe enough sometimes to induce mystical experiences. Once a mystical experience is associated with the Cross, or some other religious emblem, it can be revived and confirmed by the emblem's subsequent appearance.

Intellectual indoctrination without emotional excitement is remarkably ineffective, as the empty pews of most English churches prove; the social pressure which once sent even the agnostic or lukewarm to Sunday matins having long been relaxed. And recently we found ourselves welcoming a high-powered American fundamentalist who had come to win back for the churches the congregations that they had lost. What the force of religion could once be, even under civilized paganisms using effective methods, is shown by Frazer's account in *The Golden Bough* of the Syrian Astarte worship. The great festival of this goddess fell in early spring:

While the flutes played, the drums beat, and the eunuch priests slashed themselves with knives, the religious excitement gradually spread like a wave among the crowd of onlookers, and many a one did that which he little thought to do when he came as a holiday spectator to the festival. For man after man, his veins throbbing with the music, his eyes fascinated by the sight of the streaming

blood, flung his garments from him, leaped forth with a shout, and seizing one of the swords which stood ready for the purpose, castrated himself on the spot. . . . When the tumult of emotion had subsided and the man had come to himself again, the irrevocable sacrifice must often have been followed by passionate sorrow and life-long regret. This revulsion of natural feeling after the frenzies of a fanatical religion is powerfully depicted by Catullus in a celebrated poem. p. 350.

It does seem that most powerful religious movements are attended by physiological phenomena which cause intellectual disgust and dismay in nonparticipants. Thus Fox's blameless "Friends," whose faith was based on nonviolence, were given the sneering nickname of "Quakers" because they "shook and trembled before the Lord."

Men, women and little children at their meetings are strangely wrought upon in their bodies, and brought to fall, foam at the mouth, roar and swell in their bellies.[88] Knox, *Enthapian,* p. 150.

Fox himself reports in his Journal:[48]

This Captain Drury, though he sometimes carried fairly, was an enemy to me and to Truth, and opposed it; and when professors came to me (while I was under his custody) and he was by, he would scoff at trembling, and call us Quakers, as the Independents and Presbyterians had nicknamed us before. But afterwards he once came to me and told me that, as he was lying on his bed to rest, in the day time, he fell atrembling, that his joints knocked together, and his body shook so that he could not get off the bed; he was so shaken that he had not strength left, and cried to the Lord. And he felt His power was upon him, and he tumbled off his bed, and cried to the Lord, and said he never would speak against the Quakers more, and such as trembled at the word of God. p. 106.

The Quakers later settled down to become rich and respectable, abandoning the means by which they had built up their early spiritual strength. It is the fate of new religious sects to lose the dynamism of their "enthusiastic" founders; later leaders may improve the organization, but the original conversion techniques are often

tacitly repudiated. The wild militancy of General Booth's early Salvation Army is gone. The frantic scenes of the Welsh revival are forgotten in new and respectable chapels where the *hwyl* (a Welsh preaching device for exciting the congregation to religious frenzy by breaking into a wild chant) is now rarely heard. The surprise that Dr. Billy Graham's success has caused in Great Britain, where all he has to compete with is religious addresses aimed at the congregation's intelligence rather than its emotions, shows how widespread is the general ignorance of matters discussed in this book. Even in Christianity the "gift of tongues," sometimes only an incoherent babel, is still applauded by certain primitive sects as supposedly reproducing the experience of the Apostles at Pentecost, and great importance is placed in other religions, too, on the appearance of trance phenomena. This is shown by the attribution of divine wisdom to the Delphic oracle in classical Greece. It is shown in Tibet, where national policy was often decided by an oracle of the same sort. Harrer, in *Seven Years in Tibet*[67] describes how his Tibetan friend Wandüla took him to an official consultation with the oracle at the Nechung Monastery at Lhasa. A nineteen-year-old monk was the mouthpiece of the oracle at that time, and Harrer remarks:

. . . It was always a curious experience to meet the State Oracle in ordinary life. I could never quite get accustomed to sitting at the same table with him and hearing him noisily gulping his noodle soup. When we met in the street, I used to take off my hat and he bowed and smiled in return. His face was that of a nice-looking young man, and bore no resemblance to the bloated, red-flecked, grimacing visage of the ecstatic medium. p. 182.

Harrer gives details of what happened when the oracle fell into a trance; and wondered whether drugs or any other means were used to induce it:

. . . the monk has to be able to dislodge his spirit from his body, to enable the god of the temple to take possession of it and to speak through his mouth. . . . Hollow, eerie music greeted us at the gate of the temple. Inside the spectacle was ghastly. From every

wall looked down hideous, grimacing faces, and the air was filled with stifling fumes of incense. The young monk had just been led from his private quarters to the gloomy temple. p. 180.

Here is Harrer's description of the actual possession:

The trembling became more violent. The medium's heavily laden head wavered from side to side, and his eyes started from their sockets. His face was swollen and covered with patches of hectic red. . . . Now he started beating on his gleaming breastplate with a great thumb-ring, making a clatter which drowned the dull rolling of the drums. Then he gyrated on one foot, erect under the weight of the giant head-dress, which just now two men could hardly carry. . . . The medium became calmer. Servants held him fast and a Cabinet Minister stepped before him and threw a scarf over his head. Then he began to ask questions carefully prepared by the Cabinet about the appointment of a governor, the discovery of a new Incarnation, matters involving war and peace. The Oracle was asked to decide on all these things. pp. 181-82.

Harrer goes on to say that he attended many consultations of the oracle, but had "never been able to arrive even at an approximate explanation of the riddle."

Some persons can produce a state of trance and dissociation in themselves, or in others, with a decreasing need for strong and repeated emotional stresses, until it may become so much a conditioned pattern of brain activity that it occurs with only minor stresses and difficulties; for example, in the primitive religious context, at the renewed beat of a drum, or the screaming roar of the rhombos.

States of possession or trance have also been used by numerous religions to try to help the spectator, as well as the possessed person, accept the relevant doctrine as true. If the trance is accompanied by a state of mental dissociation, the person experiencing it can be profoundly influenced in his subsequent thinking and behavior. Even if the spectators remain unmoved and devoid of any emotional excitement, it may still help to persuade some of them of the truth of the belief professed, especially if they have been led to think that a trance means that the person concerned is now pos-

sessed by, or in communication with a certain god. When the modern spiritualistic medium in her suburban house uses messages from dead relatives, or from the ghost of an Indian fakir, or from a child-like spirit called Forget-me-not, to help to create faith in spiritualism, the same mechanisms may be seen in operation as when the State Oracle of Tibet gyrates and clatters in the Nechung Monastery, or as when the drugged Pythoness of Delphi, her face distorted by Apollo's divine possession, raged on her tripod, pouring out a stream of confused prophecy which the priest in charge, if suitably paid, turned into hexameters for the visitant.

The proof of the pudding lies in the eating. Wesley changed the religious and social life of England for the better with the help of such methods in a modified and socially accepted form. In other hands and other countries they have been used for sinister purposes. But one can be thankful that there have always been scientifically curious people in all ages prepared to examine and report on the actual results obtained before condemning the use of such methods out of hand. Thomas Butts has this to report about Wesley's preaching as early as 1743:[17]

As to persons crying out or being in fits, I shall not pretend to account exactly for that, but only make this observation: it is well known that most of them who have been so exercised were before of no religion at all, but they have since received a sense of pardon, have peace and joy in believing, and are now more holy and happy than ever they were before. And if this be so, no matter what remarks are made on their fits. p. 135.

Wesley found that the important conversions recorded in the New Testament were sudden ones, and certainly the account given in the Acts of the Apostles (Chapter 2) of Peter's sermon at Pentecost also emphasizes the effectiveness of the religious methods discussed in this chapter. No less than three thousand converts are said to have been added that day to the very small group of Apostles and other believers who remained faithful after Jesus's farewell on the Mount of Olives. The chapter begins:

And when the day of Pentecost was fully come, they were all

with one accord in one place. And suddenly there came a sound from heaven as of a rushing mighty wind, and it filled all the house where they were sitting. And there appeared unto them cloven tongues like as of fire, and it sat upon each of them. And they were all filled with the Holy Ghost, and began to speak with other tongues, as the Spirit gave them utterance . . . (and) . . . every man heard them speak in his own language.

Peter then rises and begins to preach. He adds further tension to an audience already half stupified by the news of that strange Gift of Tongues. In a very powerful speech he announces that they are now watching what has long been foretold by the prophets. He quotes the prophet Joel:

And it shall come to pass in the last days, saith God . . . I will shew wonders in heaven above, and signs in the earth beneath; blood, and fire, and vapour of smoke: The sun shall be turned into darkness, and the moon into blood, before that great and notable day of the Lord come: And it shall come to pass, that whosoever shall call on the name of the Lord shall be saved.

Then he flings an emotional thunderbolt at his scared and excited listeners. He tells them that Jesus of Nazareth was "a man approved of God among you by miracles and wonders and signs," whom the chief priests had handed over to the Romans to be "crucified and slain by wicked hands." He makes them understand just who the man was whom they had allowed the chief priests to hand over for crucifixion to their Roman patrons, but whom God had now raised up from the dead. By not making a mass protest, however busy they may have been on preparing for the Passover, they have become, he insists, murderers in the second degree.

Therefore let all the house of Israel know assuredly, that God hath made that same Jesus, whom ye have crucified, both Lord and Christ.

Peter's audience had now come to believe that the Gift of Tongues was a sign from God, God who, in accordance with eschatological prophecy, had darkened the sun at the Crucifixion and turned the

moon to the color of blood, with a fearful dust storm from Elam. Now they are assured that the victim was God's representative on earth and they cannot escape the guilt of his death. It is therefore easy to understand how

. . . when they heard this, they were pricked in their heart, and said unto Peter and to the rest of the apostles, Men and brethren, what shall we do? Then Peter said unto them, Repent, and be baptized everyone of you in the name of Jesus Christ for the remission of sins, and ye shall receive the gift of the Holy Ghost. . . . And with many other words did he testify and exhort, saying, Save yourselves from this untoward generation. Then they that glady received his word were baptized: and the same day there were added unto them about three thousand souls.

New beliefs and habits now seemed readily imposed on the converts:

And they continued steadfastly in the apostles' doctrine and fellowship, and in breaking of bread, and in prayers. And fear came upon every soul: and many wonders and signs were done by the apostles. . . . And the Lord added to the church daily such as should be saved.

The case of Saul on the road to Damascus confirms our other finding: that anger may be no less powerful an emotion than fear in bringing about sudden conversion to beliefs which exactly contradict beliefs previously held. Acts, Chapter 9 tells us:

And Saul, yet breathing out threatenings and slaughter against the disciples of the Lord, went unto the high priest. And desired of him letters to Damascus to the synagogues, that if he found any of this way, whether they were men or women, he might bring them bound unto Jerusalem. And as he journeyed, he came near Damascus: and suddenly there shined round about him a light from heaven: And he fell to the earth, and heard a voice saying unto him, Saul, Saul, why persecutest thou me? And he said, Who art thou, Lord? And the Lord said, I am Jesus whom thou persecutest: it is hard for thee to kick against the pricks. And he trembling and astonished said, Lord what wilt thou have me to do?

A state of transmarginal inhibition seems to have followed the acute stage of nervous excitement. Total collapse, hallucinations and an increased state of suggestibility appear to have supervened. Other inhibitory hysterical manifestations are also reported:

And Saul arose from the earth; and when his eyes were opened, he saw no man: but they led him by the hand, and brought him into Damascus. And he was three days without sight, and neither did eat nor drink.

This period of physical debilitation by fasting, added to Saul's other stresses, may well have increased his anxiety and suggestibility. Only after three days did Brother Ananias come to relieve his nervous symptoms and his mental distress, at the same time implanting new beliefs:

And Ananias went his way, and entered into the house; and putting his hands on him said, Brother Saul, the Lord, even Jesus, that appeared unto thee in the way as thou camest, hath sent me, that thou mightest receive thy sight, and be filled with the Holy Ghost. And immediately there fell from his eyes as it had been scales: and he received sight forthwith, and arose, and was baptized. And when he had received meat, he was strengthened.

Then followed the necessary period of indoctrination imposed on Saul by the brethren at Damascus, and of his full acceptance of all the new beliefs that they required of him.

Then was Saul certain days with the disciples which were at Damascus. And straightway he preached Christ in the synagogues, that he is the son of God. But all that heard him were amazed, and said; Is not this he that destroyed them which called on this name in Jerusalem, and came hither for that intent, that he might bring them bound unto the chief priests?

At all events, the most striking and momentous individual conversion, and the most far-reaching mass conversion in the history of the early Church are both recorded in the Acts in terms consonant with modern physiological observations, and the authorship of the

Acts is attributed to St. Luke who was himself a physician. It would therefore be foolish to underestimate the efficiency of such methods. Not only have they assisted in the emergence of Christianity as the leading religion of the Western world today; but they have been used, time and time again, to reinforce numerous other types of religious and political belief – which will be discussed in the rest of this book.

6 APPLICATIONS OF RELIGIOUS TECHNIQUES

Homer's epics are still being published in many languages nearly three thousand years after they were first composed. His readers throughout the centuries have been brought up in quite different social and religious environments, yet the psychological types, and the normal and abnormal behavior patterns he describes in his heroes, are still easily recognized. Often his descriptions of mental conflicts make us feel that he is describing our own.

If our temperaments and modes of thought were so largely the result of environment, upbringing, and the exercise of "free will" as some people think, the behavior of characters in ancient literature could mean very little to us. Yet, as Ben Jonson[85] showed in his "Humour" comedies, there was no noticeable difference between the basic temperamental types of the Jacobean age and those described by Hippocrates some two thousand years before; and Jonson's plays still play to packed houses. Basic behavior patterns in man are indeed more dependent on our inherited higher nervous systems than we sometimes care to admit. The personality can react only along limited lines to all environmental changes and to a life full of stresses. If stress be severe enough, the most secure and

stable personality can show symptoms of anxiety, hypochondria, depression, hysteria, suspiciousness, excitement, anger or aggressiveness, and the list is then almost complete.

Since, therefore, the same basic patterns of reaction to stress were all noted in the classical era, if not for thousands and thousands of years previously, and since their equivalents can also be demonstrated in the behavior of animals, they are most likely, it seems, to be physiologically determined. Moreover, physiological treatments can be shown to be most effective in ridding ordinary brains of previous patterns of behavior and thought; and it has been pointed out repeatedly in this book that in abnormal persons and in the overmeticulous, particularly violent physiological treatments may be needed if firmly fixed delusions and obsessional habits are really to be changed at all.

In 1902 William James in *The Varieties of Religious Experience*[82] wrote about states of deep spiritual depression:

> *But the deliverance must come in as strong a form as the complaint, if it is to take effect; and that seems the reason why the coarser religions, revivalistic, orgiastic, with blood and miracles and supernatural operations, may possibly never be displaced. Some constitutions need them too much.* p. 162.

The cure for the most severe types of religious melancholia, for which nothing could be done in James's day, has turned out to be even more drastic than he predicted. Melancholics, whom even orgiastic revivals leave cold and unimpressed, are now quickly benefited by simple physiological convulsions, mechanically induced by passing an electric current through the brain.*

*John Wesley was, interestingly enough, a great believer in electrical treatment, though not given to the point of producing a convulsion. A Leyden jar that was used for this purpose can be seen in Wesley's Museum, City Road, London. Starting in 1756, special clinics for this treatment were provided at Moorfields, Southwark, St. Paul's, and the Seven Dials. Wesley writes in almost a modern vein:

> Hundreds, perhaps thousands, have received unspeakable good; and I have not known one man, woman or child, who has received any hurt thereby; so that, when I hear any talk of the danger of

Wesley's preaching could stir up such a state of external or internal excitement in some types of people that brain inhibition finally supervened and they collapsed from emotional exhaustion. Voodoo dances, drums, and other similar methods producing feelings of conversion to, and possession by, gods, can also cause such states of brain excitement in suitable subjects. Many kinds of spiritual healers seem to use the same basic technique with differing interpretations added. In Tripoli, for instance, Alberto de Pirajno in *A Cure for Serpents*[32] describes the treatment of a girl suffering from melancholia supposedly "caused by a dark and evil spirit." A large frog with henna-tinted legs was said to contain the *jinn* or spirit which gave the native healer his power to heal "without medicine by provoking curative convulsions in sick people." The method required the depressed person to dance to the point of frenzy for hours on end, to beating drums and rhythmic singing, and a mounting group excitement till "a stream of foam and sweat ran down from the corners of her mouth." With a "piercing shriek" the patient finally flung herself on the ground, was stripped of her clothes, and repeatedly plunged into water.

Naked, the girl seemed to be made of ivory as she hung between the smoke-black arms of the negresses who carried her towards the tub. . . . When I saw the girl again, she was wrapped in a blanket and her expression was completely altered. . . . She smiled ecstatically and cast her eyes heavenwards . . . and smilingly received the congratulations of her friends, as they led her to the magician's feet. The faqth *had not moved at all throughout the seance, except to take on his lap the frog with the henna-tinted legs.* p. 46-47.

Electric convulsion therapy for depressed patients also seems to belong to this same physiological category; because here the pa-

being electrified (especially if they are medical men who talk so), I cannot but impute it to great want of either sense or honesty.

And he also said:

> We know it is a thousand medicines in one; in particular, that it is the most efficacious medicine in nervous disorders of every kind, which has ever yet been discovered.[183] Tyerman, Vol. II, p. 162.