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THE SCIENCE OF HUMANITY

THE
SCIENCE OF HUMANITY

K. G. COLLIER

Foreword by Sir Fred Clarke

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CONTENTS

FOREWORD BY PROFESSOR SIR FRED CLARKE	xi
PREFACE	xv

PART ONE

THE SCIENCE OF HUMAN NATURE

I	SCIENCE AND THE PROBLEM OF HUMAN NATURE	3
	1 What this Book is about	3
	2 The Nature of Man : the Problem	6
	3 The Definition of Science	10
II	THE PHYSICAL BASIS OF HUMAN NATURE : HUMAN HEREDITY	17
	1 The Growth of a Living Body	17
	2 The Mechanism of Inheritance	19
	3 The Application of Mendel's Principles to Human Inheritance	21
	4 Statistical Foundations	22
	5 Human Inheritance	28
III	THE PHYSICAL BASIS OF HUMAN NATURE : THE BRAIN AND THE SENSES	32
	1 Mapping the Functions of the Brain	32
	2 The Structure of the Brain	34
	3 The Senses	35
IV	THE PHYSICAL BASIS OF HUMAN NATURE : THE EVOLUTION OF MAN	37
	1 The Reality of Gradual Evolution	37
	2 The Mechanism of Evolution	41
	3 The Origin of Life and the Origin of Man	45

CONTENTS

V	THE PHYSICAL BASIS OF HUMAN NATURE :	
	INSTINCT IN MAN	49
	1 The Meaning of Instinct	49
	2 Instinct in Man	50
	3 Gregariousness and the Conditioned Reflex	53
VI	THE PHYSICAL BASIS OF HUMAN NATURE : THE	
	INFLUENCE OF THE ENDOCRINES	58
	1 How the Endocrine Glands work	58
	2 Endocrines and Temperament	63
	3 Other Experimental Work on the Physical Basis of Temperament	65
VII	THE NATURE OF INTELLIGENCE	68
	1 The Meaning of Intelligence	68
	2 The Statistical Approach	72
	3 The Perception of Relations	77
	4 The Measurement of other Abilities	80
VIII	THE UNCONSCIOUS	83
	1 The Development of Freud's Ideas	83
	2 Evidence for Freud's Views	87
	3 Projection	91
IX	THE ANTHROPOLOGISTS' CONTRIBUTION TO THE	
	UNDERSTANDING OF HUMAN NATURE	98
	1 Tribal Life	98
	2 Explaining the Differences between the Tribes	105
X	THE SUPREME INFLUENCE OF VALUES : THE	
	INDIVIDUAL AND HIS UPBRINGING	108
	1 The Methods by which Values exert their Influence	108
	2 The Sources of Values	113

CONTENTS

	3	Compulsive Values	117
•	4	Conditions under which Parental Values are Modified or Rejected	120
XI THE SUPREME INFLUENCE OF VALUES : THE INDIVIDUAL AND THE COMMUNITY			
	1	The Relation of the Individual's Values to those of the Community as a whole	123
	2	The Projection of Benevolence	134
XII SCIENCE AND VALUES			
	1	The Nature of the Human Mind	138
	2	Science and Human Nature	149
	3	Conclusions	153

PART TWO

THE SCIENCE OF HUMAN SOCIETY

XIII		THE HUMAN CRITERIA OF SOCIAL DEVELOP- MENT	157
	1	Local <i>versus</i> Universal Values	157
	2	Methods of ascertaining Local Values	159
	3	Values current in Britain	166
XIV SOCIAL EVILS OF ECONOMIC ORIGIN			
	1	Starvation and Poverty	170
	2	Unemployment and Economic Insecurity	175
	3	Unsatisfying Work	177
XV SCIENTIFIC METHOD IN ECONOMICS : THE CAUSES OF SLUMPS			
	1	The Choice of Economic Problems	195
	2	Analysis of the National Income	196
	3	The Problem of Under- and Over- employment	210
	4	The Trade Cycle	217

CONTENTS

XVI	SCIENTIFIC METHOD IN ECONOMICS: THE SWING TO OVER-EMPLOYMENT	225
1	The Elimination of Chronic Unemployment	225
2	The Relation between Employment and Foreign Trade	228
3	Over-employment and the Standard of Living	237
4	Operational Research	239
5	Scientific Method in Economics	244
XVII	WAR AND WORLD ORDER	247
1	The Problem Analysed	247
2	Motives for Fighting between Individuals	247
3	Conditions of Self-restraint in a Stable Society	250
4	Motives leading to War between Nations	254
5	Conditions of Restraint on the International scale	258
6	Practical Conclusions	260
XVIII	THE INFLUENCE OF SOCIAL STRUCTURE ON HUMAN CHARACTER	262
1	The Influence of Economic Structure	262
2	The Influence of City Life	269
3	The Price of Liberty	276
4	The Crisis of Civilisation	278
5	The Future of Civilisation	280
XIX	SCIENCE AND CIVILISATION	288
1	The Field and Boundaries of Science	288
2	Science as a Human Activity	290

CONTENTS

PART THREE

STUDYING A COMMUNITY IN ACTION

Suggestions for a practical course

(A)	HOW THE MATERIAL NECESSARIES OF LIFE ARE PRODUCED	303
1	Farming	303
2	Manufacturing Industry	306
3	Public Services	310
4	Finance	312
(B)	HOW THE COMMUNITY LIFE OF THE DISTRICT IS CONDUCTED	316
1	The Variety of Communities to which each Individual belongs	316
2	The State's Job of maintaining Law and Order	317
3	The State's Job of Government	319
4	Social Structure	321
	REFERENCES AND FURTHER READING	327
	INDEX	337

FOREWORD

by

PROFESSOR SIR FRED CLARKE

*Formerly Professor of Education in the University of
London, and Chairman of the Central Advisory
Council to the Ministry of Education*

I WELCOME the invitation to write a Foreword to this courageous book. It can be so described since the author is so evidently aware of the magnitude and the difficulties of the task he has undertaken. Were he not so aware he would have been less cautious in his formulations and less modest in his estimate of what he has achieved.

There can be few now among those who view at all thoughtfully the movements of our contemporary world, who do not realise that a profound revision of culture is taking place. There will be few, too, who will not agree with Mr Collier that the compelling force which has made revision necessary is the 'absorption' of science into the mind and life-conditions of modern man.

We must speak of revision rather than of the creation of a 'new' culture. This latter way of speaking implies not only a rejection of too much of the legacy of the past, it implies also an exaggerated estimate of human foresight and capacity to control events. The truth is that cultural revision, forced upon us by circumstance as it is, and achieved piecemeal, often against resistance, must be at best a somewhat haphazard proceeding. Confident prophecy is dangerous in the extreme; we must reject the soothsayers, though if we think at all, we shall arrive at some conjectures. As for the actual control of events, evidence accumulates all around us of the strict limitations within which hopes must be confined, and of the many incalculable factors which must

FOREWORD

inevitably upset, or at least disturb, the working of the most carefully devised plans.

What then can we do, remembering that what we contemplate is not an objective spectacle from which we can stand detached, but the very stuff of our lives in which our existence is immersed?

I should answer that we can do what Mr Collier has set himself to achieve in this book, *correct our perspective and make sure of our criteria*. That the two aims are but aspects of a single purpose is made clear enough in the book itself. Relations and emphases within the corrected perspective will be as required by the criteria we apply: the criteria will be such as we arrive at by the application of reason to experience of our world and of ourselves.

In regard to both aspects the prominence given to science in Mr Collier's analysis is well-justified. It is not easy to determine at the moment which of the two contrasting needs is the more urgent. On the one hand there is still much to be done before we can be sure that those who play their part in the common life, especially those in high places, have had an education which equips them to understand and appreciate the impact of science upon life in the world of today. On the other hand, the danger that the limitations of the place of science in any total interpretation of human life and destiny may be overshot, grows more and more imminent. (It is by no means confined to the half-educated.)

It is an outstanding virtue of Mr Collier's book that he keeps the twofold need steadily in mind and builds up a synthesis which may be offered as a tentative solution. Most readers will agree with him that old and young alike, as they too strive to achieve perspective and frame sound criteria, should use the data of their own experience, constantly adding to the stock and exercising over it all a habit of critical reflection. But even to those who practise the habit only to a small extent the book will have value. At least it states the issues clearly and offers an answer which should carry conviction to many. I would commend especially that brief statement of what Mr Collier would regard as the 'ideal

FOREWORD

personality' which appears on pp. 282-3. I find myself in substantial agreement with it, and appreciate its value as a formulation of the goal to which educational effort must now be directed.

The book should prove serviceable, as the author hopes, to Sixth Form pupils, who have arrived at the stage where they feel the need for a synthesis, however preliminary and tentative. Personally I am sure that it will be especially valuable for the training of teachers, particularly of those who will be responsible for the education of the bulk of the adolescent population in what are now known as the secondary modern schools.

The essence of the whole great matter is perhaps conveyed, very concisely, in the quotation from Pascal which is given on p. xiv overleaf. May the book serve to restore in some degree that healthy tension in the consciousness of man which keeps him aware both of his affinity to the brutes as subject to Nature, and of the majesty of his calling as image of God. If that tension breaks, or sags unduly, he is in danger of falling, not to the level of the brutes, but to something even lower. We should have realised that by now.

It is dangerous to make a man see too clearly how nearly he is akin to the brutes without showing him his greatness. It is still more dangerous to leave him in ignorance of both.

PASCAL

[In a science of man] we must glean up our experiments from a cautious observation of human life, and take them as they appear in the common course of the world, by men's behaviour in company, in affairs and in their pleasures. When experiments of this kind are judiciously collected and compared, we may hope to establish on them a science which will not be inferior in certainty, and will be much superior in utility, to any other of human comprehension.

HUME

PREFACE

THIS book is frankly experimental. It has been written by a man whose job is education, whether of children or of adults, and it naturally bears the stamp of its origin. But it is not a textbook in the ordinary sense. Rather it is a framework of study, a guide and commentary. I believe there is a great need for something of this kind on the science of human affairs.

It is hoped that the book will have an appeal for a wide range of readers. It is directed in the first instance to the intelligent adult who wants to know what science has to say on the human situation. In particular I hope that it will be used by those who are members of adult classes.

The inquiring adult may come from a variety of backgrounds. In some cases he will have had a scientific or technical training which he has since come to regard as too exclusively occupied with physical or biological science or technology. Yet this has impregnated his mind with the ideals of science, and he finds himself suspicious of the pronouncements of writers without a scientific background and a marked strain of scientific scepticism. Another reader will come to the subject without having been taught any science, simply because he has been impressed with the achievements and confident claims of the scientists. In this case it may be as well for me to reassure him in advance over the mathematical sections : if he does not like mathematics he can skip the lot ! It is not necessary to work through all the calculations to follow the general argument of the book.

But I have also designed the book with a view to its systematic use in Universities, Teachers' Training Colleges, and the Sixth Forms of Grammar Schools. I do not think this is an extravagant claim : there is a good deal of material in the book, and my experience with various types of class leads me to suppose that, if judiciously selected to suit age

PREFACE

and experience and mathematical capacity, it should provide the basis of courses for a number of different kinds of student.

Some readers possibly may object that Grammar School pupils have not had the experience of life to tackle the subject systematically.

I would agree with them that it is idle to try to carry your pupils very far from first-hand experience in any subject. The biggest obstacle to all education is certainly the difficulty of building it on sufficiently profound experience. But in my view it is not only possible but eminently practicable and desirable to give sixth forms all the experience that is necessary for initiation into the studies of this book. I would say that the first third of the total time spent on the course should be devoted to the gathering and recording and discussion of suitable experience. For this reason I have added the section at the end of the book 'Studying a community in action.'

Even for a class of graduates or members of the W.E.A. I would emphasise the importance of an experience-gathering stage. Keynes once wrote of Malthus that he 'began to be interested [in economics] as a philosopher and moral scientist,' and 'immersed himself . . . in the facts of economic history and of the contemporary world,' 'filling his mind with a mass of the material of experience.' The first stage in the scientific study of any subject is that of preliminary observation. You soak yourself in the subject and get to know the kinds of experience and problem it has to offer.

To some extent of course we have all conducted first-hand observations on human affairs long before we have heard of science, in the mere business of daily living. But the drawback of casual experience is that it is certain to be one-sided. If we have been brought up in a city slum, or a trim suburb, or a country house, our observation is patently going to be distorted by our social background and to need correction. This is why I regard a practical course as important even for adults.

PREFACE

I am aware of various deficiencies in the book. The scope of the subject is very wide—too wide for a single person to master it in detail in all its branches. Some of the more specialised sections have been read by friends who are experts on those subjects ; but they cannot be held responsible for faults of interpretation and emphasis. It is the perspective that is most important, and is most liable to be distorted by personal bias. I have attempted as far as possible to be impartial, but beyond a certain limit I think the only thing we can do is to bring our bias out into the open and allow for its effects. In any case I hope that such prejudice as I display will serve to provoke readers the more vigorously to argue and think about these subjects for themselves.

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Secondly I must thank the editors and publishers of the following journals for permission to incorporate parts of certain articles of my own : *The Sociological Review* ; *The Hibbert Journal* ; *The Listener*.

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PART ONE
THE SCIENCE OF HUMAN NATURE

CHAPTER I

SCIENCE AND THE PROBLEM OF HUMAN NATURE

I WHAT THIS BOOK IS ABOUT

THE world today is plagued with uncertainty and frustration. Everywhere people show themselves to be more clearly aware of what they will fight against than what they will fight for. It is commonly felt that mankind possesses the technical power and the resources to give everybody a reasonable standard of living ; and yet somehow this never comes off. Instead we waste our wealth on war, or on preparing for war. Nobody wants another world conflict ; yet everybody is apprehensive of one. Mankind is more profoundly and bitterly divided than has been the case for many centuries. We seem to be in the grip of forces that we fear and hate, but cannot control. Can we even identify them ? Does the cause of our failure lie in economic or political organisation, or in a temporary collapse of morale, or in some permanent defect of human nature ? In an insufficient use of reason, or in a weakened sense of religion ? Everywhere people are haunted by these questions, and many in their perplexity look to science for an answer ; for of all the living movements of human thought science alone continues to gain momentum in spite of wars and revolutions ; science alone seems to promise unlimited future growth.

What do people expect to find in science when they put these momentous questions ? It depends on their background. They must in any case have been impressed with the results of science and feel that it has a special contribution to make in human affairs. But those who have had no scientific or technical training will be much less precise in their expectations than those who have. The instructed, however, in a case like this may not be in a better position

THE SCIENCE OF HUMAN NATURE

for forming a correct judgment than the uninstructed. Many of them have had experience of scientific method only in the physical sciences and the simpler parts of biology, and on this account have acquired quite false views of its potentialities in human affairs. Some of them regard it as totally inapplicable ; others imagine it to be capable of yielding results as certain and simple as those of the physical sciences. Few appreciate both the wide scope of scientific method in this field and the statistical and tentative nature of the results obtainable.

But whether these inquirers have had any scientific training or not, their main interest is to learn what science has to say about the human situation. From their standpoint I can state the two chief objects of this book as, first, to show how scientific method has to be adapted when it is applied in human affairs ; and second, to sum up the results to date of scientific work on a number of important human problems.

But these are not my only objects in writing the book. I hold that science has not only great potentialities, but great limitations ; and I regard it as essential to explore not only the potentialities, but the limitations. This means that we must examine what kinds of question it is appropriate to ask when we tackle human problems from a scientific angle, and what kinds of question cannot of their very nature be answered by the scientific method. Intellectual and technical power can be as intoxicating as political or military power ; and scientific method is a weapon whose potency has turned the heads of a great many people.

But intellectual intoxication is not its only danger. The study of human nature and society demonstrates beyond doubt that the most important single characteristic of a community is its code of values, its convictions about good and evil. And nothing can be clearer than that science has had, directly or indirectly, a vast influence on the values of Western civilisation. The fact is that the present explosive condition of the human world is due in large part to the impact of science. Every serious challenge to man set by the twentieth century has been either generated or fostered

SCIENCE AND THE PROBLEM OF HUMAN NATURE

by science. It is therefore equally essential to attempt to trace the more important changes that science has already brought about in our civilisation.

In these last two matters I have a great deal of sympathy with the opponents of science. There are a great many people who distrust the influence of science, and distrust it profoundly. I hope, therefore, that they too will read this book ; for I feel that they will learn something of the good that it can do for mankind when it is properly harnessed, and perhaps help to see that it is rightly used.

It becomes clear that if we are to estimate both the value and the limitations of scientific techniques in the human sphere we must not be afraid to tackle the fundamental problems of modern man. I propose, therefore, to plunge straight into the matter of the book with the question : what are the major evils of the modern world? I suggest the following list—before you look at it you should try writing one out for yourself :

Economic and political : war and the lining up of mankind in two opposite camps ; mass unemployment ; poverty amidst plenty during a slump ; economic insecurity ; unsatisfying work ; the growth of bureaucracy ; the common occurrence of starvation and malnutrition in many parts of the world.

Psychological and moral : widespread selfishness and irresponsibility, apathy, resentment, and the rejection of law ; the decline of spontaneous co-operation in industrialised countries ; in short, a decay of civilised values and a rising tide of evil.

What has science to say about these things ? As soon as we ask how, or whether, science can prescribe any remedies for them, we realise that we have first to settle the question : where do we want to go ? We know we want to get away from these evils ; but are we sure we know what haven or promised land we want to attain ? Where does human happiness lie ? What is good for human beings ? What are good and evil ? These are fundamental questions which we

THE SCIENCE OF HUMAN NATURE

cannot escape. They determine the purpose of the first half of this book : to draw a picture of human nature which sticks as closely as possible to the evidence that we see to be scientifically established ; for without knowing how human beings are constituted we cannot have any foundation for concluding what is ' good ' or ' bad ' for them. We shall, in fact, be trying to sum up how far Hume's ideal, quoted on page xiv of this book, has been, or is capable of being, fulfilled.

We shall then in the second half return to the question of the causes and remedies for our social evils.

2 THE NATURE OF MAN : THE PROBLEM

The question that faces us in Part One of the book is the great problem of human nature. It is a vast and complicated subject, and before we can begin any fruitful discussion of details we must see what it is that we are up against as a whole. We can pick out three main aspects of the question, involving conflicting types of evidence :

- (a) What is the relation of man to other animals ?
- (b) What is the relation between the mind and the body ?
- (c) What is the nature of conscience and freewill ?

(a) *What is the relation of man to other animals ?* Is he a glorified ape, a little cleverer at satisfying his instincts than the rest of the animal world ? Or are there fundamental differences ? As we discuss the evidence we have to bear in mind the two sides to the question. We have many profound resemblances to the other mammals, particularly the ape : we have very similar skeletons ; our physical processes of breathing, eating, excretion, and reproduction, are almost exactly the same ; our organs of sight and hearing are similarly constituted ; and we share with them inborn urges to feed ourselves, to fight, to escape danger, to have offspring. On the other hand we have profound differences : we can think abstractly—we can carry abstraction to the extraordinary degree

SCIENCE AND THE PROBLEM OF HUMAN NATURE

revealed in higher mathematics or abstruse philosophy. We create art—great music, great novels, great films, great buildings. We have religions, worship gods. We have a conscience, a sense of moral obligation. Men at their worst, in brutality or lust, seem to be more dreadful than the beasts ; yet we also see men with open eyes and cold calculation submitting themselves to torture and death for abstract ideals that they can never see realised.

In analysing our likeness to animals we must not forget the differences, or *vice versa*.

(b) *What is the relation between the mind and the body?* Can the mind exist, or operate, independently of the body? Here we have several types of evidence to take into account :

(i) The body certainly affects the mind. Alcohol progressively reduces the co-ordination of your mind and your body to lower and lower levels until you are laid flat on the floor. The failure of a gland in a man's body may turn him into an old man in a day.

(ii) The mind also affects the body. A man undergoing psychiatric treatment to work out an unconscious memory of a painful incident may reproduce on his body weals or other marks corresponding to those of the original incident. Under hypnosis it is possible to raise a blister on a man's skin by touching it with a pencil and telling him it is a lighted cigarette.

(iii) We have to consider the relation between the impressions registered by the senses, which are physical organs in the body, and the ideas that pass through the mind. In discussing the subtle question involved we have to remember that indulgence in alcohol may lead you to see pink rats that are not there : your eyes register impressions that do not correspond with the outside world. Equally, keen expectation or anxiety may lead you to perceive what is not there. When you are apprehensive of the arrival of bad news every noise sounds like the door-bell. Furthermore, we habitually use general ideas, of a circle say, or honour, which correspond to no particular object in existence : the mind has ideas that,

THE SCIENCE OF HUMAN NATURE

though derived from its sense-experience, are somehow detached from it.

(iv) There is the possibility of the mind's acquiring knowledge independently of the senses, by such means as telepathy and clairvoyance.

Once again we have to remind ourselves in handling any one section of the evidence, that there are other facts that bear quite a different complexion.

(c) *What is the nature of conscience and freewill?* The third great question that needs to be faced is that of conscience and freewill. Is conscience merely the voice of custom, or convention, or may it contain the voice of God? In what sense are we 'free' to follow the recommendations of our conscience? Again we have a number of separate strands of evidence to bear in mind.

(i) Standards of behaviour vary conspicuously from one country to another: what is right to an Englishman may well be wrong to a Solomon Islander, and *vice versa*. On the other hand there is a good deal of agreement among the wise men of the world's history on a number of values which they claim to be valid for all men at all times. What is the relation of local and relative values to those that are absolute and universal? How are the individual's values related to those of the society in which he grows up?

(ii) We are conscious of having no difficulty in choosing whether to go one way or another for a walk. Yet we know that however much we try we may be unable to cure ourselves of pulling our drive at golf. In some situations we seem to be free, in others not. Beyond this we know that unconscious urges may lead a man to perform actions that, since he is unconscious of his real motives, he puts down to quite false reasons. And yet we also know that there are some people we meet who give us a strong impression of being free from rigid prepossessions or unconscious compulsions, of coming to a fresh person or problem without prejudice. An outstanding man may give an impression of this kind

which, though entirely personal and subjective, is overwhelming and is felt by a large number of people.

These are the questions that face us. Before we go any further I think I should say plainly what my own bias is. Being a professing Christian I believe that human beings have a soul as well as a body ; but I reached this conclusion before I became a Christian, on the strength of the evidence that I am presenting in the following pages. I hold that a man's nature is certainly conditioned by his physical constitution ; but that the crucial factor in determining his character and outlook is the human society that he grows up in. I also feel that, just as the thinkers of the Middle Ages concentrated too exclusively on human reason and freewill in their analysis of man's nature, so in our time we have focused our attention too narrowly on the physical side, and have often lost sight altogether of the facts and effects of deliberate choice, of belief in a loving God or an absolute moral law. Fortunately, however, this lop-sidedness appears now to be undergoing correction, mainly under the influence of the anthropologists. Nevertheless it is also my conviction—or this book would not have been written—that science has a great part to play in the understanding of human nature and society ; it is this role of science which we shall be exploring in the following pages.

As regards the second half of the book I must admit to having fairly definite views on politics. These are perhaps best described by the phrase coined by Lord Beveridge at the 1945 election : Radical Liberal. But I believe that economic and political policies can only succeed in so far as they conform to the facts of human nature and society, and accordingly that science has in this sphere also a great part to play in helping us to understand and overcome our problems. This brings me to my next task : the definition of science.

THE SCIENCE OF HUMAN NATURE

3 THE DEFINITION OF SCIENCE

What do we mean by science? What is scientific method? How is it to be distinguished from 'historical' method or from any other mode of study? It is convenient to approach the question indirectly, by first discussing the characteristics of historical study.

I once attended the trial of a man charged with attempted murder. The victims were two old friends of his with whom he was staying; they asserted that he had crept into their room in the middle of the night and hit the wife on the head with a hammer. He maintained that he had come into their room to wake the wife because one of their children seemed to be in trouble, and that when he tapped her on the shoulder she leaped up screaming 'murder,' and she and her husband attacked him without ado. No motive for his assault was suggested. You would not have thought there could have been much doubt about the facts of a case where the contradiction between the two stories was so glaring. But in the event the argument proved lengthy and involved.

The whole question turned on the reliability of the witnesses. Much of the fight had taken place in the dark; two of the parties to it had been woken out of their sleep; another witness was a boy of thirteen. It is obvious that the evidence—if we rule out bare-faced lies—would suffer from two kinds of defects: the parties to the dispute might have been genuinely mistaken as to who hit whom in the dark; and the emotional stress and need of self-justification might lead them later to throw a false light, quite unwittingly, on the events as they reconstructed them from their memory.

Such mistakes of observation and distortions of memory happen to everyone, even the most rigorously trained scientists. This was neatly demonstrated by an experiment carried out some years ago at an international congress of psychologists. During one of the meetings a clown suddenly broke into the lecture hall pursued by a Negro brandishing a knife. After two or three narrow escapes the clown managed to get out of the hall still followed by the Negro.

SCIENCE AND THE PROBLEM OF HUMAN NATURE

The psychologists were asked to write detailed objective reports of what had happened. When the reports were analysed they revealed a remarkable assortment of garbled statements, including even inventions of what had never occurred at all.

Even the best-trained and best-willed witnesses may not be wholly reliable in the evidence they give.

If we want to get at the truth of some unique event, whether it is the murder of Mr A. in 1948 or the historical circumstances that resulted in the victory at Waterloo in 1815, our method must depend in the last resort on *assessing the reliability of our witnesses*. This is the essence of the historical approach to truth. The object of history is always to discover what particular unique events have occurred in the past, and by what unique details of thought and action the chain of those events is connected.

I have approached the question of the nature of *science* with a discussion of the nature of *history* because this brings out the first essential feature of science : it is not interested, at bottom, in unique events. Not for their own sake anyway. The quality that makes them unique is the one quality the scientist wants to discount.

In a sense, I suppose, every event may be regarded as unique. When you jump out of bed in the morning, put on your clothes and go down for breakfast, these are things you have done every day perhaps for years ; but they are not precisely and exactly the same as yesterday and the day before. You did not get up at precisely the same moment or say exactly the same things to the other people at the breakfast table, or have the same number of grains of sugar on your cereal.

Similarly, the swings of a pendulum will not all be absolutely identical, for the instrument is gradually slowing down anyway. But for the physicist's purpose, say to verify the formula connecting the length and the time of swing of the pendulum, they may be regarded as exact repetitions of a single movement.

The scientist is concerned with how things work, with

THE SCIENCE OF HUMAN NATURE

the connections between events that are, or can be, repeated. His final aim is to establish unvarying connections between events that are repeated : in Whitehead's words he ' finds mere rules of succession.' The physicist, as we have noted, looks for a connection between the times of swing of pendulums of different lengths, the chemist for one between the pouring of a certain acid on to chalk and the emission of a gas. The biologist watches out for some unchanging relations between the stages of development of a frog's egg.

But the distinction between the scientific and the historical approaches is not absolute. In some sciences the facts that are studied consist almost entirely of a series of unique events which are carefully observed at their occurrence, for example seismology, the study of earthquakes. In this case historical material forms the basis of a science. The same is true of the study of the development of human societies. The sociologist uses the facts recorded by the historian in the manner of a scientist : to elaborate constant connections between portions of the cycles of human history. He observes, for example, similar historical sequences in Greek and English civilisations, which suggest that we in England are in danger of such-and-such a development in the next century. The sociologist elaborates a theory of the evolution of human societies in much the same way as the geologist constructs one for the evolution of fossils ; for geology also is based on historical facts—those recorded in a multitude of individual quarries and clay-pits.

However, the sociologist—we may regard him for the moment as representing the human sciences—suffers under certain disabilities by contrast with the geologist. In the first place he is seldom able to get equally clear-cut data : it is a much more difficult matter to pick out the significant features of a human society at a certain date than those of an assemblage of fossils from a particular bed. Realisation of the need for more precise facts has led in recent years to the development of the ' case-study.' This means a patient, detailed study of an individual ' case ' : as, for example, that of a primitive tribe in New Guinea, or a neurotic

SCIENCE AND THE PROBLEM OF HUMAN NATURE

patient in Vienna, or a new town in the Western Highlands.

In the second place, whereas the geologist can quite easily measure the length and breadth of his fossils, the sociologist has the utmost difficulty in measuring the features of a human society. This contrast points to the second fundamental distinction between scientific and other studies : *the use of measurement in science*. I am aware that the adjective 'scientific' is nowadays often used of any systematic and objective study, and that a certain school of thought denies that measurement is fundamental to science. To my mind, however, this is to rob the word of a connotation which it has acquired during the last three hundred years from the *certainty* which is now the most obvious characteristic of 'science.' The intellectual prestige of science is due largely to this factor : the layman feels *certain* that when he flicks the switch the electric light will normally come on, and that if it does not, there is a definite ascertainable reason for the failure. And this certainty derives almost wholly from the use of measurement.

This word 'certainty,' however, possesses various shades of meaning. We feel 'certain' that if a man falls over a 100-foot cliff he will be killed. Yet we realise that there is in fact a minute chance that somehow he will not be killed : he might conceivably fall into deep calm water and be rescued. We feel rather more certain that the sun will rise tomorrow morning, rather less that we will have our usual breakfast. The only ideas we feel absolutely certain about are abstract mathematical and logical propositions : that two and two make four, or that you yourself cannot be in two places at once.

Now it is most important to appreciate that different branches of science are capable of different degrees of certainty. In the physical sciences, as we have seen, we might figuratively speak of a 99 per cent degree of certainty. We can never be *absolutely* sure of any inference from experience : there is just a faint chance of something unforeseen intervening. But it is quite good enough for all ordinary

THE SCIENCE OF HUMAN NATURE

purposes, practical and theoretical. We regard the laws governing the production of electricity for light as *established* by the evidence ; and the fact that they are so is due entirely to the circumstance that the various features of the process can be *measured* accurately—that is, the current, the voltage, the resistance of the wires, the speed of rotation of the dynamo, and so on.

What about biology ? It is quite obvious that much of the biologist's material is unique : the shape of an oak-leaf, the development of a frog's egg, will vary from specimen to specimen. The only way in which the biologist can reach any degree of certainty in framing a general ' law ' of, say, the development of a frog's egg is by *observing a large number of specimens*. He will then be able to discount the uniqueness of each, and show that in a certain percentage of cases he found a particular sequence of steps. To extend our previous metaphor we can perhaps talk of a 95 per cent certainty. We can still speak of the biologist as being able to *establish* a theory

In the human sciences, however, the degree of individual variation is greater still, and certainty is again reduced. All laws now have to be framed in terms of statistical probabilities : the odds are 2 to 1, or 20 to 1, that if this boy has this quality at this age he will have that quality at that age. In psychology, perhaps, the main framework of conclusions and laws can now be regarded as established. But in such studies as sociology and ethics it is impossible to make such a claim. The philosopher, for example, who tries to prove the ethical principle that justice is the supreme value, may bring forward all sorts of evidence, carefully noted and analysed ; but because he is not able to measure it he cannot *establish* his theory of an invariable connection between just actions and happiness or peace of mind. The sociologist cannot offer any certainty in his comparison of Greek and British history. In such cases as these we may describe the argument as *supported*, but not *established*, by the evidence. I think we may fairly assert that a subject of study only begins to develop into a science when, by making use of

SCIENCE AND THE PROBLEM OF HUMAN NATURE

measurement, it succeeds in *establishing* its facts and connections.

Let me sum up the argument.

Science is knowledge of how things work, or more precisely, of how repeated events recur, in so far as measurement enables us to *establish* this knowledge.

Science has to be distinguished from other studies in two ways. In the first place we have to notice that all historical studies set out to discover the course of trains of unique events. Their basic principles are concerned with the assessment of the reliability of witnesses. By way of contrast with history, science is concerned with the recurrences or repetitions that can be discerned amongst the unique events that we observe. Science attempts to formulate the conditions of these repetitions as 'laws.'

In the second place we have to distinguish studies which, through the use of measurement, have succeeded in *establishing* their main framework of laws and conclusions, from those in which the results are not 'established' but only 'supported' by the evidence available. These latter studies do not satisfy the criterion of *certainty* which has come to be one of the distinguishing marks of science.

The idea of certainty must itself be analysed. No conclusion from experience can have the absolute certainty that attaches to a logical proposition. But the certainty of the results in the physical sciences is usually so high that we do not think of couching them in statistical terms. In biology the material is subject to greater individual variation, and many conclusions have to be framed in terms of probabilities. In the human sciences the variation and complexity are such that all laws have to be stated in statistical terms, and the probabilities are often much lower than in the biological domain.

All studies are founded equally on the precise observation of particular local events, and all equally demand hard thinking, clear analysis of ideas, and careful sifting of evidence. But if the title 'science' is to be used in a descriptive sense, rather than as a term of approval (or

THE SCIENCE OF HUMAN NATURE

disapproval), and to retain its connotation of certainty, then it should be applied only within the limits I have defined. What I am chiefly trying to show in this book is how scientific method has been adapted for use in human studies, what sort of results it has yielded, and where the limitations of the method lie.

CHAPTER II

THE PHYSICAL BASIS OF HUMAN NATURE : HUMAN HEREDITY

I THE GROWTH OF A LIVING BODY

A HUMAN individual starts life as a single fertilised cell in his mother's body. A cell is the unit of which all living matter is composed, 'a little aggregate,' as Sherrington says, 'of atoms and molecules such as the world we call lifeless nowhere contains.' An adult human brain alone may contain 12,000 millions of them. They vary more than could be imagined in size and shape and function, but all possess a common structure and they all grow by the multiplication and differentiation of the original egg-cell. Any cell consists, briefly, of a semi-fluid substance called cytoplasm, which performs the characteristic activity of the cell, and (as a general rule) a structure termed the nucleus, which controls its growth.

When a cell divides, the first stage in the process is normally the segregation of the nucleus into a number of minute threads that wriggle about like eels. These are called chromosomes. They soon split in half longitudinally, and the halves separate to opposite sides of the original nuclear region. There they coalesce in two groups, the threads dissolve into one another again, and we are presented with two nuclei where before there was only one. A partition now appears across the cytoplasm : and the original cell has become two. The same process, more or less, occurs every time a cell divides ; but differentiation also occurs, giving us at various stages the biscuit-shaped red cells of the blood, 0·0003 of an inch across, the yard-long nerve-cells by which the sensations in your fingers pass to the spinal cord on their way to your brain, and all the assemblage that make up your body.

THE SCIENCE OF HUMAN NATURE

In the last forty years the biologists have accumulated evidence appearing to show that the chromosomes are the principal carriers of heredity. Chromosomes vary in shape and can be seen to be composite in structure. They are

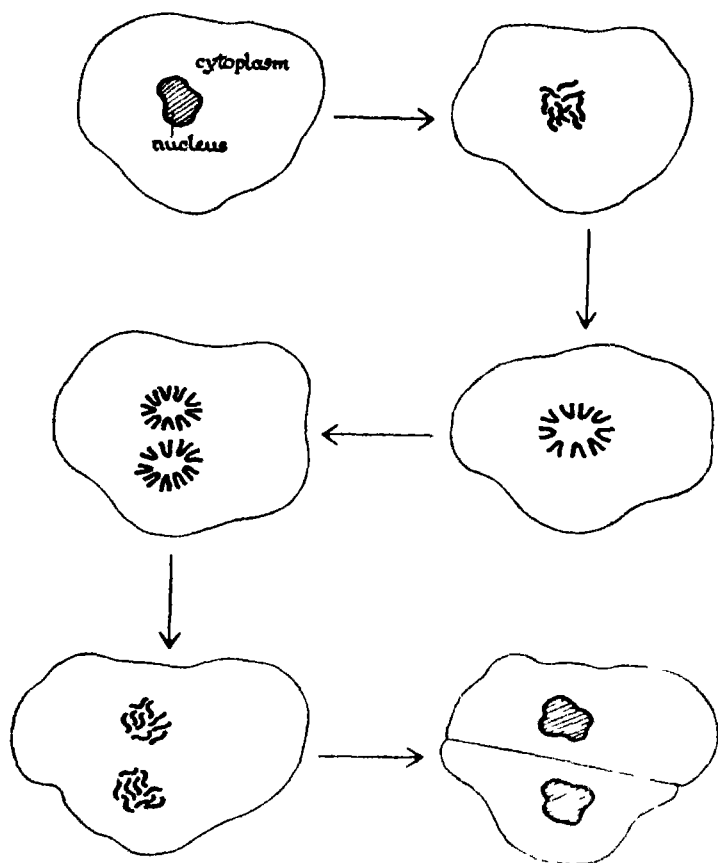


Fig. 1 Stages in division of a cell

believed to consist of a considerable number of small particles, called *genes*, a gene being the carrier of a single element or feature of your heredity. It is common experience that children's features may resemble their parents'; and two questions inevitably arise : what *laws* govern the transmission

THE PHYSICAL BASIS : HUMAN HEREDITY

of such characteristics? and are *mental* traits (whether of temperament or of ability) also passed from one generation to the next by physical means?

To answer these questions we must examine the mechanism of inheritance a little more closely.

2 THE MECHANISM OF INHERITANCE

We saw just now that all the cells in the human body derive from a single egg-cell in the mother, and that each body-cell acquires its complement of chromosomes (48 in human beings) by the splitting of those of its predecessor. How in that case can the father's chromosomes get a foothold in the process? The answer lies in the constitution of the original male and female cells: these contain only half the usual number of chromosomes. In other words, when the male sperms and female ova or egg-cells are generated, the chromosomes do not split longitudinally but merely divide into two parties, one to each new cell. And therefore when a sperm fertilises an ovum, it brings half of a specimen set of the father's chromosomes to unite with half a set of the mother's. The fertilised human egg-cell thus derives 24 of its chromosomes from its father and 24 from its mother.

The laws governing the distribution of inherited traits were discovered in 1865 by an Austrian monk called Mendel. Unfortunately he conducted his experiments on sweet peas and published his results in an obscure horticultural journal, with the consequence that they were lost to the scientific world for nearly forty years. In a typical investigation he crossed a pure-bred pea with yellow seed with a pure-bred strain having green seed. In the first generation he got 100 per cent yellow seed: the green had, apparently, gone under. He reared plants from this yellow seed, and, in this and subsequent generations, continued to breed them by self-fertilisation. The second generation showed 75 per cent yellow and 25 per cent green seed: the green had not succumbed after all. But what had happened to the green colour in the intervening generation? And how was it possible to explain

THE SCIENCE OF HUMAN NATURE

the fact that these green-seeded peas now bred true, yielding no more yellow seed ? There must be some hereditary factor that could be carried by a plant throughout its life without affecting its outward character, and emerge from latency with sufficient strength to control all subsequent generations.

The yellow seed of the second generation also exhibited rather surprising properties : one third of it bred pure yellow, and the remainder was hybrid, producing offspring in its turn in the same proportions as what we have called the second generation, one pure yellow to one pure green to two hybrid.

What explanation could be given of these facts ? Mendel's conclusion was that the sex-cells of the parents carried a number of separate particles or factors determining the characteristics of the progeny ; and that each sex-cell could only carry one of these particles, though the resulting cells of the new creature contained two, one from each parent.

It is obvious that Mendel's hypothesis dovetails with the chromosome hypothesis : the colour of the seed is determined by a particular gene ; each body-cell contains a seed-colour gene from each parent, one green (G) and one yellow (Y) ; but the sex-cells contain only half the number of chromosomes and somehow, therefore, only one of the seed-colour genes. The body-cells of a particular plant determine the seed-colour of that plant. If the body-cells contain two Y-genes, a pure-breeding yellow-seed strain results ; if two G-genes, a pure green strain. If a Y and a G gene occur together, the Y seems to get the upper hand of the G for this generation : the yellow colour is said to be ' dominant,' the green ' recessive.' But in the sex-cells of the hybrid plant the Y and G genes separate without prejudice to either.

Some inherited qualities are not mutually exclusive like the green and yellow colours in the above case. When black and white Andalusian fowls are crossed the colours blend and you get ' blue ' chicks. The second generation then consists of 50 per cent ' blue ' hybrids, 25 per cent white birds, and 25 per cent black.

Exactly similar results have appeared whenever experi-

THE PHYSICAL BASIS : HUMAN HEREDITY

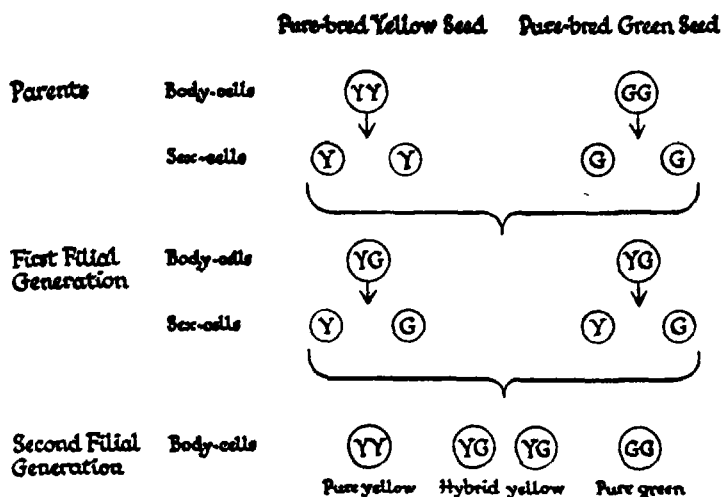


Fig. 2 The crossing of sweet peas

ments have been conducted. A pure piebald strain of rat mated repeatedly with a pure albino gives a first generation of piebald rats. If these are now inbred the second generation turns out to consist of pure piebald, pure albino, and hybrid in the ratio of 1:1:2.

3 THE APPLICATION OF MENDEL'S PRINCIPLES TO HUMAN INHERITANCE

An examination of ancestry has proved precisely similar happenings in human inheritance. A brown-eyed man coming from an all brown-eyed family marries a pure-bred blue-eyed woman. The children are all brown-eyed. If the children grow up and marry blue-eyed persons, the next generation do in fact turn out to have blue eyes in one case in four, brown eyes in the remainder.

As soon as we start discussing the process at the human level we find ourselves asking further questions of crucial importance : which children will be blue-eyed, and which brown? And if, in the example just quoted, the second generation consists of, say, six children, how many will have

THE SCIENCE OF HUMAN NATURE

blue eyes? It is obvious that you cannot have a three-to-one ratio in a family of six.

The whole fabric of conclusions on Mendelian inheritance rests on a statistical basis. The assumption behind all the predictions is that the meeting of sex-cells carrying the different genes is governed by chance, and if that is the case the results must obey the laws of chance. In the crossing of the sweet peas we are assuming that the male pollen contains equal numbers of G sex-cells and Y sex-cells, and the female ova the same, and that their conjunction occurs in exactly the same way as would the conjunction of black and red counters drawn in pairs from a large drum.

We have come to a conception of central importance in the biological and social sciences: that some of the laws or regularities of behaviour that we are looking for are not applicable to individual cases, but only to be interpreted in terms of large numbers, where the laws of chance may operate. It is therefore essential to turn next to the meaning of 'chance' and the operation of statistical laws.

4 STATISTICAL FOUNDATIONS

Two questions arise: (a) What does 'chance expectation' mean? In other words, how are mathematical calculations of probability related to real happenings? and (b) If the numbers in an experiment do not coincide exactly with those predicted, does it mean that the prediction is entirely falsified?

(a) *The meaning of chance expectation.* Take a simple case: if you toss a couple of coins, what are the odds that you will get two heads? Let us examine the possibilities. You can put them down in a table:

H + H	H + T
T + H	T + T

Coin A can come down heads and be followed by B either heads or tails, as in the first row of the diagram. Or coin A can come down tails and be followed by B heads or

THE PHYSICAL BASIS : HUMAN HEREDITY

B tails. These are all the possibilities ; and the mathematical probability that you will get two heads is defined simply as a ratio : (number of cases in favour) $\div$ (total number of possibilities), which is here $\frac{1}{4}$. Similarly the probability of your not getting two heads is given by the ratio $\frac{3}{4}$.

We can express these figures in more colloquial terms by saying that the odds against getting two heads are three to one : for one pair of throws that gives two heads you are likely to get some other combination three times. Or again you can say that the chance expectation of getting two heads is one in four of your tosses.

But if you actually start spinning coins, do you get these ratios ? No, you do not. While writing this chapter I have performed the experiment of tossing a sixpence a large number of times. It is clear that the expectation of heads is one in two, or, if you like, the odds against getting heads are even. Here are the results of my actual experiment :

	Heads
H H T T T T T H H H	5
T H H T H T T H H H	6
T H H H T H H H T H	7
H T H H H T H T H T	6

In 40 throws I got 24 heads, where chance predicts 20. Yet at one point I had 5 tails in succession.

I went on to complete my century and recorded the following scores : 6, 5, 3, 4, 7, 6. This made a total of 55, giving an average percentage of 55. After 200 tosses my total was 109 : a percentage of 54.5. After 300 tosses the figures were 158 and 52.7. After 1,000 throws the total was 518 heads, which means a percentage of 51.8. We therefore conclude that *the actual frequency of occurrence of heads only approaches chance expectation when we make a very large number of trials, and even then does not match it exactly.* A mathematical probability makes no prediction about the real world. Only experience, or experiment, and that with large numbers, will show whether some event happens with the same

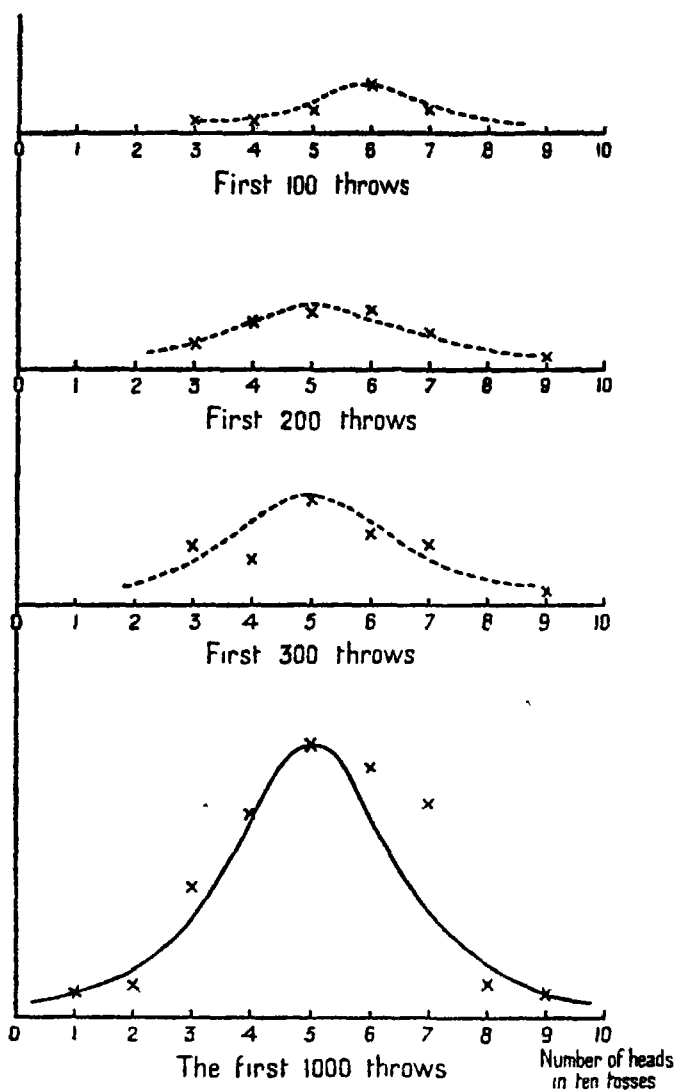


Fig. 3 Graphs showing frequency of occurrence of various scores

THE PHYSICAL BASIS : HUMAN HEREDITY

frequency as it would if chance governed its occurrence. Then we can conclude that chance is the governing factor.

It is instructive to plot these figures on a graph.

After 1,000 throws we can see a shape beginning to emerge, the bell-shape of the 'curve of chance distribution.' This is a curve of great importance. The theoretical shape can be obtained by calculating the chances of occurrence of various scores in a very large number of tosses. You are likely to get very small scores a very small number of times. Slightly larger scores have a slightly greater probability ;

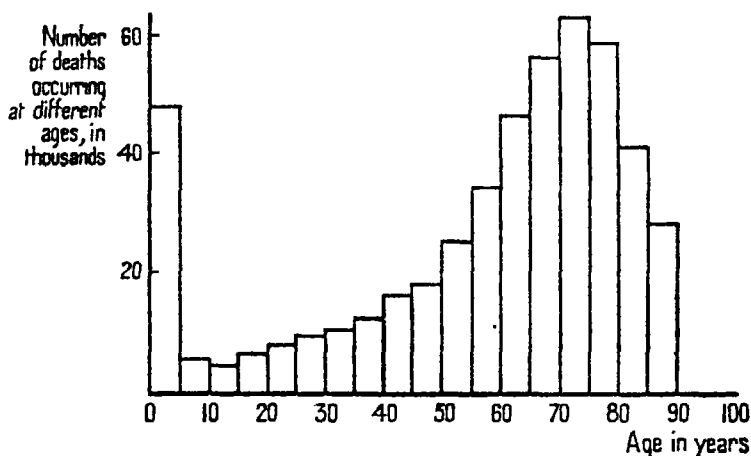


Fig 4 Numbers of deaths occurring at different ages in England and Wales in 1938

and so on. The middling scores have the highest likelihood of occurring. The shape you get is due to the fact that *the causes operating to make individuals depart from the mean are as likely to act in the one direction as the other.*

This curve is a thing to remember ; we shall have frequent occasion to refer to it. It is worth comparing with the rough graph of death-rates at different ages (see Fig. 4), and with a curve of income distribution (compare Fig. 21 p. 201). These two graphs show maximum frequencies far from the centre of the curve.

From the curve of chance distribution we can get a good

THE SCIENCE OF HUMAN NATURE

idea of the kind of criterion we must apply in deciding whether the result of an actual experiment is to be regarded as strong support or virtual disproof for a law, or as giving no ground for decision either way. This, it will be remembered, was the second topic on which we wanted to get some statistical information.

(b) *Testing the validity of a statistical 'law.'* The first conception to grasp is that of 'scatter.' If a class of children averaged 40 marks out of 100 in an examination, this figure would not tell us whether all the children scored between 35 and 45, or some got more than 90 and some less than 10. The latter group would be said to show a much wider 'scatter' than the first group. The curve of chance distribution will be lower and broader when scatter is wide than when it is narrow.

The degree of scatter of a set of measurements is known as the 'standard deviation,' and can be calculated in the following way. The formulae used have been worked out from mathematical principles which need not detain us here. For illustration let us take my first 200 tosses with the sixpence. (It is more convenient to handle the numbers here in batches of 20 than the 10s previously used.)

The Standard Deviation is 2.42. The meaning of this quantity is that two-thirds of all scores obtained in such an experiment are likely to fall within a distance of 2.42 from the average; i.e. the odds are 2 to 1 against any score falling outside the range 8.48 to 13.32. It also means that 95 per cent of all scores will fall within 2×2.42 of the mean, i.e. the odds are about 20 to 1 against any score falling outside the range 6.06 to 15.74.

Our next move is to calculate the reliability of our mean, 10.9. It is not difficult to see that if the scatter in the examination scores of a class of boys is wide, the absence of a few boys through sickness may make a big difference to the class average—much bigger than would be made if all the scores were close together. When scatter is great, therefore, the mean is less reliable than when scatter is low.

The reliability of the mean is measured by what is known

THE PHYSICAL BASIS : HUMAN HEREDITY

Scores obtained per batch of 20 tosses	Mean	Deviation of each score from mean	Square of deviation
11	10.9	0.1	—
13		2.1	4.4
11		0.1	—
7		3.9	15.2
13		2.1	4.4
8		2.9	8.4
11		0.1	—
11		0.1	—
15		4.1	16.8
9		1.9	3.6
109			52.8

$$\text{Standard Deviation} = \sqrt{(\text{sum of squares of deviations})/\sqrt{(N-1)}} \\ = \sqrt{52.8/9} = 2.42$$

(N = number of batches of 20 tosses)

Table 1 Calculation of standard deviation

as the Standard Error of the series of scores. This is calculated from the formula .

$$\text{Standard Error} = \text{Standard Deviation}/\sqrt{(\text{number of scores in series})}$$

$$\text{In the example given above S.E.} = 2.42/\sqrt{10} = 0.77$$

The S.E. of the series of scores—which we can regard as a ‘sample’ series from a very large number of scores—is really the Standard Deviation of the *mean* of the series. In other words it tells us that if we went on to make thousands of throws of the sixpence, the average that we would get from them all, i.e. the true average for the coin-tossing experiment, is likely to come within a certain range of the mean that we have already obtained. The odds in fact are two to one in favour of the true mean lying within the range 10.13 to 11.67, 20 to 1 in favour of its lying between 9.36 and 12.44, and 100 to 1 in favour of its lying between 8.98 and 12.82. For

THE SCIENCE OF HUMAN NATURE

a coin that is not biased the true mean will be 10·0 ; and we can see that this lies outside the 2-to-1 range but well within the 20-to-1 limits. Our *formulae*, it is important to remember, are made for an imaginary unbiased coin ; we can only tell if the coin is, or is not, biased by comparing its experimental performance with the theoretical calculations (see p. 23). In my own tests with the sixpence we can conclude that the excess of heads may reasonably have been due to chance, since the mean of 10·0 for an unbiased coin comes within the 20-to-1 range, and 20-to-1 odds are usually taken as a reliable indication. The Royal Mint endorses this interpretation.

The experiment also illustrates the fact that the S.E. gets smaller if a larger sample is taken. (This is true as long as the S.D. remains relatively constant ; which is likely to be the case in a coin-tossing experiment.) If, for example, we take my first 1,000 tosses, $N = 100$ instead of 10, and the S.E. becomes $2·42/\sqrt{100}$, or 0·24 instead of 0·77. Since the experimental average was now 10·36, the odds will be 2 to 1 in favour of the true value lying between the limits 10·12 and 10·60, and 20 to 1 on its lying between 9·88 and 10·84. These figures confirm the conclusion we reached from the smaller sample, that the excess of heads was due to chance.

5 HUMAN INHERITANCE

We are now in a position not only to appreciate statistical arguments in later parts of the book, but to reach certain conclusions on human inheritance :

(a) We know that certain physical peculiarities definitely follow Mendelian laws. Such are albinism, colour-blindness, the quality of your blood (which determines what kind of transfusion you can take, and is sometimes used in paternity tests), and haemophilia (a condition of the blood which prevents it from clotting and causes death by bleeding).

If the inherited characteristic is dominant, approximately half the children of anyone possessing it will also bear it. If it is a recessive quality, it is likely to appear amongst the

THE PHYSICAL BASIS : HUMAN HEREDITY

offspring of two people who do not show it themselves, if it so happens that they are both carriers. (It will be remembered that if two hybrid yellow-seeded peas are crossed, 25 per cent of their progeny are green ; for both parents are ' carriers ' of a green-seeding gene.) For this reason the odds against the occurrence of undesirable recessive characteristics such as albinism are much lower in first-cousin marriages than in others. For example, according to Hogben the chance that a man who carries an albino gene will marry a woman carrier is about 1 in 70 in the population at large, but only 1 in 8 in a first-cousin marriage.

But characters may also blend, and in that case they will not appear as distinctive features in subsequent generations. (b) It is impossible to predict precisely how many children in a family of average size will inherit a particular quality. When hybrid yellow-seeded peas are crossed, the chances are that 1 in 4 of the next generation will be green *if the number is large*. But if the sample is small, as is usually the case in human families, the odds in favour of the exact theoretical proportion are low ; in a family of three children all three might well show, or fail to show, some hereditary characteristic of the parents.

(c) Mental characteristics are much more difficult to trace than physical. The influence of genetic constitution on prominent physical traits, in sweet peas as in human beings, can only be determined with precision *because variations in environment are not sufficiently great to affect these traits*. If an embryo fish is put in an ice-box at a certain stage of development, it will grow only one eye : the change of environment has altered its adult form.

To study the inheritance of mental characteristics in human beings we have either to look for a trait that is not susceptible to environmental influences, or to compare the effect of different environments on persons of identical heredity, or to compare the effect of identical environments on persons of markedly different heredity.

Psychologists have attempted all three approaches, but the results have proved rather inconclusive.

THE SCIENCE OF HUMAN NATURE

A trait appearing to be relatively independent of environmental influences is the ability measured by intelligence tests—let us call it test-intelligence. In the great majority of cases this varies by less than 5 per cent in the course of a child's growth to maturity; and it has been shown to be closely related to parental 'test-intelligence.' But unfortunately it is not an all-or-none quality, so that it is impossible to say if its inheritance follows Mendelian laws or not; and the relative importance of natural endowment and early conditions is thrown into doubt by the fact that drastic changes in environment have sometimes resulted in a change of test-intelligence by 15 or 20 per cent.

The fact that a human being receives twenty-four of his chromosomes from each of his parents implies that different children of the same parents are likely to receive different sets of chromosomes. There are in fact ten million ways of combining the chromosomes from one father and mother. It looks as if the chances of two children having the same endowment are negligibly small. But, luckily, the case of identical twins does seem to fit our requirement: their physical measurements, even to their finger-prints, are so close as to suggest that they owe their existence to the division of a single fertilised cell into two independent cells at a very early stage, and that they therefore possess identical constitutions. Psychologists have consequently sought, and occasionally found, pairs of identical twins who have been separated at a very early age, and brought up in totally different environments. The mature adults have shown considerable differences of temperament and achievement, and suggest that the dominant influence is that of environment.

In the third instance investigators have measured the test-intelligence of large numbers of individuals of different race living in similar environments: for example, black and white citizens of America. They have found slight average differences, but nothing clear enough to warrant any hard-and-fast conclusions.

We must infer that even with the help of the elaborate

THE PHYSICAL BASIS : HUMAN HEREDITY

statistical machinery described above, research on the inheritance of mental characteristics has not so far yielded much in the way of positive results. Without the statistical apparatus, however, we should not even be in a position to judge whether the results of researches were positive or not. In the biological and social sciences the criteria by which we judge whether conclusions are to be regarded as 'established' or not are generally statistical.

CHAPTER III

THE PHYSICAL BASIS OF HUMAN NATURE : THE BRAIN AND THE SENSES

I MAPPING THE FUNCTIONS OF THE BRAIN

THE chief source of information on what happens in the brain is the study of the mental effects of injuries to the brain. The brain may be injured by a blow on the head, for example, or by a tumour in the skull. Much evidence of both kinds has come to light during the two world wars.

The effects of local damage to the brain can be illustrated by one or two examples. Injuries to the back of the skull are associated with defects of vision, and may even result in blindness, irrespective of the condition of the eyes and eye-nerves. You can test the connection for yourself by getting somebody to hit you on the back of the head with a blunt instrument, whereupon the visual area of your brain will be stimulated and you will see stars. Similarly, speech difficulties have been found to be associated with injuries to an area just in front of the left ear.

From this and other evidence it is clear that special parts of the brain have special roles, and a map has been composed which is illustrated in Fig. 5 opposite.

It appears that sense-impressions are retained in particular parts of the brain, and the areas where they are stored are not the same as those in which they are originally received.

Although much of the brain has been mapped in this way, it may be remarked that the frontal lobe is still uncharted. In some cases injury to it has resulted in impairment of reasoning and will-power, in other cases not. Mottram quotes the example of an aggressive but well-disciplined soldier who was injured in the forehead in a motor-bicycle accident. As a result he lost all restraint on his pugnacity and self-confidence. He spoke to senior

THE PHYSICAL BASIS : THE BRAIN AND THE SENSES

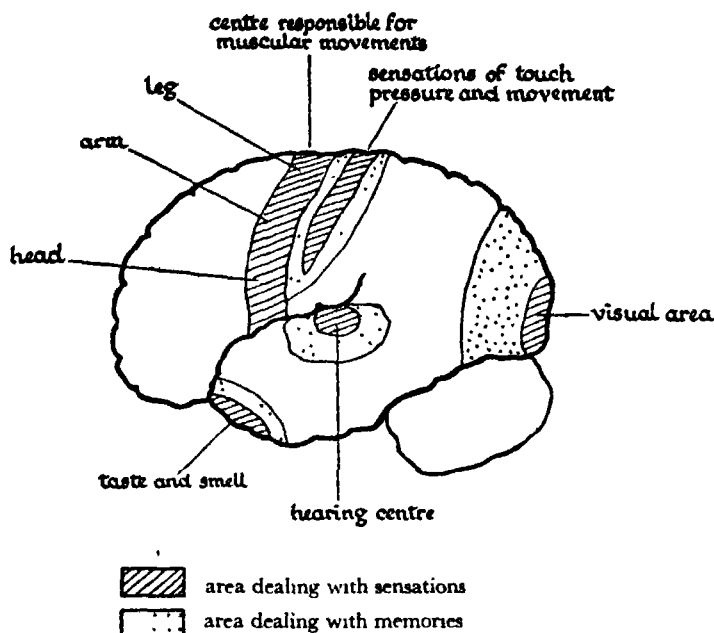


Fig. 5 Map of areas of brain dealing with different types of sensation and memory

officers as an equal, and when another N.C.O. made some casual remark he knocked him down. Here the character has been altered, but not the memory. In cases of severe mental disturbance psychiatrists have taken the drastic course of severing the connections between the forebrain and the part called the optic thalamus, and so far altered the patient's personality as to enable him to lead a normal life.

You can see from Fig. 5 how many different sorts of impressions go to make up our memories. At a simple level this is a fact we can easily demonstrate by experiment. Try to cast your mind back to your breakfast this morning, and then jot down on a piece of paper two or three things you can *picture* to yourself. Now try putting down three objects that you can recall the *smell* of, that you can actually imagine yourself smelling now. Can you reproduce in your mind the *taste* of anything you had for breakfast? These mental

THE SCIENCE OF HUMAN NATURE

reproductions are called 'images,' whether they are seen or smelt or perceived by another sense. Can you recall any of the *sounds* you heard at breakfast, or the *sensation of heat* of your tea, or the *feel* of your lips saying 'good morning'?

2 THE STRUCTURE OF THE BRAIN

A section of the brain shows two kinds of substance, the 'white matter' and the 'grey matter': the latter is a sort of skin or bark over the former. Both are composed of nerve-

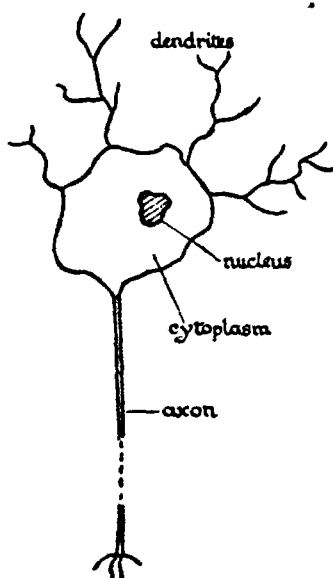


Fig. 6 A nerve-cell

cells, which consist of a central body with one or more receiving branches, the dendrites, and one transmitting branch, the axon. The 'white matter' is a mass of axons leading to and from the cell-bodies composing the 'grey matter.'

The axon of one cell passes nerve-impulses to the dendrites of the next cell. These impulses are electrical changes which travel along the nerves at anything up to 200 m.p.h.

There are many different types of nerve-cell, and these have different jobs.

Those in the eye are affected by the incoming light through their dendrites. Their axons—a million of them—gather together to form the main optic nerve, which conducts the impulses to the brain, and the nerve-cells of the visual area register the picture seen.

A nerve-cell of the type adapted for receiving sensations of pain in the skin will be very similar to the optic nerve, but will lead to the spinal cord instead of direct to the brain.

Then there are the nerve-cells that transmit messages

THE PHYSICAL BASIS : THE BRAIN AND THE SENSES

outwards to the muscles. In these the cell is situated in the spine, and its axon stretches out to the muscle. When you touch a hot kettle, pain-cells receive the sensation and send a volley of impulses through to the spinal cord. Here other cells transmit it to the particular motor-cells actuating the muscles that cause your hand to jump back. Notice that in this case the brain may very well be short-circuited : it receives impressions of what happens, but does not have to take any decision about it.

The brain itself is made up of an extraordinarily complicated mass of nerve-cells and their fibres. It has been estimated that there are 12,000 millions of them, much more than the total population of the world, and they are interconnected in an elaborate manner. A photograph taken through a microscope looks like the shreds of hay crossing one another in a haystack. It is as though everybody in the world were on the telephone and all the lines were interconnected ; and even that metaphor does not do justice to the numbers involved.

3 THE SENSES

The senses deserve a little further attention, for they are the means by which the brain and the nervous system receive the impressions they deal with.

All the senses operate through specialised end-organs, cells that are somehow adapted for responding to a very narrow range of happenings outside themselves, just as a radio set tuned in to one wave-length is adapted for responding to a special kind of external event, namely, wireless waves of that particular wave-length. In the eye, for example, the sensitive surface—corresponding to the film of a camera—is the retina. This contains nerve endings already mentioned, termed on account of their different shapes ‘rods’ and ‘cones.’ The rods are sensitive only to different intensities of light and shade, or in technical terms to rays whose wave-length lies between 0·0004 and 0·0008 of a centimetre. The cones, on the other hand, respond differ-

ently to different wave-lengths : when light of about 0.0008 cm. wave-length falls on them, they send a message to the brain which it interprets as 'red.'

The retina is reproduced in the visual area of the brain, point by point, and your brain (or is it your 'self'?) distinguishes the different kinds of nerve-impulses reaching this area as representing the objects you are looking at.

We have not the space to discuss all the senses in detail, but they all appear to be built on the same pattern : special end-organs located in different parts of the body are sensitive to special types of stimuli and transmit impulses to the brain. These impulses are all identical in nature, though travelling at different speeds in different fibres, and are sorted out in the brain according to the kind of end-organ they come from. The intensity of the stimulus is indicated by the frequency of the impulses. The real mystery begins when we get to the brain : how does my 'self' turn these electrical impulses into the rich warm world of faces and voices and smells that I am 'conscious' of?

CHAPTER IV

THE PHYSICAL BASIS OF HUMAN NATURE : THE EVOLUTION OF MAN

THERE are other sides to the question of the physical basis of human personality. Let us take next the relation of man to the other animals. This raises, first, the problem of evolution : has man evolved from some other animal ? and second, the problem of instinct : is man's life ' governed ' by instincts ?

I THE REALITY OF GRADUAL EVOLUTION

Nobody who has studied the fossil record in detail could doubt the reality of gradual evolution.

Let us take a few typical cases :

(a) One of the best-known evolutionary lines is that of the horse. Its ancestry has been traced back to an animal about the size of a fox-terrier. This possessed short molar teeth whose shape dimly foreshadowed the elaborate system of ridges and grooves of a modern horse's lengthy molars. The front feet had four toes, together with a splint-like bone that appears to represent the vestige of a fifth toe. The hind feet had three toes and one vestigial remnant. This ' dawn horse ' was well adapted to walking on marshy ground and browsing on lush vegetation.

At a later stage we find the remains of an animal the height of a small pony, with three toes on all feet, but the central one much enlarged. In fact, it was now so long that the bones corresponding to the wrist or ankle must have begun to look like a knee, as in the modern horse. This central bone was also much stronger than before and evidently bore the greater part of the animal's weight. The molar teeth had become longer and more elaborate.

In the living genus, which is well adapted to galloping

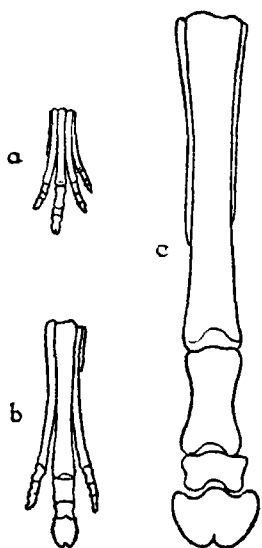


Fig 7 Evolution of the horse's hoof

over hard ground, only the central toe survives, the hoof is the nail of this toe. The bones from the hoof to the knee correspond in structure to the middle bones of the hand up to the wrist. The molar teeth now have extensive ridged surfaces well suited for grinding the vegetable food bitten off by the front teeth, and long enough to allow for wearing down on hard grasses.

Between these three stages are to be found many intermediate forms, which can be classified into distinct genera and species, but which constitute a single trend of development. The time taken for this change to occur has to be measured, it must be emphasised, in tens of millions of years, and the numbers of generations

in millions, and the very immensity of these figures defeats the imagination. When we read of monstrous extinct dinosaurs, weird flying reptiles and the other discarded experiments of evolution, we must make continual efforts to break down the rows of os in the geological dates into numbers that are within the reach of our imagination.

(b) For various reasons, however, the remains of sea-shells have provided the most convenient material for geological studies of evolution: marine deposits have always been richer in fossils than have other rocks, and it is naturally easier to assemble a large collection of good specimens of a common sea-shell than of a creature with a complex skeleton like a horse.

One of the first fossils to receive intensive study was a sea-urchin in the Chalk. A Dr Rowe of Folkestone was interested in the classification of the genus *Micraster* into species. He therefore collected a very large number of specimens, over a period of years, from the chalk-pits in his

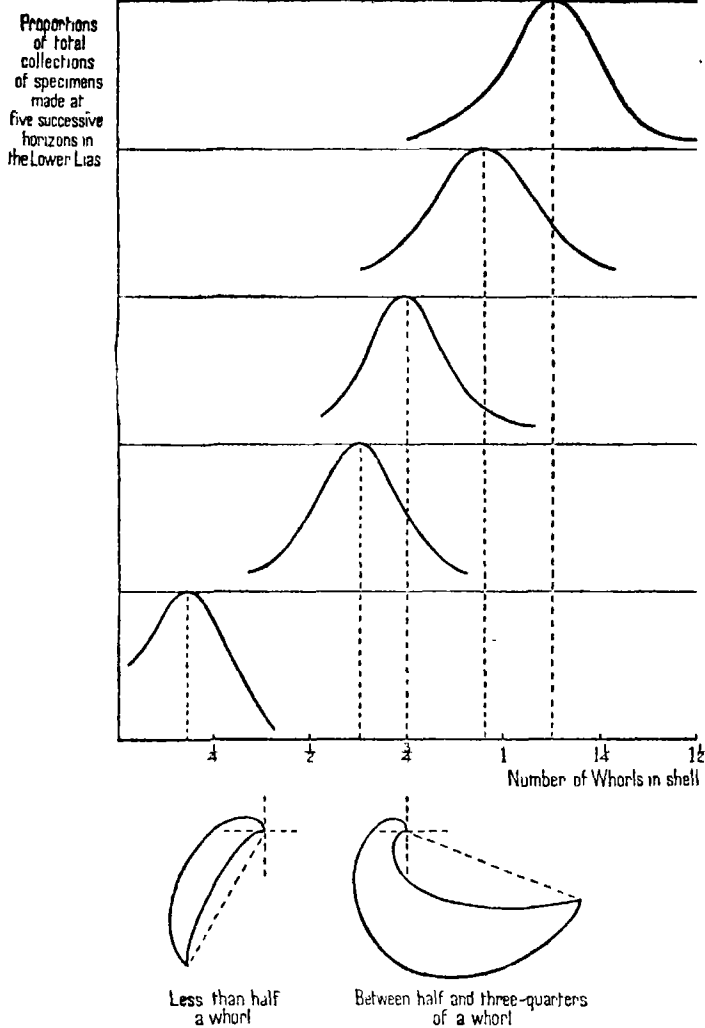


Fig 9 The evolution of *Grypha*
(after Swinnerton)

THE PHYSICAL BASIS : THE EVOLUTION OF MAN

All these changes ran parallel to one another, though not necessarily at the same rate. For example, at a given horizon it would be possible to find specimens in which the height of the shell was about the average for that level, while the keel corresponded to the average of the next layer above and the groove to the horizon below. But the average moved steadily as you traversed the succession.

The evidence, in short, suggests that new species do not spring from the old by sudden jumps but by small steps.

(c) The case is clinched by the statistical analyses that have been applied in a few cases. In the Jurassic clays of this country, for example, occurs a member of the oyster family called *Gryphea*—commonly known in the brickyards as the Devil's Toenail. In the course of the ages during which this genus flourished certain features underwent evolution, such as the size of the adult, the area by which the shell was attached to the sea-bed, and the degree of coiling of the shell.

This last characteristic has been measured in a very large number of specimens from a succession of horizons and the results plotted. At each zone we get, roughly, the bell-shaped curve of chance-distribution: the range of variation is wide, but the bulk of specimens cluster round a definite measurement. And when the bell-curves for the successive beds are assembled on a single graph we get the results shown in Fig. 9.

The peak moves steadily in one direction, but at any given level a large number of individual shells overlap in shape with those from lower and higher horizons. The evidence for gradual evolution in such a case seems indisputable.

2 THE MECHANISM OF EVOLUTION

(a) *Experiments with the fruit-fly*

We come to the question: how do these changes come about? We cannot answer with certainty, but a gigantic series of experiments begun at Columbia University, New York, in 1911, on the fruit-fly, *Drosophila*, enables us to

account for a good many of the facts of evolution. Mendel conducted his experiments on sweet peas with the object of throwing light on the processes of evolution ; and the work on *Drosophila* continued the investigation in circumstances enabling the biologist to examine the changes in the chromosomes.

For the fruit-fly has every advantage that the experimenter could desire. It is (or was before the war of 1939-45) easy to rear, for it can be fed on banana skins. Its whole life-cycle is completed in a week or two, so that a hundred generations span no more than three or four years. It is prolific enough to give us the numbers required for statistical analysis. Above all, certain cells in its body contain giant chromosomes which can be quite easily examined under a microscope, and as they are only four in number and distinguishable from one another, the changes in them can be followed with precision.

An immense number of these flies have now been bred, running into millions, and during the process a large number of 'sports' have appeared. The fly itself is a small creature not unlike a house-fly ; in a sport the wings may be only half their usual size, the eyes may be black or white, say, instead of their normal red, the body may be hairier than usual : any feature of the fly may alter. Such changes in appearance are due to 'mutations,' i.e. changes in the genes, and these can to some extent be followed in the fly's chromosomes.

It has been established that mutations are inherited on Mendelian lines, and the evidence all goes to suggest that mutations are the building-blocks of evolution.

(b) *The influence of mutations*

Mutations must be understood as involving the notion of discontinuous variation : a sudden change in a gene produces a sudden change in a correlated character. In this sense the occurrence of mutations would easily explain sudden evolutionary jumps, but would offer no basis for the continuous changes described in the last section.

THE PHYSICAL BASIS : THE EVOLUTION OF MAN

But the original conception has with prolonged experimentation been greatly modified. Mutations are now recognised to vary vastly in their effects.

In the first place there is a good deal of evidence to suggest that a change in a gene may be very small indeed, making only a slender difference to, say, wing-span or whatever character is involved.

In the second place, it is now known that a single character may be affected by several genes. The colour of a mouse, for example, is controlled by at least three, the size of a tobacco-plant's flower by more. A change in one of these genes will be governed in its effect by the rest of the assemblage ; and since a single gene may affect several characters, it is clear that a subtle mutual influence is at work among the genes.

In the third place, the effect of a mutation may vary with environment : in the fruit-fly, for example, one particular modification of the abdomen is found to develop only if the insect is reared in moist conditions.

As a result it has been concluded that mutations are more likely to show their influence in producing apparently continuous variation than by producing spectacular new forms.

(c) Factors that control the course of evolution

Next we must ask ourselves what forces have operated on the mutations to produce the new species, the new families and orders of animals, the vast proliferation of living creatures now peopling the world ? Is it some life-force that drives living beings to follow evolutionary trends, till their vitality declines and they die out ? Or are we to attribute evolution to the inheritance of characteristics acquired by individual members of a species in their struggle for existence ? Or is the major factor the mechanical process of natural selection—the effect of the environment in favouring the survival of the variations best adapted to it ? Here are three alternative explanations. Which best fits the facts ?

THE SCIENCE OF HUMAN NATURE

Geologists sometimes emphasise the first : they point out that several occasions in geological history have witnessed the development of a coiled oyster like *Gryphea*, and that in each case the trend has persisted to the point of extinction : in the final stage the incurving of the shell has prevented it from opening. But these facts are difficult to explain on any reasonable theory. Supporters of natural selection have suggested that this is one of the cases where a mutation that has affected shell-form has also increased the hardness of the individual : it has been shown that one of the mutations of *Drosophila*, though its wings are useless for flying, is nevertheless better able to withstand famine conditions than the wild type. But there is no means of checking the explanation.

The theory of the inheritance of acquired characters is always associated with the name of Lamarck. The suggestion is that the giraffe—for illustration—acquired a long neck because for generation after generation the individual giraffe stretched its neck a little beyond its natural length, and the slight lengthening acquired through habit was passed on to its children. But despite the immense labour that has been expended on experiments—with the fruit-fly, the white rat, and other creatures—no definite evidence has yet been established in favour of the Lamarckian theory.

Natural selection has, however, received the backing of an ever-accumulating mass of observations since Darwin's publication of *The Origin of Species*. Statistical calculations show that even if a mutation resulted in only a 1 per cent better chance of survival, it would establish itself in half the individuals of a species in a hundred generations. In other words, if a hundred and one individuals with this mutation survived for every hundred without it, it would spread through the species in what is, geologically speaking, a short time.

The way in which selection can occur is nicely established by the Frizzled Fowl. This (states Huxley) has a 'peculiar plumage, with upcurled feathers which do not retain heat well, and are at a great disadvantage in temperate climates.

THE PHYSICAL BASIS : THE EVOLUTION OF MAN

In tropical climates, however, the breed is extremely common : here the frizzled plumage is an advantage, since it enables the birds to keep cooler than normal birds.' This particular mutation appears to be ousting the normal form in the special conditions : it has a better 'survival value.'

Another good illustration of this principle is provided by a small moth that occurs in light and dark colorations. It was noticed that 'the relative abundance of lighter and darker forms in a dark pine-wood and an adjacent light birch-wood was quite different, and so, but inversely, was the intensity of selection, as revealed by the number of wings left by birds. The result was that in the dark environment the darker type had become sixteen times commoner, while in the light environment the lighter types were six times more abundant than the darker.'

These two cases show how selection can occur in a mixed stock : an individual inherits several genes affecting a single character in different ways ; and the environment, by weeding out those less well adapted to it, breeds an apparently new strain without there having necessarily occurred any fresh mutation, or any inheritance of acquired characters. This is the explanation of the breeder's success with domestic animals or crops. It is also worth noting that creatures that can move are to some extent able to select their own environment, by moving to conditions favouring them.

3 THE ORIGIN OF LIFE AND THE ORIGIN OF MAN

I want to return to the subject of sudden evolutionary jumps—the emergence of the first land-animal, for example, or the first appearance of feathers on a reptile's wing. The great majority of the conspicuous mutations in the fruit-fly have been harmful to the possessor—they have lessened its chance of survival. Unless, however, by some hazard the new form is also sterile towards normal members of the species, we will not find an abrupt appearance of a new

THE SCIENCE OF HUMAN NATURE

species, but, as already described, a gradual modification. It is a condition of the sudden jump that the new form shall be sterile towards the old. This process has been observed on a few rare occasions. In one well-known case a species of primula at Kew suddenly threw up a new variation that failed to cross with the old, and now constitutes a new species.

But such jumps as have been observed have never been anything like the big evolutionary jumps I have mentioned. One factor that has to be taken into account is the foreshortening effect of geological time—the interval between two series of rocks may be small when measured in terms of geological epochs, but very large when counted in generations of living animals. The very idea of big jumps in evolution may therefore be partly illusory—there may have been more time for intermediate steps than has been supposed.

Nevertheless, it remains an odd fact that the gaps should be as large as they are—that, for example, the first sea-shell to be recorded should be already a highly-developed form. Possibly under suitable conditions the rate of favourable mutation has been accelerated—there is good evidence for this having occurred at certain times in particularly abundant species, but not in scarce or new organisms.

Yet if this problem is hard to pin down to facts, it leads us to two special cases in which even speculation is difficult. These are the origin of life, and the origin of man.

On these abstruse questions it seems to me the only useful remarks have a philosophical rather than a scientific slant.

I think the evidence is quite definite that life did appear suddenly at a particular point in the history of our planet. Certainly we know that no rocks laid down before this period have yielded signs of life, whereas the great majority of water-laid sediments of later dates do contain fossils.

Now I cannot conceive of life appearing spontaneously from matter. It seems to me that there is a difference in nature between living and inanimate matter which precludes the spontaneous 'evolution' of the one from the other.

THE PHYSICAL BASIS : THE EVOLUTION OF MAN

It is true that a chicken's heart has been kept alive in a watery liquid for thirty years after the death of the rest of the chicken. It is also true that a mutation represents a change in kind in the cell-structure of an animal. It is furthermore reported that Russian physiologists have revived a dog after death. And it is plain that living matter is composed of molecules that are merely highly complicated conjunctions of the same atoms as occur in the simpler compounds of which inanimate matter is composed. In short, it is possible to hold that living matter is continuous with inanimate matter and that the former arose through a chance combination of simple molecules into a more complex one—an event against which the odds are enormously high, but which is not on that account rendered *impossible*.

Nevertheless these seem to be 'minor' considerations compared to the major idea that remains clear in my mind : that the quality we call 'life' is of so radically different a nature from that of inanimate matter as to be derivable only from previously existing life.

Pursued backwards this argument implies the existence of a living being from all eternity—a being that could not 'not exist.' The fact that a number of lines of evidence indicate that the solar universe is probably less than 5,000 million years old suggests that at some date a living being created this universe.

But these arguments are not scientific : the statement that living matter is 'radically' or 'fundamentally' different from inanimate matter is a generalisation from felt intuitions, not from scientifically established facts. However, the 'accident' theory of the origin of life can make no better claim to be established ; and it seems to me that to refuse to analyse the implications of the facts where they take you beyond the scientific evidence is to make a fetish of scientific caution.

We face a similar position when we come to the origin of man : in what sense can we say that man is 'fundamentally' different from other animals ? This is a question that it is useless to discuss without examining the evidence

THE SCIENCE OF HUMAN NATURE

concerning the nature of the human mind and its relation to the body. Without having these facts before us it is impossible to decide whether there has been any more radical departure from the pre-existing forms of life than when feathers first appeared on a flying reptile's wing. The physical frame of man clearly evolved from ape-like ancestors; but it is not possible to say from anatomical evidence alone whether the last step in the sequence was different from the earlier ones.

CHAPTER V

THE PHYSICAL BASIS OF HUMAN NATURE : INSTINCT IN MAN

I THE MEANING OF INSTINCT

We commonly hear that the behaviour of animals is governed by instincts. How far is this true of man ?

The idea of instinct is best gained from an example. Take the case of the species of wasp known as the Solitary Wasp. It hatches out from a chrysalis and thus never sees its parents. Yet it recognises certain kinds of caterpillar as the right food for its own grub. It stings the caterpillar on a certain nerve centre, which has the effect of paralysing it without killing it, and thus secures that the meat will remain fresh without having to be canned. The wasp then seals the carcase in the nest with the egg. The grub hatches and behold, its meals are all ready for consumption without the necessity of a tin-opener.

How can it do all this ? Does it never make a mistake ? As a matter of fact it may make ridiculous mistakes, and it takes a long time to learn from them. The wasp does not always sting the caterpillar in quite the right place at first. And if you keep removing the body from the door of the nest—the wasp always has a look inside before putting the body in—you will have to do it perhaps two hundred times before the wasp will take the body in without first dropping it outside ; but it will change its mind eventually.

Here we see the main characteristics of an instinct :

- (a) it is *inborn and unlearned*. It may be improved by experience, but it is there from the start.
- (b) it is a *persistent urge to perform a certain kind of action* : the wasp takes a lot of deterring.
- (c) it involves a disposition to *pick out and respond to some objects rather than others in the environment* : the wasp singles

THE SCIENCE OF HUMAN NATURE

out a particular species of caterpillar for its attack, and stings it in a particular spot.

As we ascend the evolutionary scale we can see the pattern of behaviour becoming more flexible : the chaffinch is not prevented from building its nest because it can find no horsehair ; a hungry dog will show a good deal of cunning in procuring food.

Nevertheless there is sufficient uniformity for the psychologist to be able to measure the relative strengths of different instincts in some animals. In one experiment, for example, white rats were offered various incentives for crossing an electrified grill. The experimenter counted the number of times that the rats braved the grill in twenty minutes under the influence of different instincts. The results were as follows :

<i>Instinct</i>	<i>Average Number of Crossings</i>
maternal	22·4
thirst	20·4
hunger	18·2
sex	13·8
exploring	6·0
no incentive (sheer activity)	3·5

Table 2 Relative strengths of instincts

2 INSTINCT IN MAN

What do we find when we come to man? Certainly nothing as stereotyped as the behaviour of the white rat or the solitary wasp. Yet we can undoubtedly discern certain impulses that are universal, occurring in every race and at every period of history : such are the impulses of fear, of fighting, of feeding and of sex. In what sense are we to call them instincts?

(a) *Fear*. It seems to be inborn, for an infant will show reactions which look like fear if a sudden loud noise is made or if he is dropped. The characteristic urge of an instinct is, according to McDougall (the foremost advocate of the theory), felt by the experimenter as an emotion. The kind of action

THE PHYSICAL BASIS : INSTINCT IN MAN

prompted by fear varies from running away to 'freezing.' In either case the end served is escape, and the signs of the response include wide-open eyes and stopping or speeding up of heart and respiration

We recognise the symptoms ; but are we right to use the word 'instinct' here ? Are we considering all the relevant facts ? I remember a report of a Scottish regiment engaged in Crete in 1941. The bravest man, according to the Commanding Officer, was a rifleman who was terrified from start to finish, but continued to fight and to patrol and to carry out all orders regardless of his feelings. Such behaviour we recognise as impossible to animals ; how are we to interpret it in terms of the instincts ?

(b) *Fighting*. The corresponding emotion is anger. This, or something that looks like it, can be roused in an infant by holding his arms down tight to his body. The circumstances provoking it in later life are extremely varied, and it is difficult to reduce them all to terms of one stimulus, such as the obstruction of some desire. It is even more difficult to be sure of the simple relationship between the fighting impulse and the feeling of anger suggested by McDougall. For surely if the relationship were simple, we should expect the boxer who loses his temper to be the likely winner ? and bomber crews to be selected from the fiery and the hot-headed ?

(c) *Feeding*. This is equally clearly an innate drive ; but it hardly needs an anthropologist to tell us that hunger receives as many forms of satisfaction as there are tribes in the human race.

(d) *Sex* illustrates vividly how an instinct may work powerfully in a human being's mind without his having any conscious realisation of the end implied, perhaps impelling him to actions bringing him nearer to that end, or merely adding zest to a social function directed to quite other objects. We can also see how an instinct may dispose a person to pick out and respond to particular objects in his environment. As a young man walks down the street his eyes tend to pick out human beings rather than buildings, women rather than

THE SCIENCE OF HUMAN NATURE

men, young women rather than old, pretty young women rather than plain. And he may be resisting the impulse strenuously.

Yet even here the evidence is not undisputed. We take for granted in Western civilisation that men are more strongly sexed than women ; but the fact that in some primitive tribes there is no consciousness of a difference in this respect, while in others the women are just as implicitly assumed to have the more vigorous sex-impulses, suggests that, whatever the inborn drive, it is liable to become overlaid, and even totally reversed, by patterns of behaviour derived from quite different sources, such as custom and tradition.

These four drives, however, certainly represent important channels along which human energy is released. In addition McDougall described a number of other strong human impulses as instincts, such as self-assertion, submission and maternal care. But what sort of evidence is there ? It is true that when we look round us we see men struggling for power and wealth and sexual satisfactions. But are we sure that even such uniformity of behaviour as we can observe in our own country is universal amongst men ? Consider the maternal instinct, which has frequently been put forward as the mainspring of unselfishness and self-sacrifice. Surely it takes somewhat peculiar forms ? In the Andaman Islands, we are told, children are always adopted by other families before they are six years old, and then treated with the same affection as unadopted children. In some countries it has been the practice to expose unwanted children at birth, in others to kill off the excess of boys or girls if more of the one sex are born than of the other. Are these habits expressions of the maternal instinct ? or are we to conclude that other influences may operate so powerfully as to disguise, or altogether reverse, the promptings of this most vigorous instinct ? In short, we must ask ourselves : in what sense can any of these urges be described as instincts ? Or—to be more precise—what value for the purpose of understanding human nature has a theory of human instincts whose outlines are so vague ? For we must confess that we can scarcely

THE PHYSICAL BASIS : INSTINCT IN MAN

specify any details of behaviour as consistently associated with a particular drive.

3 GREGARIOUSNESS AND THE CONDITIONED REFLEX

There is, however, another characteristic man shares with many animals : his gregariousness. This trait is often referred to as the 'herd instinct' ; but, as we shall see later, many of the habits that have been attributed to this 'instinct' have quite different origins. But this does not detract from the very great importance of the psychological needs and behaviour referred to. Gregariousness appears to be based on what McDougall called 'primitive passive sympathy.' What we generally mean by sympathy is our feeling of sorrow or pity for another person when he is in distress. But McDougall meant something a good deal more general than that. He used it rather in the sense of *feeling with* other people, as any good leader must feel with his men if he is to manage them effectively, or as an advertising agent must feel with the public if he is to sell his wares.

Here, as elsewhere, McDougall started from the phenomena of animal psychology : a herd of deer are grazing ; one member is attacked by some beast of prey and utters its characteristic cry of fear : every other member of the herd immediately seems to feel fear too and takes to flight. One of a pack of hounds finds a lost trail : that one utters its characteristic yelp, and all the rest at once take up the call. One small boy stands still in the street and gazes up into the sky, and before a minute has passed a crowd has gathered to gaze up into the sky. The small boy laughs and goes away. One person in a church begins coughing or yawning and everybody else takes it up. How does this spontaneous transmission of feeling take place ? The process is quite simply explained in terms of the *conditioned response*, a useful idea which we must now examine.

A reflex action is an automatic involuntary response to a definite stimulus. If you cross your legs and tap the

upper limb just below the knee it kicks forward. The movement occurs without your willing it, and it is very difficult to control ; it is a precise physiological response to a definite stimulus. The nerve mechanism was described on p. 35. The brain is not usually involved at all.

It was this perfectly mechanical process that fascinated the great Russian physiologist Pavlov, and led him, over the course of years, to devise a famous series of experiments.

When you see a juicy steak, your mouth waters ; that is, the salivary gland begins to secrete saliva into your mouth to assist chewing and digestion—a typical reflex action. When a hungry dog sees a juicy bone its mouth likewise waters ; and it is quite easy to fix up an apparatus to measure the number of drops of saliva produced. This is what Pavlov did. His experiments included the following :
(a) He rang a bell at the same time as he showed the dog food. After doing this several times, he found that ringing the bell would produce the saliva without any food being present. He termed this a ‘conditioned response’ to the bell, or ‘conditioned reflex.’

(b) In a second experiment the bell was sounded a number of times without the food. The dog’s mouth began to salivate less and finally stopped. But if he was once given food again at the same time as the bell, the pattern was immediately re-established.

(c) In another experiment Pavlov used a circular disc of light to condition the response, while with a narrow oval of light he gave no food. The dog had no difficulty in distinguishing the two signals and did not become conditioned to the oval light. But then Pavlov gradually altered the shapes of the lights, making them more and more similar, until a point was reached where the dog could not make up his mind whether food was coming or not ; whereupon he began to get excited and yelp, forgot everything he had learned, and salivated at any shape or size of light. For some time afterwards he remained bad-tempered and irritable.

(d) Again, Pavlov found that natural reflexes could

THE PHYSICAL BASIS : INSTINCT IN MAN

easily be stopped. Electric shocks of gradually increasing strength were given to the dog at the same time as the food, until even a shock that would normally have proved painful was greeted with mouth-watering, tail-wagging, and other symptoms of pleasure. The natural response of pain was entirely stopped or inhibited.

We can all parallel these results in our own experience, even in the last instance. how many men have disliked the bitter taste of beer in boyhood and grown to enjoy it later ! The result of experiment (c) has been described as the canine equivalent of a nervous breakdown. It is worth asking yourself whether, when you see Miss Jones coming towards you, it is a conscious and deliberate action to raise your hat and form the words ' Good morning ' ; or is it reasonably explained as a conditioned response ? We shall be returning to the question of habit in other guises in chapters viii and x. It is also easy to quote cases where conditioning has failed to take place : the dog in the experiment will not learn if the experiments are conducted immediately after his dinner. Other evidence shows that conditioning is not the only means of learning. But these points are irrelevant to our present purpose ; which is to see how the principle can be used to explain primitive passive sympathy.

Let us consider an example of the automatic transmission of a response uncomplicated by human sympathies. In America there is a small grasshopper-like insect to be heard chirping on a summer evening, the katydid.

Insect A chirps : Zee.

In a moment another insect, B, chirps : Zee.

After the same interval A chirps again : Zee.

And then B, and then A, and so on—you can listen all the evening unless something interrupts them, or you get bored and go away.

If insect A had originally chirped twice, Zee Zee, then B would have replied with a double chirp Zee Zee, and the conversation would have gone on in doublets.

The explanation is supposed to be this : A's first chirp

THE SCIENCE OF HUMAN NATURE

was due to some internal stimulus, just as a man's inquiring of his wife when dinner will be ready may be prompted by the internal stimulus of hunger.

$$S_1 \rightarrow R \quad \left(\begin{array}{l} S_1 = \text{original stimulus} \\ R = \text{response Zee} \end{array} \right)$$

Now if the insect heard a bell ring every time it felt this stimulus, the bell would in time serve equally to produce the chirp. In fact no bell rings ; but the insect does hear something—its own chirp ; and so the *sound* of the chirp becomes a conditioned stimulus for the chirp.

$$\begin{array}{ccc} S_1 \rightarrow R \text{ (Zee)} & & \\ \uparrow & & (S_2 = \text{conditioned stimulus}) \\ S_2 \text{ (Zee)} & & \end{array}$$

This may be expected to happen in every individual insect. Therefore if insect A chirps and insect B hears it, A's chirp acts as stimulus to B and B chirps. Then B's chirp acts as stimulus to A and A chirps ; and so on.

There is another possibility. Suppose that A's chirp acts as stimulus not only to B but to A. Then when B chirps in reply to A, A will also chirp in reply to himself. If they do not chirp together, the two stimuli interfere with each other and nothing more happens. But quite frequently they do chirp together ; that chirp will again prompt them both to chirp. Any insects within hearing will join in ; and you will get a crowd all chirping together. And this does in fact happen with one species of insect ; you will often find a chorus of them all performing in exquisite time without a conductor. Moreover, the above explanation is confirmed by the fact that if you remove the organs which serve as ears, all the chirping will be at sixes and sevens in a moment and soon cease.

To revert then to the case where, say, a deer catches **fear** from the cry of another deer. We must suppose that the animal, through repeatedly hearing its own cry of fear

THE PHYSICAL BASIS : INSTINCT IN MAN

simultaneously with seeing some threatening beast, comes to respond to that cry as readily as to the lion itself—and therefore to another deer's cry equally.

The same process appears to occur in human beings : many people have reported a spasm of fear on hearing a sudden cry of alarm. In certain circumstances, too, people have been observed—particularly children—unconsciously imitating what others are doing : a fact easily explained in the same way.

That spontaneous transmission of feeling does in fact occur is fully established by the evidence ; that the mechanism by which it takes place is the one advanced here is not ' established,' only ' supported,' by the evidence. But it is a simple explanation, based on facts which are established — those of the conditioned reflex. In addition this explanation would help to account for the immediacy and intimacy of response that is possible between two human beings. The importance of intimate sympathetic interest between man and man is a point we shall be returning to later.

CHAPTER VI

THE PHYSICAL BASIS OF HUMAN NATURE : THE INFLUENCE OF THE ENDOCRINES

I HOW THE ENDOCRINE GLANDS WORK

THE physical foundation of personality has another aspect : the endocrine glands. These are small glands situated in various parts of the body which manufacture and secrete certain chemical substances. The tear glands secrete liquid into the eyes which overflows as tears ; the salivary glands secrete digestive juices into your mouth which you notice when your mouth waters. But the endocrines deliver their secretions into the blood stream, which passes through them. These secretions are called 'hormones,' or chemical messengers, and although they are produced in minute quantities, their effects are out of all proportion to their quantity.

In general, their function is to control certain physical changes, such as the growth of the bones and the physiological accompaniments of anger, so that they take place evenly all over the body. They act, in a word, as a chemical means of integrating the changes of the body.

The endocrines that will concern us are as follows :

(a) *The thyroid gland*, which is situated in the neck. The effects of under-activity and over-activity of this gland are extreme. A child born with seriously deficient secretion exhibits the abnormality known as cretinism. His body becomes bulky and flabby, his hands and feet large and clumsy ; his mind never rises above an animal level. But dose him with extract of ox-thyroid and at once he begins to sit up and take notice ; in a year or two he will put on a cheerful and energetic human personality. Disease of the thyroid in later life produces an analogous mentality ; Mottram quotes the case of a woman of sixty-five who 'looked like a bald and stupid old man,' slovenly and

THE PHYSICAL BASIS : THE ENDOCRINES

apathetic ; with thyroid treatment she lived to the age of ninety-four, ' the picture of a charming, lively, elderly lady.' The treatment may be compared to the application of bellows to a fire, speeding up combustion and generating energy.

It is worth noting that cretinism and goitre occur most frequently in quite well-defined areas of the globe : parts of Derbyshire, Switzerland, the Caucasus, the Andes. In all these highland regions the rocky sub-stratum is limestone and the water drawn from wells contains a rather characteristic selection of ' impurities.' All water contains a number of different substances dissolved in it, usually in minute quantities ; but the water in the areas mentioned lacks one of these : iodine. And iodine is a substance that we must have, to the tune of about one millionth of an ounce a day, if our thyroids are to work efficiently. You can see the sort of quantities involved in the overthrow of a human personality.

At the other extreme from the cretin you find people with over-active thyroids. They live, literally, in a fever of activity, for their temperature is always a little high, they never seem to feel the cold, they are perpetually on the go. The restless anxiety and excitability may end in mania or a fatal seizure.

Between the two extremes, which are definitely abnormal, it is possible to detect quite well-defined contrasting personalities — a sub-thyroid type who is inclined to be fat and placid, not very quick or energetic in either mind or body ; and a hyper-thyroid type, rather thin, unusually quick and active, highly strung and restless.

We have to be careful, however, in deciding at exactly what point the physical change has produced a mental effect. Given, for example, that a schoolboy suffering from thyroid deficiency was slow, fat, lazy and stupid, these qualities might provoke the sarcasm of a schoolmaster to the extent of goading the boy into permanent sullenness and resentment. Subsequently, then, a person ignorant of the case-history might quite wrongly suppose the sullenness to

THE SCIENCE OF HUMAN NATURE

be due to the thyroid disorder. How much more difficult, therefore, must it be to discriminate between qualities directly due to physiological constitution and those developed in the child by the impact of environment on his particular make-up !

(b) *The adrenal gland*, which is a double body lying close to the kidneys. The centre portion of it, the medulla, secretes a substance called adrenalin, which has powerful effects on the whole body in moments of danger. On a country walk, in the middle of a field, you suddenly find yourself face to face with a bull. The danger is registered by the brain and immediately nervous impulses travel to the heart, the lungs, and the adrenal gland, which discharges adrenalin. This substance has astonishing effects. One part of it in 200 millions of your blood produces, amongst others, the following effects :

- (i) it splits up the animal starch in your liver, yielding more sugar in the blood to serve as fuel for muscular exertion ;
- (ii) it stops the churning movements of your stomach and intestines, causing digestion to cease and blood to be directed to the muscles ;
- (iii) it makes your blood coagulate more easily, so that if you are wounded you stop bleeding more quickly than usual ;
- (iv) it increases the power of the muscles and their resistance to fatigue ;
- (v) it causes the small blood vessels in the face to contract, sending the blood inwards and leaving the face pale.

In short, the influx of adrenalin to your blood increases your physical strength and defensive armament.

Removal of the medulla of the gland from a cat leaves it a mild and gentle creature, lying by the fire in preference to hunting mice and wailing on the tiles at night. But rats injected with adrenalin do not suddenly turn to fighting, though they do more darting about. They also become slower in learning to find their way out of a maze. Similarly, human beings dosed with adrenalin report a sensation of

THE PHYSICAL BASIS : THE ENDOCRINES

vague anxiety and distress, accompanied by blushing and blanching and possibly weeping.

Again, therefore, we are obliged by the indecisive evidence to exercise a good deal of caution in drawing our conclusions. It has been confidently asserted that extra activity of the adrenal glands tends to make a man pugnacious, to give him unusual staying power, to hinder his digestion and to divert his energy from thought to excessive action. It is possible that this is the case ; but the fact that adrenalin appears to serve equally the fighting and the fear impulses suggests that the relative strengths of these emotions may depend on some quite different factor, while the secretion of the adrenal medulla merely provides the muscular resources that are likely to be called on whether the action taken is resistance or escape.

Sub-functioning of the outer part, or cortex, of the adrenal gland results in loss of energy, physical and mental, followed by a decline of the sex instinct. Over-activity in a man leads to premature sexual development, with a strong growth of hair on the body and unusual muscular strength. In a woman the result is typically a rather powerful muscular type. Once again, however, we must be careful about our conclusions. The adrenal cortex may be delivering too much of some hormone into the blood and causing a young woman to acquire a rather mannish appearance ; but it does not invariably follow that her outlook changes with it. She may remain just as feminine and desirous of husband and family as before. The facts suggest that the psychological change may very possibly occur only if psychological factors intervene ; for example, if as a result of the physical change she comes to identify herself with masculine ideals and values.

(c) *The sex glands.* The sex glands, like the adrenals, produce more than one hormone. Besides producing the secretions directly involved in reproduction, they generate other substances which go into the blood stream and control the secondary sex characteristics—the distribution of hair on face and body, the pitch of the voice, the proportions of the

THE SCIENCE OF HUMAN NATURE

figure, and so on. By transplanting the sex glands in animals one can completely transform sexual appearance. If the sex glands are removed before the animal reaches sexual maturity, it becomes incapable of further sexual development and its attitude to the other sex remains neutral. If the sex glands are removed after the animal has reached sexual maturity, its sex organs degenerate and it loses its specific attitude to the other sex. It also exhibits far less general non-sexual activity than normal specimens of the animal. Complete restoration is effected by injection of sex-hormones. If the sex glands are removed from a male guinea-pig and a portion of ovary from a female is grafted under his skin, he will so far develop female characteristics as to suckle the young. In certain creatures, such as the minnow and the oyster, reversal of sex occurs naturally.

Rather similar changes to those described above have been observed in human beings. The sex hormones seem to be yet another source of general physical energy. This fact has been the basis of the theory that you could rejuvenate elderly men and women by injecting them with sex hormones; but, in fact, it seems likely that the heart, the arteries and other organs would not equally be rejuvenated and the body would quickly break down.

What sort of connections, then, can we trace between these physiological events and the working of the instincts? It is clear enough that the power, and to some extent the quality, of the sex instinct depends on the sex glands. But how far can we go beyond that? We have not found any evidence for supposing that the feeding instinct depends on endocrine secretions. And we have already noticed that our two remaining drives, fear and fighting, which are so contrasted in their effects on a person's outlook, appear to be equally associated with the secretion of adrenalin. If there is a connection between particular endocrines and specific instincts outside the sphere of sex a good deal of work remains to be done to establish the fact.

Yet the evidence does seem to entitle us to draw one conclusion: that extra-activity of certain glands is likely to

THE PHYSICAL BASIS : THE ENDOCRINES

provide a bigger fund of general physical energy. It is supported by Burt, who has assembled a reasonable amount of statistical evidence in favour of an inborn quality of general mental energy or power, or strength of emotional reaction, which may well be connected with endocrine activity. We will be returning later to Burt's evidence when we are in a position to appreciate the statistical criteria involved (see p. 81).

2 ENDOCRINES AND TEMPERAMENT

So far in this chapter we have been discussing the relation between physiological functions and the working of the instincts. I now want to pass on to the evidence for a physiological basis for temperament, or inborn emotional disposition.

A number of attempts have been made to prove such a basis, inspired mainly by the most famous of modern classifications of temperament : the extraversion-introversion system proposed by Jung, the Swiss psychiatrist.

The introvert, as his name implies, is turned inwards : he is shy, sensitive, rather unsociable, naturally thoughtful and deliberate. He does not like giving away his feelings, and an impassive exterior may conceal an intense inner life. ' Still waters run deep ' is a phrase that could only be used of an introvert. The extravert's nature, in contrast, is turned outwards to the solid world of everyday life. He likes company, for he is at ease with other people and expresses his feelings without embarrassment. He tends to make plenty of friends wherever he goes, but to forget them when he moves on to a fresh locality. The introvert is more likely to possess a few intimate friends of long standing. Crime when committed by an extravert is likely to be characterised by impulsive acts of violence, when by an introvert it will rather be long-planned and subtle. Anxiety and suicide are commoner among introverts. The Chinese was obviously an introvert who said, ' Me no drinkee for drinkee, me drinkee for drinkee.'

The distinction certainly accords with common ex-

perience ; we all recognise the opposed characteristics. All we need to clinch the argument is to apply a statistical check. But how could we set about this ? We could give some form of introversion-extraversion test to a large number of people and plot a graph of the results. If we did so, what should we find ?

Let us first take an imaginary case. We have a mixed crowd of Englishmen and Congo pygmies. The average height of the former is 5 ft. 7 in., of the latter about 4 ft. 7 in. If, therefore, we plot a curve of the type shown in Fig. 4, we should get something like the following :

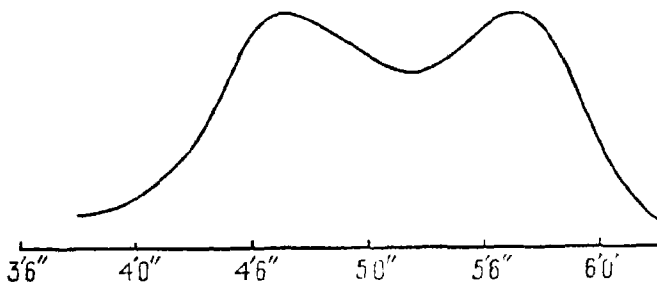


Fig 10 Graph representing imaginary frequency of occurrence of men of different heights in a mixed crowd of Englishmen and Pygmies

Any collection of individuals that fall into two contrasting groups should give a graph of this shape. And therefore if, as the theory implies, people tend to be *either* introverted *or* extraverted, we should get a graph of this same type when we plot the scores of our introversion-extraversion test. But in fact the curve we get turns out to have the normal chance-distribution shape, as in Fig. 3. The great majority of people are evidently neither full-blown extraverts nor hermit introverts, but somewhere in between. We conclude that Jung's classification cannot represent clearly defined alternatives in native endowment. (The question is discussed again later, on p. 126.)

THE PHYSICAL BASIS : THE ENDOCRINES

3 OTHER EXPERIMENTAL WORK ON THE PHYSICAL BASIS OF TEMPERAMENT

The above conclusion has not deterred the laboratory psychologists from doing a good deal of experimental work on the physical basis of temperamental differences, and by large-scale testing under statistical control they have succeeded in isolating certain qualities. These we can illustrate by a couple of simple tests.

First you need to make for yourself a couple of large irregular ink-blots, some inches across. Then give yourself a minute to see how many faces, figures or objects you can detect in one blot, turning it round as you like. Repeat with the second blot. The average score is about six.

This is a test for a quality known as *surgency*. You notice that it involves quickness and flexibility of imagination. The theory is that this is normally accompanied by high speed of reaction in other directions, and that surgency is a fundamental quality of each individual's nervous system. It has been found that surgent people share many of the extraverts' qualities—they tend to be cheerful, sociable, humorous, fertile in imagination. The desurgent type tends to be slow in thought, reserved and shy. This is shown by the statistical method of *correlation*, which we will be coming to in the next chapter. It has been proved that there is a high correlation between surgency and the extraverted qualities mentioned, and between desurgency and the introverted qualities. In other words, although the average person is not likely to be markedly either introverted or extraverted, yet if he does show introversion in one respect, he is more likely to show introversion than extraversion in other respects too.

A second quality, known as *perseveration* (not to be confused with perseverance), is the tendency of mental effects to persist in your mind after the experience that has provoked them is past—as a tune may go round in your head or a feeling of annoyance last on as a bad mood. You may test this quality in yourself by writing w's as fast as you can for half a minute, three times ; and then writing them back-

THE SCIENCE OF HUMAN NATURE

wards as fast as you can for another half minute. Then divide the average of your forwards scores by your backwards score. The average is about two. A high score is usually associated with introversion.

But what can we infer from such observations? We are asked to conclude that the desurgency and high perseveration of an introvert are characteristics of his nervous system in virtue of which he tends to become an introvert. Surely we would be equally entitled to argue that the human nervous system responds to environment, and that the introversion, the desurgency, and the high perseveration have all developed as a result of the interaction between the individual and his environment? Such an interpretation is supported by certain other experimental work. In one investigation people were put through a number of mechanical tests under varying conditions: first alone, and then in competing and co-operating groups. It was found that a single person's speed and efficiency were likely to vary with his circumstances as widely as a group of people varied among themselves. In other words the responses of his nervous system varied with his environment, and varied widely. It looks as if the individual's human environment may have at least as powerful an effect on his capabilities as the functioning of his nervous system. You should compare the pros and cons for this tentative conclusion with the evidence on instincts mentioned on pp. 51-2.

You will, no doubt, have noticed that we are here no longer attempting to trace a man's temperament to the influence of chemical changes or endocrine secretions, but to that of his nervous system. This brings us round to a point we noted some time back, in chapter III (p. 33), when we were dealing with the structure of the brain: that radical changes in character could be brought about by the application of purely physical agencies, such as surgery or electricity, to the brain.

We have, therefore, now followed the main attempts that have been made to relate personality to physical constitution. It is clear that human personality is profoundly

THE PHYSICAL BASIS : THE ENDOCRINES

influenced by the physical constitution and functioning of the body ; but it is also, I think, clear from the evidence I have brought forward, not so much that the connections are difficult to disentangle—of course they are that—but that they are often entirely overlaid, and even apparently reversed, by the influence of the human environment.

CHAPTER VII

THE NATURE OF INTELLIGENCE

I THE MEANING OF INTELLIGENCE

WHAT does 'intelligence' mean? Is the boy who gets all the prizes at school to be regarded as more intelligent than the one who sits at the back of the class and makes a fortune in after life? Do intelligence-tests measure intelligence? What connection is there between intelligence and wisdom? Has a madman intelligence? Or an idiot? Is intelligence an indication of an immortal soul? Or is it a reflection, so to speak, of chemical or electrical changes in the brain?

The problem has a double importance for us. it has a bearing on the nature of the human 'mind' or 'spirit'; and the methods by which it has been tackled illustrate some further statistical techniques of wide application. These are associated particularly with the name of Spearman of London University. Before Spearman began to develop his special methods there had been various approaches to the problem.

(a) *Intelligence as the capacity for abstract thought* In the first place, the legal and administrative difficulties of defining the limits of mental deficiency had led certain investigators to take up the question from this starting-point. They were disposed to regard intelligence as the capacity to think abstractly. For the most conspicuous defect of the mentally deficient child is his inability to grasp a general idea, whether of a rule in arithmetic or of an industrial process: he is often quite good at the purely mechanical parts of a job. Our own experience will probably lend weight to the view; for most of us find it harder to grasp abstract notions of time as a fourth dimension, or of inflation and deflation, than to follow the complicated workings of a motor-car engine that is right under our fingers. On the

THE NATURE OF INTELLIGENCE

other hand this conception seems to imply that the theoretical mathematician ranks higher than the engineer or financier, whose dealings with figures are less bookish and abstract.

(b) *Intelligence as adaptability.* In the second place, the students of animal behaviour observed that the more primitive the animal, the less easily it adapted itself to new situations. The solitary wasp is tied to a mechanical routine in providing for its offspring, whereas the fox will resort to all sorts of shifts to get food for its young. The same contrast is to be found among human beings, as the following stories show.

The first is of a mentally deficient girl whose job was to scrub the hall floor in the Home every morning. One day they found her kneeling by her pail half-way through the morning doing nothing, and they asked her why she was not washing the floor. She showed them she had not got any water in the bucket—somehow it had not been filled and she had never thought of looking for somebody to help her.

The second shows the pitch of rapid adaptability that can be attained by a brilliant man. The incident is taken from the early career of the first Lord Birkenhead when he was a rising barrister, and is quoted from Churchill's *Great Contemporaries*.

A boy had been run over by a tram and his parents were suing the Company. Birkenhead was defending the Company. The case for the boy was that the accident had led to blindness. The story goes on as follows :

The judge, a kindly if somewhat garrulous soul, allowed sympathy to outrun discretion.

'Poor boy, poor boy !' he exclaimed. 'Blind ! Put him on a chair so that the jury can see him.'

This was weighting the scales of justice, and F.E. was moved to protest.

'Perhaps your Honour would like to have the boy passed round the jury-box,' he suggested.

'That is a most improper remark,' exclaimed the judge.

'It was provoked by a most improper suggestion,' was

THE SCIENCE OF HUMAN NATURE

the startling reply. The judge tried to think of a decisive retort. At last it arrived.

‘Mr Smith, have you ever heard of a saying by Bacon—the great Bacon—that youth and discretion are ill-wedded companions?’

‘Yes, I have,’ came the instant repartee. ‘And have you ever heard of a saying by Bacon—the great Bacon—that a much-talking judge is like an ill-tuned cymbal?’

‘You are extremely offensive, young man,’ exclaimed the judge.

‘As a matter of fact,’ said Smith, ‘we both are; but I am trying to be, and you cannot help it.’

‘What do you suppose I am on the bench for, Mr Smith?’

‘It is not for me, your Honour, to attempt to fathom the inscrutable workings of Providence.’

The repartee displays not only verbal mastery but extraordinary flexibility of thought. The contrast between the future Earl of Birkenhead and the mentally deficient girl shows clearly enough why adaptability should have been regarded as a criterion of intelligence.

(c) *Intelligence as a capacity for learning.* A third approach was adopted by the teacher, who was naturally concerned with his pupils’ capacity for learning.

(d) *Intelligence as a name for a bundle of unrelated capabilities.* A fourth school regarded the whole question as misleading: they insisted that the human mind contained a number of unrelated capacities, and that to talk about ‘intelligence’ was to beg the major question at issue.

The argument at this stage shows plainly how inconclusive the evidence on a disputed subject may remain, even when well documented, before measurement is applied. Further progress has been due to the development of measurement by two great pioneers, Spearman, whom we have mentioned, and Binet, a French psychologist.

In 1901 Binet was asked by the educational authorities in Paris to give them a clear-cut technique for distinguishing mentally defective from normal children.

THE NATURE OF INTELLIGENCE

He tried out a number of different types of tests on school children, but he found that no single one was dependable. Any child might do far better on one test than on another. He therefore decided that if he was to give every child a fair chance he must set him a miscellaneous battery of varied tests—tests that would measure his memory, his understanding of words, his ability to detect absurdities, his arithmetical capacity, and so on.

His next difficulty was to find a *standard* by which to measure the children's abilities: it is not much use to you to be told you have scored 14 marks out of 20 in a test if you do not know whether most people score 2 or 20. He therefore tried arranging his tests not according to the *capacity* they were designed to measure—all the memory questions in one group, all the arithmetical ones in another, and so on—but according to the *age* at which an average child was likely to answer them correctly. He extended the series downwards to something that a three-year-old child should be able to do—such as giving a name to four or five common objects that were shown to him—and upwards to something that a fourteen-year-old should manage, such as giving three differences between a President and a King.

How could he be sure that such a group of tests was suitable for a seven-year-old child? He simply gave each separate item to a very large number of children of various ages and found where the average lay for each. This involved a good deal of testing and re-testing and replacing of unsatisfactory items, and it was not until 1905 that he finished his first standard set. Even then the work was by no means complete, and the battery continued to be revised by successive investigators after Binet's death in 1911.

By means of these tests Binet established a *standard score* for each age. Then a child who gets the score for the age of 6 is said to have a *Mental Age* of 6 whatever his physical age may be. This will have a very different implication for a child of 5 and a child of 7. The former will be advanced, the latter backward. Moreover, tests show that if he is a

THE SCIENCE OF HUMAN NATURE

year behind at one age, he is likely to be twice as far behind at twice the age. In other words the *ratio* of Mental Age to Physical Age remains more or less constant. It was this fact that led Stern and Terman to develop a new concept of the Intelligence Quotient or I.Q. A person's I.Q. is the ratio of his Mental Age to his Physical Age reckoned as a percentage. If a girl of 10 has a Mental Age of 8, her I.Q. is 80; if she has a Mental Age of 13, her I.Q. is 130.

2 THE STATISTICAL APPROACH

Meanwhile Spearman was at work on a different tack. He maintained that there were two basic problems involved: first, is intelligence a single mental power or capacity which can be switched on to any job at will, or a bundle of separate and unrelated capacities? and second, what is the nature of abstract ideas?—how do we get them? what reality have they? how are they related to the physical world?

Let us take the first question. Is intelligence a unitary capacity or a bundle of unrelated capacities? The technique Spearman adopted introduced a revolution in psychological methods. It marked the first successful application of mathematics to a problem of this kind, and it has been the basis of all subsequent work on this and many other topics.

To decide whether there was any common gift underlying different capacities—which he measured by tests similar to Binet's—he had to calculate what is known as a *Correlation Coefficient*. We can make the meaning of this clear by a couple of examples.

If we plot a graph of the numbers of fatal road accidents and of motor licences current in Great Britain in the years 1922 to 1930, we get the results shown in Fig. 11 opposite.

The two trends are obviously closely connected. They are said to have a high coefficient of correlation—perhaps 0.8 or 0.9. The highest correlation that is possible is 1.0, which will mean an exact parallelism of the lines in every detail.

THE NATURE OF INTELLIGENCE

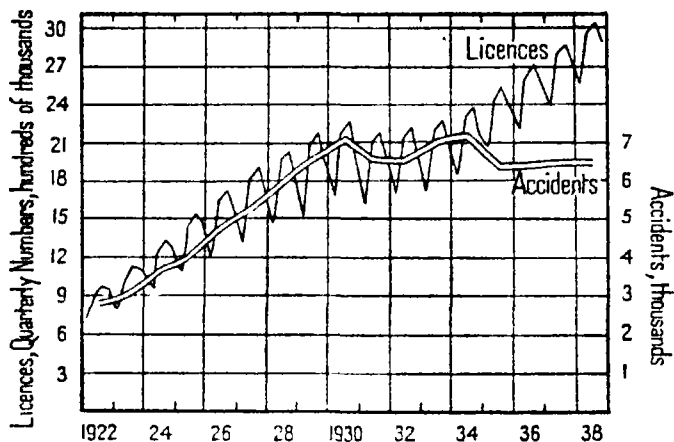


Fig 11 Example of a positive correlation Fatal Road Accidents and Motor Licences current in Great Britain, 1922-38 (after Tippett)

If we plot Real Wages against Marriage Rates per 1,000 of population in England and Wales from 1850 to 1890, we get the following



Fig 12 Example of a negative correlation Marriage Rate and Real Wages (after Tippett)

THE SCIENCE OF HUMAN NATURE

We can see a general tendency for the one to go up as the other goes down. There is a *negative* correlation between them. (There is also a positive correlation in certain peaks and troughs of the curves.) This does not necessarily mean that the two are *causally* connected. But it does mean some sort of association. A zero correlation means no connection whatever, such as that of an irregular line drawn at random across the graph.

But you cannot get an exact measure of correlation from such graphs. One method of calculating a correlation coefficient is illustrated by the following figures, obtained from a group of ten pupils of mine. This method is based on the comparison of the rank positions of the boys when they are placed in order of performance at different activities.

The correlation coefficient between two orders has been shown by mathematicians to be given by the formula $1 - [6 \times (\text{sum of } d^2)]/[N \times (N^2 - 1)]$, where N is the number of boys. The coefficient for columns (1) and (2) is $(1 - 6 \times 98)/(10 \times 99)$, or 0.40, and that for columns (1) and (3) is $(1 - 6 \times 190)/(10 \times 99)$, or -0.16.

What do these figures mean? The correlation of 0.40 implies that there is some common factor (perhaps more than one) at work in the two tests—it may be intelligence, or determination, or something else. The correlation of -0.16 indicates no significant association between the mental ability and the athletic gift.

But we could not argue from the above figures alone that there was in fact a common factor operating in the two examinations, or that there was no connection between the academic order and the football order. The chance errors, such as we discussed in chapter II, are far too high when our numbers are so small. (It is obvious, for example, that children's orders in class are highly variable quantities, depending on all sorts of unpredictable influences.)

What Spearman did, therefore, was to apply batteries of tests of various kinds to some thousands of children of approximately the same age, and then to calculate the correlation coefficients between the scores obtained in the

THE NATURE OF INTELLIGENCE

Boy	(1) Order in Physics Exam.	(2) Order in Chemistry Exam.	(3) Order at football	Columns (1) & (2)		Columns (1) & (3)	
				difference in position =d	d ²	d	d ²
A	6	7	2	1	1	4	16
B	3½	2	7	1½	2¼	3½	12¼
C	1	3	1	2	4	0	0
D	8½	9	5	½	¼	3½	12¼
E	10	5½	6	4½	20¼	4	16
F	5	1	10	4	16	5	25
G	3½	4	8	½	¼	4½	20¼
H	2	8	9	6	36	7	49
I	7	10	4	3	9	3	9
J	8½	5½	3	3	9	5½	30¼

Table 3 Method of calculating correlations between the orders of ten boys in three activities

different tests. The correlations turned out to be as high as 0.7 or 0.8 between tests that were based on certain rather abstract relationships. For example, an 'Analogies' test is composed of questions like these:

- (1) FINGER IS TO HAND AS TOE IS TO ——— ?
- (ii) CHARACTER IS TO REPUTATION AS TRUTH IS TO (BRAVE OR OPINION OR LIE).

A 'Classification' test asks you to point out the word belonging to a different category from the others: for example, among the following—CHAIR, TABLE, WHEAT,

RUG, CURTAIN. Tests of such kinds correlated highly amongst themselves, but much less highly with such tests as judging weights or picking out musical notes. Spearman showed that the statistical facts could be interpreted in accordance with what was termed the 'Two Factor' theory of intelligence.

This suggests that every capacity you have, from baking cakes to researching in mathematics, from playing golf to playing the flute, involves two factors, a general one which Spearman called g , and a special aptitude, s , for that particular type of activity. The special aptitudes, according to Spearman, bulk differently in different performances: in mathematics g was shown to be nine times as important as s , in drawing only a quarter as important. In other cases the discrepancy is even more marked. one well-known calculating prodigy who did some highly specialised computation on factors and prime numbers for the Academy of Sciences at Hamburg was quite unable to learn the simplest geometry. And a man who spent many years in the Royal Earlswood Institution for the mentally defective constructed marvellous mechanical models while there. It is as though the general capacity g had to work through a number of engines of varying complexity, and that in some cases the engine had a much bigger part to play than in others.

Spearman's theory, in modified form, has gained wide acceptance. It now generally takes the form of a 'Three-Factor' theory, which inserts between the general ability and the special aptitudes a number of 'group' factors which affect your performance in several directions but not all. For instance, a strong feeling for words may represent a group-factor that puts up your score in all tests based on words, but leaves your scores in musical or mechanical tests unaffected.

We can see that the answer to our question, whether intelligence is a unitary capacity or a bundle of unrelated capacities, is not a plain 'yes' or 'no'.

THE NATURE OF INTELLIGENCE

3 THE PERCEPTION OF RELATIONS

Spearman's second question was: What are abstract ideas? The results of his large-scale mental testing convinced him that the general factor *g* was concerned with the *perception of relations*, and led him to formulate the laws governing the processes of thought.

(a) *The laws of thought.* We can illustrate them by analysing the process of answering a question from an intelligence test : FINGER is to HAND as TOE is to —.

The first step is to understand the meanings of the words promptly and correctly.

The second is to grasp the relation between FINGER and HAND aright : the finger is the end-part of the whole hand. You can make a diagram like 13*a* below.

Relationship : end-part to whole

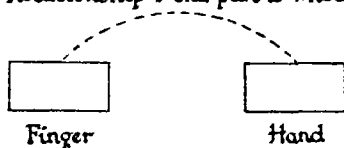


Fig 13*a*

Relationship : end-part to whole

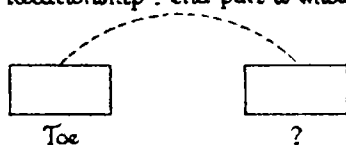


Fig 13*b*

The third step is to transfer the relationship to TOE, and from these two ideas, the idea of TOE and the idea of the relationship, to discover a third (13*b* above) that will fit

These, according to Spearman, are the processes behind all discoveries, all inventions, all new ideas.

The man who invented the steam engine must, then, have seen that the relation symbolised by Fig. 14*a* was the same as the relation illustrated in Fig. 14*b*.

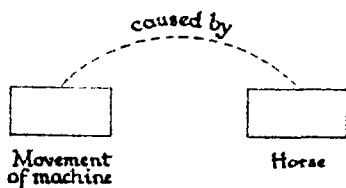


Fig 14*a*

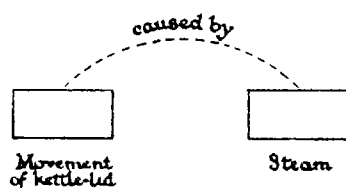


Fig 14*b*

(722)

THE SCIENCE OF HUMAN NATURE

You can see how a primitive savage would imagine a spirit behind a thunderstorm (see again later, p. 95).

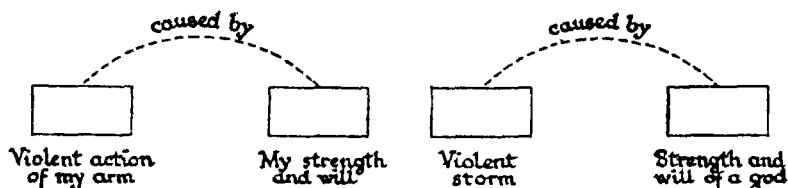


Fig 15

The essential property of intelligence is, in Spearman's view, the power to grasp relationships.

For myself, I regard the theory as eminently satisfactory. But it is only fair to point out that there are others who maintain that in normal usage the word 'intelligence' involves an element of 'good judgment' or 'wisdom' which finds no place in Spearman's theory. It seems to me, however, that a scientist is entirely justified in defining a word in a slightly narrower sense than usual—as long as the restriction of meaning is made quite plain—if he thereby gains in precision of thought.

Let us return to Spearman's view. There is a relationship of 'oppositeness' between 'black' and 'white,' of resemblance between 'large' and 'great'. There is a relation of conjunction in time between the act of dropping a stone and the event of its hitting the ground. There are time relationships between the ideas that pass through your mind, or between the different notes of a tune. There are many different types of space relationships, seen in geometry or in the spatial relations of a painting. There are relations between the colours of a painting and between the notes of a musical chord. One of the most important of all categories of relationship is that of causation.

What reality, then, have abstract ideas? Let us consider a few examples.

(b) *Abstract ideas.* What about a quality like 'redness'? Does it exist independently of our minds? We have seen already that what we perceive as 'red' is light that has a

THE NATURE OF INTELLIGENCE

particular wave-length. But we also know that colour-blind people cannot distinguish its colour as 'red': it is yellowish, perhaps, or a shade of grey. It seems clear that the wave-length is a quality of light that exists independently of our minds, but that the quality of 'redness' exists only in our minds.

What about an idea like 'chair'? Do we have a picture of a chair in mind when we think of the concept? Not necessarily: some people do, others do not. Even if you do call up an image of a chair, you will agree that there are many other kinds of object that you would include in the category that are quite unlike your image. We might define a chair as 'an object for one person to sit on, raised up off the floor.' We can then see that it is the *system of relationships* of the materials of the chair which constitutes its 'chairness.'

A relationship may or may not exist in the real world: the relation of horn to horse that characterises a unicorn does not.

At a further remove from the physical world that we can see and handle are those ideas that incorporate relations, not of concrete objects, but of other relations: many familiar words, such as freedom, justice, or democracy, involve complicated systems of relations among already abstract relationships. We use these and a multitude of other abstractions habitually without noticing them. It was this capacity for abstraction which Aristotle probably had in mind when he defined the human being as an animal endowed with reason. The circus horse may be able to distinguish small numbers but it cannot operate the multiplication tables, let alone the calculus. The chimpanzee may be able to put two sticks together to haul a banana into his cage, but he cannot build a steel bridge.

What is more, the average human being can be more certain about a logical argument than about any generalisation from experience. We feel *absolutely* certain that this book cannot be and not-be at this spot at the same moment. We feel equally certain that if thrushes are birds, and all birds have wings, then all thrushes must have wings; in fact we

THE SCIENCE OF HUMAN NATURE

can be just as certain of the same argument if we replace the nouns by nonsense words, for example, bogytes, tackriches and bantings. This is the philosopher's idea of certainty to which I referred on p. 13. It must be carefully distinguished from the certainty of any generalisation from experience or scientific 'law.'

What do these facts imply? Here there can be no certainty. It seems clear that sense-impressions involve the physical modification of brain-cells; yet I find it inconceivable that the grasping of abstract relationships can be fully interpreted in material terms. It is true that the building up of a conditioned response involves the perception of a time relationship; yet this seems to me to leave untouched the difficulty of interpreting the perception of *abstract* relationships. I cannot get away from the conclusion that the 'mind' or 'self' that has this capacity is something 'immaterial' or 'spiritual.'

4 THE MEASUREMENT OF OTHER ABILITIES

So much for the nature of intelligence. Let us return to the subject of the measurement of human ability.

It is important to realise that when the psychologist gives a group of boys a test of intelligence or special aptitude, he does not claim to be measuring the boys' chances of getting on in the world. Many factors are involved besides 'brains.' To begin with, the natural talent may be turned in all sorts of directions, according to interest, social background and so on. The man of thought applies his intelligence to the analysis of abstractions; the man of action prefers to devote his gifts to the complexities of concrete objects or of human affairs. Furthermore, the element of 'character' is all-important; and it is much more difficult to assess than ability. But the same kinds of criteria have to be applied in measuring character as ability: we have to use the method of correlation to isolate 'character-factors' corresponding to the 'group-factors'—verbal, mechanical and so on—of which we spoke when we were dealing with

THE SCIENCE OF HUMAN NATURE

clusions are summed up in his theory of the structure of human personality. According to this, the normal personality may be compared to a two-storey house with a basement. On the ground floor lives a reasonable, peaceable family who correspond to our conscious waking 'ego' or 'self' that we are aware of in ordinary everyday life. In the basement lives a wild and unruly family who correspond to the primitive part of our personality, termed by Freud the 'id.' On the top floor live a couple of fierce old maiden aunts whose chief job in life seems to be to bar the way up from the basement, i.e. to prevent our primitive desires from breaking out into action. They correspond to what Freud called the 'super-ego,' that part of ourselves which insists on high moral standards and which we are partly conscious of as our conscience. To some extent also we are conscious of the impulses of our 'id'; but one of Freud's major points is that the greater part of both the super-ego and the id are unconscious, for we are equally oblivious of the repressing and the repressed impulses. That there are a super-ego and an id, i.e. repressing and repressed forces, at work in many people's minds is not in question; but whether they occur in everybody, and whether their nature is exactly as Freud depicted, is not so clear.

The essence of his theory is that the super-ego and the id, though we are unaware of their existence, are as active as the conscious ego we know. But if that is so, we naturally ask: how can they affect actions that we perform consciously? The psycho-analysts reply that these unconscious forces *compel* us to carry out certain actions, either in spite of ourselves or with the misguided assent of our conscious will.

We know that Freud built up his theory on thirty years of clinical experience. Can we put briefly any evidence for it which the ordinary man can recognise as convincing?

THE UNCONSCIOUS

2 EVIDENCE FOR FREUD'S VIEWS

(a) *The fact of compulsive behaviour.* First let us consider some experimental work on hypnosis. It has been shown that if a man under hypnosis is instructed to carry out some action at a certain signal after he wakes up, he will normally do so. In a particular instance, however, the experiment was tried on a man who was a professional psychologist. Knowing what was likely to happen he decided when he woke up that he would not do anything that seemed odd. Despite this, however, he soon began to feel a dreadful urge to put a chair on the table—as indeed he had been instructed to do by the hypnotist. Suspecting that it was only a post-hypnotic suggestion he swore to himself that he would not do anything so silly, and finally went home. But the urge so plagued him that he could not get it out of his mind, and after an hour's fruitless struggle he returned to the scene of the experiment and placed the chair on the table.

Here the evidence of compulsion by a motive whose nature and source are unknown is clear-cut. Are we justified in transferring this interpretation to the following case? A small boy of five insists on washing his hands again and again to remove an imaginary stickiness. He has to have his shoes and his toys always in their own places, his face-flannel folded and hanging in a special position. His mother talks to him reasonably; he agrees that it is silly, and that if he did not fuss so much he would have more time to play. Yet it seems that when he is carrying out one of these queer jobs, it is the most important thing in his life, and whatever else happens he must go through with it. I think we will agree that the small boy's behaviour is compelled by motives of whose nature he is quite unconscious. Similarly, I do not think we shall have any difficulty in extending the interpretation to the case of the man who suffers, say, from a nervous twitch of the face, or from an urge to walk on the lines between the flagstones of the pavement.

(b) *The symptoms of compulsive behaviour.* Let me quote two other characteristic experiments on hypnosis. A young man is instructed under hypnosis that he is not to leave the room before anyone else. At the end of the evening he, as a guest, is invited to go out first—he declines—the host insists—he refuses flatly—his host takes him by the shoulders and pushes—he resists with all his might. In another case he is told he is to open the window at a certain signal (after waking from hypnosis). He duly does so. But when he is asked several minutes later why he did so he denies having done it at all : his memory seems peculiarly defective over a compulsive action. If, in the experiment, he is asked for his motive immediately after opening the window he trots out an excuse straight away : ‘ Oh, I thought it was getting a bit stuffy in here.’ We can see clearly that the reason is not genuine : that it is what Freud christened ‘ a rationalisation,’ an excuse concocted to make an unreasoned action appear intelligent and deliberate.

Now take another case from ordinary life. A man keeps all his clothes and papers and other personal possessions punctiliously in neat docketed piles and he hates occasions when he cannot get them properly arranged. If he is asked his reason he says that he can never find his things otherwise. If his leg is pulled about it, or he is prevented from doing it, or his papers happen to be upset by his small boy, he gets annoyed. Are we justified in interpreting this excessive desire for tidiness in terms of an unconscious compulsion? We suspect that if he did not trot out the obvious rational excuse, or get annoyed when prevented from putting his things as he wanted, we should see the matter in a different light. The irritation suggests to us that underneath, perhaps, he would really rather like to be untidy himself and grudges other people their indulgence of the impulse. Certainly this is the way we are apt to interpret the puritanical people who condemn innocent pleasures. This view is supported by evidence from quite a different source : the observation of young children at play.

In a particular instance recorded by Susan Isaacs there

THE UNCONSCIOUS

was a squabble among a group of children in her sand-pit, and a small girl called Lena threw sand at one of the others who had spoiled her castle. She was reminded that if she threw sand she would not be allowed to remain in the pit, and when she did it again she was lifted out. One of the boys, Joseph, got very excited over this and said, 'Now I'll throw sand at her.' When asked not to, he said, 'Put her out of school. She threw sand at us, throw her over the wall so she can't come to school.' Presently he began to throw sand himself, and finally he too had to be lifted out of the pit.

In this case it is clear that Joseph's annoyance and his condemnation of Lena for throwing sand are accompanied by a strong desire to do the same thing himself, and that he finally succumbs to the impulse.

On the strength of such evidence, greatly multiplied, it has been suggested that (a) some strong desires or purposes are due to unconscious compulsions; (b) that a 'reason for an action' may really be a rationalisation of a compulsion: an excuse for the misguided assent of the conscious will; and (c) that irritation may be a sign that some unrecognised, or unconscious, desire is only restrained by some unconscious, or half-conscious, compelling force.

But it is clear that the evidence we are handling here is something very different from the facts on which we based our notions of intelligence. Here we can see no scope for statistical checks on our conclusions. The difficulty of interpreting the facts is increased by the possibility of a person's *accepting* the compulsion as something 'good' or 'necessary' so unreservedly that his own opposed wish fades away, and his irritation and condemnation die. It has in fact been shown that people tend to accept more whole-heartedly as they grow older duties that they disliked discharging when they were young. This and other items of evidence suggest that there is no sharp line between compulsion and whole-hearted assent. We shall be returning to this very important question in a later chapter.

(c) *The violence of the id and super-ego.* Finally we must ask

THE SCIENCE OF HUMAN NATURE

what kind of evidence Freud had for maintaining that the id is so unruly, the super-ego so severe.

The first item is the intensity of the guilt and shame disclosed in the unconscious layers of the mind in the process of psycho-analysis. An intense sense of guilt implies an intense sense of being condemned, and that implies a severe super-ego.

The second is the extraordinarily dogged resistance that the psycho-analyst generally meets with at some stage of his treatment. It is difficult to describe this briefly ; you should read such a case as *I Lost my Memory*.

Freud also draws into his net of evidence such facts of common observation as the terror of a nightmare, which is far more extreme than anything we experience in our conscious life, and the desperate urgency of childhood phobias. These facts argue the existence of terrifying agencies in the unconscious mind. The psycho-analyst would, in short, assert that the super-ego and id are usually cruder and more energetic than we imagine, and frequently quite savage in their intensity. This comes out very clearly in children who find their way into the police courts. The incorrigible ones (in cases that have been tested by psycho-analysts) are characterised by a sense of being violently condemned, or utterly unwanted, by their family or community ; and this they furiously resent.

It is, however, very important indeed to appreciate the other side of the coin to this violence and destructiveness : the fact, equally firmly, but less spectacularly, supported by evidence, of the lengths to which people will go in trustfulness and gratuitous kindness and self-sacrifice. If such facts are subjected to an interpretation parallel to that given above, they imply that the super-ego and id may also contain figures as infinitely loving and gentle as the top-floor and basement families of our analogy were cruel and licentious. This brings me to another important idea of the psycho-analysts which requires attention : projection.

THE UNCONSCIOUS

3 PROJECTION

The germ of the idea is quite simple. When you cheerfully stick your spoon into your egg in the morning and find that it is nothing but an empty shell put into your egg-cup by your small son or brother, you can tell yourself that you have been *projecting* qualities into the shell from your own experience. They have become tied by association to the qualities you do see ; and you are not merely reminded of them, you see them as *inhering* in the shell.

We project our private feelings into other people in much the same way. There is a well-worn story of the First World War which illustrates the process. A captain is taking a lieutenant, a sergeant and a private up the trenches after dark. They reach a trench and the captain whispers to the lieutenant, 'This is the third-line trench.' The lieutenant passes it back to the sergeant : 'This is the third-line trench.' The sergeant likewise whispers, ' . . . third-line trench.' They march on in silence to another trench which turns out to be the second line, and a little later they reach the front line. The message passes back as before and the lieutenant whispers to the captain, 'How far away are the enemy now?' The captain answers, still whispering, 'Five miles.' Whereupon the lieutenant exclaims aloud with some heat, 'Then what the blazes are we whispering for?' In the same voice comes the reply, 'I've got laryngitis.'

It is obvious that the lieutenant is attributing to the captain feelings, motives, ideas, intentions that are naturally, in their particular situation, associated in his own mind with a whisper.

Now picture the responses of a small child. One of his most striking characteristics is his instability of emotion : he swings in a moment from love to anger, from despair to jubilation. Another trait, which often escapes notice in our restrained households, is the crudity of the impulses he experiences in anger—impulses to bite and tear the offender to pieces. The psycho-analysts accordingly suggest that the basis of the super-ego, i.e. of the repressing forces in the mind,

THE SCIENCE OF HUMAN NATURE

is the projection of the child's primitive feelings on to the parents, as a result of which both the love and the condemnation of the parents for the child are exaggerated and their demands reinforced beyond what they recognise.

Evidence for the theory is not established. But no alternative explanation seems to account for all the facts. For example, it has been suggested that the super-ego arises simply out of the process of conditioning of the child by rewards and punishments : the pain of the punishment sinks into the child's unconscious as the repressing force. This interpretation, however, fails to explain the *intensity* of the repressing forces sometimes revealed, in small children who have never been harshly treated, by nightmares, by phobias and by deep anxiety. The savage punishment imagined by the three-year old child in a nightmare would then be interpreted as a projection of his own feelings.

The psycho-analyst's picture of the super-ego, ego and id may or may not represent the truth ; and, if it does, his explanation of their growth in terms of projection and so on, may or may not be correct. But that human beings do project feelings, motives, ideas, values, or any other mental experiences into the world outside them is well established by the evidence. It is important to classify such mental experiences according to the results of their projection :

- (i) ordinary conscious assumptions ;
- (ii) friendliness and goodwill ;
- (iii) criticalness or condemnation ; and
- (iv) unscrupulous selfish motives.

(ii) and (iii) correspond to the mild and the harsh sides of the Freudian super-ego (though the argument does not depend on our assuming the reality of the super-ego—ego—id picture drawn by Freud). (i) corresponds to the conscious everyday ego ; and (iv) to the repressed selfish id, particularly its resentment and destructiveness. Let us consider in turn the effects of projecting these different types of feelings and impulses.

THE UNCONSCIOUS

(i) The effect of projecting experiences of group (i) is easily seen : any keen argument, pursued to a detailed analysis, reveals much of the disagreement to have been due to the two parties having used some abstract word like ' freedom ' in different senses and *each having attributed his own meaning to the other man*. The Englishman shopping in an Indian market is apt to think the Oriental an unscrupulous double-crosser because he assumes that a man is dishonest if he asks three times as much as a thing is worth ; the Indian, because he assumes that the proper way of shopping is by haggling, thinks the European mad. Each projects his own common assumption into the other.

(ii) The projection of goodwill or benevolence results in an attitude of trustfulness and friendliness on our own part. (See ch. XI, p. 134-7.)

(iii) To project an accusing or critical attitude into another person, or into the world at large, means that you feel accused of doing something wrong, or of lapsing from some standard that you acknowledge.

The effect of this is to produce a sense of guilt, which may, however, pass at once into a sense of resentment at an unjust imputation. It may also pass into a sense of pride if you can persuade yourself that you are quite up to the mark. It must be emphasised that the guilt is usually very largely unconscious.

Let me quote a few examples of what I mean. In the first the guilt is accepted :

(A) A rather nervous girl of eight while playing at a friend's house knocked a cheap china doll off the table and broke it. On her next visit she was very shy and could hardly be induced to play at all. Finally she played a game with some lead soldiers, and the game was the story of a little girl who had broken her doll and had to be shot. In other words she was translating her feelings about her own accident with the doll into a drama with the soldiers. When she was asked if the little girl could not be let off this time she refused absolutely, and said the little girl had been naughty in breaking the doll and had to be punished. Her mother

THE SCIENCE OF HUMAN NATURE

added that the little girl had been dreadfully upset and worried about the doll.

In the second instance the criticism is felt more and more acutely until it is finally rejected in an emotional scene :

(B) A young typist came up for treatment because she had been unable to keep any job for more than a few months since she left school. The reason was that she ascribed to each of her superiors, and even to her fellow typists, an unbearable criticalness which they did not in fact exhibit. She misinterpreted their remarks as condemnation or accusation until in a final outburst she would refuse to stay any longer under such intolerable conditions.

In the third the accusation is repudiated before it is in fact made :

(C) ' Benjie (just over four) after lunch dropped the water-jug accidentally. He looked quickly at Mrs Isaacs, laughed excitedly, then kicked it across the room. He was about to kick it downstairs. Mrs Isaacs asked him not to do so, but before she could get near he had done so, and broken it. Then he was very defiant, shouting " I'll hit you in the face ; I'll not come to school any more " and so on. This was clearly remorse that took the form of defiance.

' When Benjie spat into the pudding-dish and Mrs Isaacs hastily said, " Now you can't have any pudding," he threw his plate on the floor and broke it. Then he cried very bitterly in anger and defiance.'

The sense of guilt is unbearable and to shake it off Benjie defies the condemnation before it is even made. It is important to notice that he also speaks to Mrs Isaacs as if she were being nasty to him : he is helping to justify himself by also attributing the bad motives of group (iv) to her. Now compare this with Hitler, who used regularly to complain that Britain preached morality at him and organised encirclement : he projected moral condemnation into us and, to be able to repudiate it, he also attributed to us motives of hypocritical self-interest. Probably most of us will be able to ~~think~~ ^{think} of cases from our own experience where we have ~~worked~~ ^{worked} up a great display of righteous indignation at being

THE UNCONSCIOUS

able to reject somebody else's criticism as being based on (say) jealousy. I should perhaps add the caution that our motives in such a case are generally quite unconscious.

The application of these mechanisms varies endlessly. There is, for example, (D), the case of the gangster who regarded himself as a kind-hearted chap who never did anyone any harm except in self-defence : he looked on the outside world as out to do him down and resisted it by every means in his power, not excluding guns. And then there is (E) : a man has a motor accident in which he knocks down an old woman. He immediately begins to feel dissatisfied with the car and exchanges it within the week for a new one.

The man feels a strong unconscious sense of guilt over the accident and resolves it by attributing the responsibility for the event to some ' badness ' in the car. The process is put in a nutshell by a proverb : ' the bad workman blames his tools.' What the proverb does not bring out is the fact that the man would not have felt an uncomfortable sense of guilt if he had not been liable to project hostile accusation into the world at large. People like this suffer, in a sense, from a perpetual guilty conscience : somehow they have grown up with a *habit of projecting hostility and criticism into the outside world*. This could be seen constantly in the utterances of leading Nazis before 1939. The native tribesman who imagines the thunderstorm to be the action of a vengeful god is doing the same thing. (The consequences of such projection are discussed again on p. 126.) (There is no incompatibility between this statement and that of p. 78. The transference of the relationship takes place first but is probably never formulated, and the projection arises out of continual association.)

When such people succeed in satisfying the demands that they project on to the outside world they become models of self-righteousness : as can again be illustrated from the Nazis, in this case Goebbels : ' All we National Socialists are convinced that we are right and we cannot bear with anyone who maintains that he is right. For either,

THE SCIENCE OF HUMAN NATURE

if he is right, he must be a National Socialist, or if he is not a National Socialist, then he is not right.'

We can see why in conditions of serious strain (as of unemployment, or enemy occupation of the country) tempers become frayed and quarrels break out easily: simply because feelings of guilt and inadequacy become much stronger.

What are we doing in the above argument? It will be noticed that I have quoted a number of cases which illustrate different types of projection. These fall into two groups that have to be carefully distinguished: the *imaginary* cases (the empty egg-shell, the front-line trench) which are used to make the idea intelligible; and the *case-histories* (A-E) which are used as evidence that people do project critical attitudes into other people, and that the results vary with the circumstances. A scientific theory can be *illustrated* but not *supported* by the former.

Case-history evidence also has its limitations, as we noticed in chapter 1: it can never demonstrate the frequency with which a particular process occurs, or whether it is universal among human beings. The only way of doing this would be to devise a means of measuring the process involved and to apply it, not to the patients coming up for treatment at a clinic, but to a random sample of the population as a whole.

The fact that projection does occur is well established in simple instances: when you make a mistake, as in the case of the empty egg-shell, you usually see as *inhering* in the empty shell (or other object) the qualities that it does not possess. The same is true of the savage and the thunder-storm. That is the basic meaning of projection. Experiments on the memorisation of nonsense-pictures show that the pictures are interpreted in terms of familiar objects, and when the experimenter tries to draw the pictures from memory he unwittingly exaggerates the parts reminiscent of the familiar objects: he is projecting into the picture (as he remembers it) the elements suitable to the familiar object with which he has associated it.

THE UNCONSCIOUS

But in the more elaborate examples I have quoted it is often impossible to be sure of the interpretations ; we are arguing from analogy with the clear-cut cases—such as that of the typist. It should be possible to devise statistical methods for showing the association between projections of categories (iii) and (iv), for on such a subject it would be sufficient to take into account only the highly selected sample of hospital patients. But this has not been done yet. We are using what is known as the ‘ comparative ’ method, which depends in the last resort on circumstantial evidence : it is impossible on such points to *establish* our conclusions.

CHAPTER IX

THE ANTHROPOLOGISTS' CONTRIBUTION TO THE UNDERSTANDING OF HUMAN NATURE

I TRIBAL LIFE

IN this chapter we reach a turning point in our journey. In chapters II to VI we explored the connection between the human mind and its physical conditions. We examined in turn the influence of the chromosomes, which carry our physical inheritance ; of the brain and senses, which might be called the habitation of our thought ; of the springs of action which we share with the animals ; of the chemical secretions in the blood stream, which are linked with our emotional responses ; and of those characteristics of the nervous system which appear to have connections with speed of reaction and similar traits. In all these cases we were obliged by the evidence to come to negative conclusions : there *is* a relation between the mind and this or that physical occurrence *but* the physical events seem only to be responsible for releasing varying degrees of energy, which can be turned in any direction ; or the influence of the physical changes can only be traced in the early years ; or the physical effects do occur, but they are liable to be neutralised or even reversed by the effect of the human environment. The upshot was that the physical contribution is of great importance in governing the *potentialities* of a human individual ; but the critical factor in his development is the human environment.

In chapters VII and VIII we put off our exploration of the human environment itself in order to take a look at *certain* features of the human mind which could be described more or less without reference to the development of personality. Now we can no longer escape the crucial

THE ANTHROPOLOGISTS' CONTRIBUTION

problem: how does a human community influence the personality of its members?

I am convinced that there is only one practical approach to this question, and that is through the study of primitive tribes. A fish takes water for granted until he is hauled out of it. It is equally impossible for us to detach ourselves sufficiently from our own society, from our own ingrained habits of thought and moral and emotional turn of mind, without first training ourselves in a new approach by examining communities where our personal prepossessions are not involved.

In this chapter, therefore, I want to transport you for a short while to the island of New Guinea. Here live a number of small primitive tribes, now all under the jurisdiction of European peoples but in many cases scarcely touched by European civilisation. In the early 1930s three of these tribes were visited by a party of anthropologists, who lived and worked amongst them for two years. The following picture of their life is based on Margaret Mead's *Sex and Temperament in Three Primitive Societies*:

(a) The first tribe visited were the *Arapesh*. They are not a numerous people, only a few hundred all told; and as the region they live in is mountainous they are scattered among a number of tiny hamlets perched among precipices. They till the ground, but the soil is poor and their garden-sites are often very steep, so that their crops of sago, taro and other tropical products are never rich. They also hunt such animals as the wallaby and opossum, but game is not plentiful either. Living is accordingly far from luxurious and in order to have a feast—which they love—they have to collect food and fuel for days beforehand.

The outstanding attributes of the *Arapesh* may be summed up under three headings:

- (i) their co-operativeness;
- (ii) their aggressiveness; and
- (iii) their gentleness towards children.

THE SCIENCE OF HUMAN NATURE

(i) Co-operativeness. Their lives are not oriented towards the goals that so often rule Europeans, of getting on in the world, or holding down a good job, or making money ; nor do they grumble over or resent their poverty and meagre resources. Instead their lives are focused almost wholly on *growing and cherishing* things—on growing good sago and taro to eat, on nourishing up fat pigs in the villages, on tending their soil, and above all on rearing good children. For these objects they will do anything.

They do not regard the land as belonging to them but themselves as belonging to the land—each family to a particular area. Generally in New Guinea each married couple fence in a garden of their own and only get help for the harvest. In the mountainous Arapesh district you might expect competition for the best gardens to be keen. But so far from the gardens being an occasion of disputes, they treat them as an opportunity for getting together. So despite the preposterous difficulties of journeys between the villages, and the fact that nothing they do in their labour is more than a one-man job, they invariably work together in groups of four or five families which visit the respective gardens in rotation. They go to this extreme and unnecessary trouble simply because they set so high a value on doing things together, on sociability and co-operation.

Precisely the same applies when they come to building a house or going hunting.

Their friendliness extends equally to strangers. Visitors are welcomed immediately, with none of the suspicion or precautions usual in savage tribes. They are pressed to stay the night, even if it means their hosts sleeping on the wet ground under the hut and stripping the hamlet of food.

(ii) Prohibition of aggressiveness. The obverse of their sociability is to be seen in their attitude to enterprise, to assertiveness, to anger, to destructiveness, to anything that so much as smells of aggression. Having no place for such feelings in their life, the least expression of them shocks the Arapesh as profoundly as we should be shocked if one old lady started abusing another at a polite tea-party. And just as

THE ANTHROPOLOGISTS' CONTRIBUTION

when our feelings are suddenly outraged we may be stung into a more biting retort than we intend, so the Arapesh man is apt to snatch up a butt-end of sugar-cane or chewed bone dropped by the offender and take it to a Plainsman to weave spells over. In the eyes of the Arapesh the Plainsmen are the source of all evil : any accident or illness is put down to their magic, while the man who stole the gnawed bone or whatever it was will be exonerated on the ground that he must long ago have forgotten his anger. The only permitted outlet for a man's annoyance is to divert it on to something entirely impersonal ; he can, for example, go and chop down one of his own trees.

A really ill-tempered or violent individual leaves them aghast. If he threatens to burn down their houses or break all their pots or go away for ever, they will beseech him not to do anything so fearful and give him whatever he asks for to appease him. They have no idea what to do with anger or malice when these crop out.

(iii) Gentleness towards children. The Arapesh treatment of their children is equally characteristic. When a baby is born the father is expected to be as closely, if not as directly, concerned as the mother. Both practise magic rituals and purification ceremonies, and until the child is a year old the father rarely leaves the family. The baby is breast-fed to the age of three or even four, and the parents ensure by sexual abstinence that no more children arrive before the previous one is two years old.

If an infant cries he is immediately suckled. When he begins to toddle there is always some adult about to pick him up and comfort him if he falls over and hurts himself. When he comes to learning the names of the things he sees around him, it is incessantly suggested to him that everything is 'good'—good sago, good taro, good house, good uncle and so on.

Even amongst the Arapesh, however, children quarrel and come to blows. The Arapesh technique in this situation is not to scold or punish it, or to laugh at it, or even to ignore it, but to separate the children firmly. If they do

THE SCIENCE OF HUMAN NATURE

not then cool off they are left to kick and scream on their own. It is worth noticing that the Arapesh do not stop aggressiveness in an aggressive manner. We are rather apt ourselves to say to the bully : ' I'll just let you know what it feels like to be hit by somebody bigger than yourself ' ; but that is not the Arapesh method.

Early in adolescence boys and girls are initiated into adult status. In most savage tribes initiation ceremonies are a pretty severe trial. But amongst the Arapesh the case is rather the reverse : the boy is better fed during his three months of segregation than he is ever likely to be again. The ' ordeals ' are mild, the instruction in tribal secrets quite simple.

Practically no difference is made between boys and girls in their upbringing, and no difference is expected, or observable, in adult temperament. Men are not more masterful or strongly sexed than women, nor women gentler or more prone to nag than men. Both are equally cheerful, co-operative and considerate.

(b) Our second tribe is the *Mundugumor*. They live less than a hundred miles from the Arapesh in a fertile district by a river. They do well with fishing and they cultivate sago and yams for food, and coconuts and tobacco for trade.

Their characteristics can likewise be summed up under three headings, which are precisely the opposite of those we used for the Arapesh :

- (i) their extraordinary aggressiveness ;
- (ii) their unco-operativeness ; and
- (iii) their harshness towards their children.

We can conveniently take the first and second items together :

(i) Aggressiveness and (ii) unco-operativeness. The *Mundugumor* ideal—to which perhaps one person in twenty-five will approximate—is a man fierce and powerful enough to maintain himself in a palisaded enclosure in the bush, with a dozen huts and eight or ten wives, and a number of male relatives too old or too weak to stand by themselves.

THE ANTHROPOLOGISTS' CONTRIBUTION

There is no genuine community in this tribe. There is no co-operation except in pursuit of a highly prized end ; and even that is extremely unstable. A head-hunting expedition, for example, consists ideally of a hundred armed men ambushing two or three small families. There is no discovery of comradeship in shared trials, no enjoyment of company for its own sake. In fact, as Mead puts it, ' Social organisation is based on a theory of a *natural hostility that exists between all members of the same sex*, and the assumption that the only possible ties between members of the same sex are *through* members of the opposite sex.' So all inheritance and family ties pass, not from father to son, but from father to daughter, and then to her son, and so on. The series is known as a ' rope.' No man can be at ease in another man's company ; nor indeed in the company of anyone but another member of his rope : brothers are jealous rivals, sisters also. Sisters hate brothers because brothers can buy wives in exchange for their sisters ; brothers hate sisters because they are always afraid of being given the slip. Sons hate fathers because of the rope tie between father and daughter ; besides, the father may well be looking for a new wife when the son is old enough to get married. The usual attitude to practically anyone in this tribe is one of angry defiance.

It is important to notice, too, that the women are not expected to be any less aggressive or violent than the men, nor any less strongly sexed. As we saw among the Arapesh, there is no idea that women are temperamentally different from men.

(iii) Harshness towards children. Even before birth the child is at a disadvantage, for neither parent wants it. To the father it means he becomes a figure of fun, and he knows it may mean a son to rival him. To the mother it means her husband's resentment and probable defection to some other woman, besides the possibility of a rival daughter.

The infant itself, if it is allowed to survive, is extremely unsympathetically treated. It is kept in a rigid basket-work bag (the corresponding Arapesh bag is always pliable), it is only suckled as a last resort when every other means of

THE SCIENCE OF HUMAN NATURE

stopping its crying has failed, there is no playful fondling, and if the child stops feeding for a moment the mother thrusts it back in its bag at once.

Whereas the leading word in the Arapesh vocabulary for child-training is 'good,' the one most frequently heard—and shrieked at that—among the Mundugumor is 'don't.' 'Don't wander out of my sight.' 'Don't go near the river.' 'Don't cling on to me.' 'Don't cry.' It reminds you of the mother who sent one of her children to look for another with the words, 'Go and find Tommy this moment, and whatever he is doing, tell him to stop doing it !'

(c) The third tribe, the *Tchambuli*, live by a lake not far away.

Their long ceremonial houses stand on piles in the water, the dwelling-houses up the hillside. The former belong to the men whose sole purpose in life is 'art': the arts of carving, painting, dancing, and making masks and flutes. Nominally they are the masters, but in fact it is the women who (but not literally) 'wear the trousers.' A visit to one of the dwelling houses shows us a brisk and lively group of women busily engaged in cooking, plaiting baskets or mending fishing gear. 'In their energetic friendly activity there is an air of solidarity, of firm co-operation and group purpose, which is lacking in the gaily decorated ceremonial houses along the shore, where each man sits down daintily in his own place and observes his companions narrowly' in an atmosphere of 'strain, watchfulness and catty remarks.'

Almost the whole work of the tribe is done by the women. Their diet consists mainly of sago and fish, and it is the women who do the fishing, the manufacture of the tackle, and the cultivation of the sago. It is the women, too, who choose their husbands, and, later, send them on shopping expeditions with exact instructions as to what to buy and how much to spend.

Their method of bringing up children is as characteristic as were those of the other two tribes. Up to the age of seven or eight, boys and girls are treated in the same cheerful and sensible way, helped if they hurt themselves but never

THE ANTHROPOLOGISTS' CONTRIBUTION

spoiled, given plenty of straightforward undemonstrative affection. But at seven or eight the boys get driven out of the women's houses, and for the next three or four years they are practically outcast, accepted by neither the men nor the women. The girls are meanwhile being taught the adult occupations of the women. The difference in treatment at this stage is rather remarkable.

2 EXPLAINING THE DIFFERENCES BETWEEN THE TRIBES

How are we to explain the differences—no, not mere differences but stark opposition—between these three tribes? Take the Arapesh: do their glands function differently from other people's? Is their diet so meagre that all aggressive impulses are, so to speak, starved? Are they feminine in physique? Some of these questions can be answered categorically. The Arapesh have the same diet as the virile and war-like Plains tribe—if anything the latter have less protein. Their physique is also very similar: Arapesh men are not more feminine in build than men of the other tribes. They belong to the same racial stock and have many affinities of language and custom.

Are they born with different instincts, then?—less aggressiveness or pugnacity, say? If that were the case, you

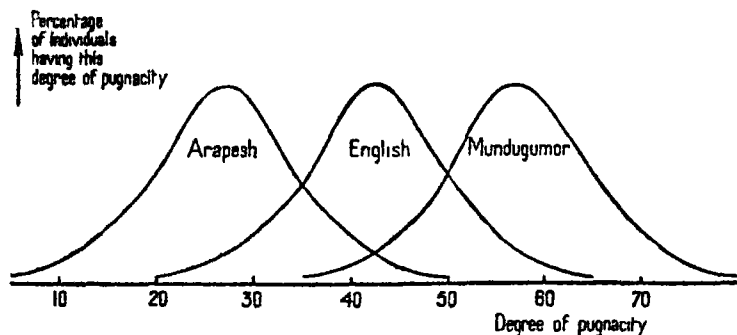


Fig. 17 Graphs showing imaginary distribution of aggressiveness to be expected if these peoples vary in instinctive endowment

THE SCIENCE OF HUMAN NATURE

would expect the extremest examples of aggressiveness amongst the Arapesh to be much less violent than in the other tribes. In pictorial terms, if we chose an imaginary scale of aggressiveness on which English people ranged from 20 to 65, then you might expect the Arapesh to range from, say, 5 to 50, and the Mundugumor from 35 to 80.

But this is not the case. You will find just as energetic and masterful individuals amongst the Arapesh as in the other tribes. And it is obvious that there is plenty of vigour available as soon as it comes to climbing up and down their precipitous country to help in one another's gardens. In other words it is not the whole range of inborn potentiality that is shifted, but the norm of adult behaviour of the tribesmen. The graphs should therefore be as follows :

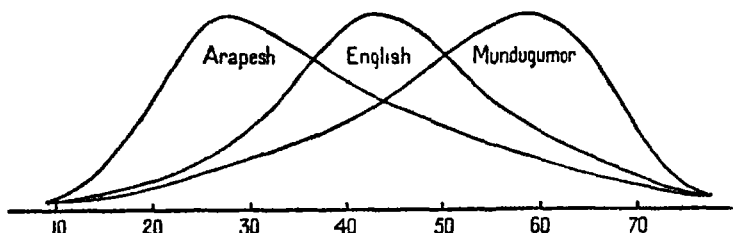


Fig. 18 Graphs showing imaginary distribution of aggressiveness if these peoples have the same instinctive endowment

Correspondingly, you notice, the extremes of gentleness are represented among the Mundugumor.

We cannot, therefore, attribute the contrasts between the three tribes to differences in the strengths of their inborn instincts.

This conclusion is strongly reinforced by what can be seen of the extreme variation in attitude towards other things amongst these and other primitive tribes. For example, the Arapesh assume that men are as ready to fondle babies as women, the Mundugumor that neither have any time for it, the Manus of the Bismarck Archipelago that only men enjoy it. Does that mean that we are to attribute different instincts or gland-activity to all these peoples? For the men and women of these tribes do, in fact, *feel* in the prescribed

THE ANTHROPOLOGISTS' CONTRIBUTION

way about the fondling of children : the Manus men do genuinely enjoy it, the Mundugumor women would scoff at the idea, and so on. And the same influence of custom and expectation on feeling can be traced in every department of their lives. It is not that there is any coercion : it is a matter of suggestion. The Manus or Arapesh man expects to like dandling the baby, and he does.

Feelings are not only influenced by expectation, but also tied up with beliefs about right and wrong. In England, for example, a woman is likely to feel jealous if her husband takes a strong fancy to some pretty girl he meets. Amongst the Tchambuli, it is regarded as a special bond of friendship between two women to share the same man.

Where then are we to look for the key to these extreme contrasts of personality and outlook, of feeling and action, among different peoples ? The conclusion that I believe is forced on us by the evidence is this : *the clue to the variation of different human communities lies in the varying value they set on different types of behaviour and possession.* This is an idea of fundamental importance, and represents in some ways a return to the views held by Aristotle and the medieval Christian tradition. It is an idea whose full meaning does not leap to the mind at once, and my next step will therefore be to expand and clarify it.

CHAPTER X

THE SUPREME INFLUENCE OF VALUES : THE INDIVIDUAL AND HIS UPRISING

I THE METHODS BY WHICH VALUES EXERT THEIR INFLUENCE

WHAT we are having to consider is that the most important factor in determining people's actions and outlook is not instinct or glandular development, but the complex of customs, habits, ideas and standards handed down to them from previous generations. Their actions are, of course, generally the outcome of desires and feelings, conscious or unconscious. What we are saying here is that the desires and feelings prevailing in any given community are very largely governed by the fabric of beliefs and values inherited from the generations before them.

(a) *The meaning of value.* When I speak of 'values' I am not referring to formulated ideals or creeds, but to the assumptions that we feel in our bones about what sort of things are worth doing and having. The Arapesh man, for example, usually devotes his existence to the loving care of his wife, his children, his pigs, his house, his garden. He judges people by their pursuit of the goals that he pursues, and these include not only the tending of his family and home, but the friendly spirit in which this is performed. In a complex modern society like our own, standards are more various : the politeness that one man calls common courtesy strikes another as hypocrisy ; the one accordingly responds to it with liking, the other with distaste. But taken all round, certain general demands or expectations of human nature are as characteristic of our country as sociability is of the Arapesh. Most of us, for instance, expect men to be tougher than women, to take the lead more readily, to have stronger sex feelings. These assumptions or expectations represent

compelling values : the timid boy is much more ashamed of his fear than an English girl or an Arapesh man would be. His guilty conscience plagues him into defying his fear, or excusing it, or denying its existence.

The matter is summed up for us in a familiar saying : 'Where your treasure is, there will your heart be also.' Your heart, your wishes, your persistent desires, are centred on your treasure, that is, the things you set most value on, whether these are the casual friendly contact prized by the Arapesh man, the furious egotism of a Mundugumor, the business success of an American, or the comfortable home-life of an Englishman.

(b) *The relation between value and desire.* The usual modern idea is that a desire gives rise to a value : the infant's instinct of hunger prompts a desire which is satisfied by milk. As a result the baby learns to set a value on milk and on the action of feeding. But this is not the only relation of desire to value ; and in my view the reverse relationship is far more important. By what means do our values influence our desires ? A man enjoys a glass of beer. He forgets that the first time he sampled the liquid as a boy he thought it had a funny smell and an unpleasant taste, but he drank it nevertheless, and eventually came to like it. Various motives may have been at work in his drinking it in spite of its taste, among them the fact that Bill Brewer, Harry Hawke, Old Uncle Tom Cobbleigh and all drank it. The sight, by natural imitation prompted him to drink his too : the original idea was felt simply as *an invitation to action*, irrespective of feeling, something to-be-done. In the first dimly apprehended instance a value is felt simply as *something to-be-done, something to-be-had* ; perhaps the Latin gerund best conveys the sense. The action is followed, possibly much later, by enjoyment or satisfaction, and hence by desire.

In addition, I suggest, the performance of the action involves the assent of the will. A child picks up certain actions, responses, habits, by imitation ; in so doing he apprehends them as things to-be-done, and this quality engages the will.

THE SCIENCE OF HUMAN NATURE

If this is likely to be the case—and you will notice that I have given no *evidence* at all that it is—we are obliged to inquire more closely into the nature of the will ; and this I propose to do next.

(c) *The nature of the will.* The will has long been a puzzle. Many thinkers have maintained that it is not a separate entity in itself, but a name given to an appearance : an ' act of choice ' is merely the victory of one desire or purpose over another. That is not the view taken here ; I find the report of the experimental work carried out by Aveling and others entirely convincing. But the evidence, though experimental, is also introspective, and cannot therefore be subjected to statistical confirmation, or regarded as *establishing* the conclusions based on it. The following account is based on Aveling's report.

The function of the will is something to do with *choosing* between alternative courses of action, with *assenting* to a single proposed course of action, with coming to decisions, with making resolutions. Most characteristic is choosing between alternatives. The experimental work referred to above displays the mental processes involved.

In one classical investigation a number of trained observers were confronted with arithmetical and logical questions that could be solved in either of two ways : they had to decide which way they would do them. The observers were fitted with various instruments for measuring pulse rate and respiration rate and the electrical state of the body. They were asked to analyse their feelings and mental operations. From the records obtained it appears that there are four stages in the process of choosing.

First you have the mental activity of grasping the alternatives. This is followed by a phase in which you feel various motives and considerations coming into play affecting your attitude to the different alternatives. You are, so to speak, savouring each, weighing up the pros and cons. ' Shall I get on with writing this chapter or shall I mend my bicycle ? I'm not in the mood for writing and I'll probably make heavy going. On the other hand time is getting on and I

may get going quicker than I expect. But I have left my bicycle so long and it needs doing, and there's just enough daylight left.' And so it goes on.

The third phase is quite distinctive, in which you are no longer actively exploring the alternatives but rather feeling hesitant, doubtful, possibly perplexed, not quite able to make up your mind. During this phase the observers usually felt—and the instruments confirmed—strong muscular tension, especially in the muscles used in breathing. But this was not invariably the case, and it is to be noted that when it did occur it was always a sign that dislike, distaste or other negative feelings were roused by one alternative.

Finally at a certain moment you reach your decision, and in that experience more than any other you become aware of your central core of personality, your very 'I' or self, making the decision.

It is not an easy matter to disentangle these various elements. The analysis of your experience is much more difficult than it sounds. It takes a good deal of practice to distinguish the various stages of it. Besides, if you examine a choice that does not really interest you (e.g. whether to cross your legs or not as you read this book), it probably takes place so quickly that you cannot distinguish any stages at all. On the other hand, if you pick on a really live question to decide, you may find your feelings so stimulated that they cloud your observation.

Further results are also of importance. When we think of a strong-willed person we are apt to picture a dominating or pushing individual. We think of will-power as something to do with effort and force, and in so far as vigour or determination renders us less prone to evasion, less subject to fear, there is a practical truth in the idea. But this is not the essence of the matter. Many of these experimental choices roused considerable effort in the process of deliberation, and this was shown on the recording instruments. But the resolutions themselves, if really decisive and whole-hearted, were found to show no record at all on the instruments. After such decisions the rejected alternatives no longer had

THE SCIENCE OF HUMAN NATURE

any attraction and faded away entirely. *Willing itself is not effort*, though it may initiate effort, even of an extraordinary intensity. Effort may accompany the process of deliberation and pondering ; but it is not an essential part of it. In fact the more effort or struggle there is about it, the less likely the final decision is to be whole-hearted and conclusive. And in that case the rejected alternative does not altogether disappear from the mind.

Thus the processes of assenting and choosing, constantly repeated, serve to reinforce certain actions so that they become habits, and to starve others so that they fade away. When the will is disposed to consent to two mutually exclusive actions, conflict ensues, and (as we have seen) the final decision is likely to be only partial. One impulse may then be banished from consciousness.

Two implications of the above account require emphasis :

(i) After a whole-hearted choice the rejected alternative fades from the mind. If there is conflict the choice is not likely to be whole-hearted, and the rejected alternative will persist. This happens if the will is already somehow ' tied ' to each of the alternatives. We will be returning later in this chapter to the way in which the will may become so ' tied.'

(ii) In the course of time the will can modify itself. For if it constantly chooses one of two alternative types of action, the satisfaction resulting from the chosen behaviour may generate a desire that reinforces the motives towards this action, and therefore makes this particular choice easier. Perhaps Aristotle had some such process in mind when he laid down that we become brave by doing brave deeds, learn kindness by performing kind actions.¹

We are now in a position to attempt to unravel the sources of our values and the way in which they acquire, or fail to acquire, their grip on the human mind. But we shall

¹ I suspect that this principle is of greater importance than I have suggested here—that men become mature through the exercise of deliberate choice, by facing and taking the responsibility for making decisions. But I could not quote any evidence at all for my view.

THE INDIVIDUAL AND HIS UPRISING

no longer be presenting and estimating evidence ; we shall be attempting to construct a theory that draws together the evidence already presented into a coherent picture of human motives.

2 THE SOURCES OF VALUES¹

The crucial question is : how are our values related to those of the community we grow up in ? By what means does one generation transmit, or fail to transmit, its outlook and standards to the next ? I want to suggest four ways in which we acquire our values :

In the first place we see certain goals as good in themselves simply because they satisfy instinctive impulses.

A second group of values owe their origin to the accentuation of instinctive forces by the parents' treatment of the child.

The third and fourth sets of standards are received from the parents, the third by their directly imposing a formulated code on us in childhood, and the fourth through the influence of their example. Let me take these in turn.

(a) *Instinctual value.* To begin with, the goals presented by instincts are seen as good-in-themselves. The infant's instinct of hunger sets a value on its satisfaction. This is the sense in which Samuel Alexander, following Spinoza, defined values. A particularly energetic or aggressive child needs scope for adventurous activity. If a strong instinctive impulse clashes with the standards of the adult environment, intense conflict may arise. This is probably what happens when an exceptionally aggressive child is born amongst the Arapesh, and indeed may often occur in a narrowly respectable English family living in a city flat : the values created by the child's own aggressiveness conflict with the standards of quietness and restraint imposed by the parents.

These natural values develop with age and experience. A group of toddlers in a nursery school will soon learn to

¹ Some readers may prefer to turn direct to p. 122, where they will find a brief summary of sections 2 to 4.

stop snatching the toys from one another and offer exchanges instead ; being roughly equal in size and strength they find jungle methods do not pay. When judgment crystallises freely out of experience, the assent of the will follows naturally unless unconscious forces interfere.

Young toddlers also learn to modify natural impulses through spontaneous identification with other children. McDougall, like Spinoza, insisted on the importance of 'primitive passive sympathy' as a basis of social contact. As we saw in chapter v, if a single deer utters a cry of fear, the rest of the herd will all behave as if they were afraid too : it is as though the one infected the others with its own emotion. The toddlers in the nursery school similarly, even at the age of eighteen months, will easily identify themselves with one another ; to the extent that you may find one spontaneously defending a second who has been hit by a third, slightly bigger, child.

Thus through spontaneous identification small children may learn to modify immediate desires in favour of pleasurable social contacts with their equals. This gives them an early start in understanding and responding to other people not 'above' or 'below' themselves in status, and, if other experience does not interfere, helps them to set a high valuation on happy personal relationships.

(b) *Reinforcement of the child's instinctive impulses by his parents' treatment.* We pass on to our second source of values, the accentuation of instinctive tendencies by parental handling. A baby's parents may bring out, by the way they treat him, certain of his impulses more frequently and more intensely than others. Thus certain desires become strengthened, certain values exaggerated. If, for example, they underfeed him they may elicit—according to the infant's particular make-up—over strong thirst, or hunger, or anger. In so doing they are likely to imprint, say, thirst too deeply in his constitution, and later on in life he may turn to drink for satisfactions denied him elsewhere. Or he may become a rigid teetotaller, perpetually on guard against a feared weakness. Alternatively, sucking impulses may become

THE INDIVIDUAL AND HIS UPBRINGING

fixated, leading to thumb-sucking in a few months' time and chain-smoking twenty years later. Such a sequence of events is not inevitable ; but the evidence of the psycho-analysts on the childhood causes of adult habits makes it clear that this is one way in which later tastes and standards are acquired.

Similarly, harsh and unsympathetic treatment of the infant may continually elicit resentment and so make this emotion a broad and persistent strand in his character. Or by care and affection the parents may draw out the generous and sociable side of his nature, accentuating his responses of love and trust. The connection between parental treatment and offspring's character is not proved ; but it seems to be strongly supported by Margaret Mead's reports of the Mundugumor and Arapesh upbringing and character.

Thus, I suggest, the infant comes to see certain kinds of behaviour as to-be-done, certain goals as to-be-had, more vividly than would have been the case if he had been born into a different family or country. These goals are not contained in his instinctive make-up though they derive from it.

(c) *Values acquired by instruction and prohibition.* Our third group of values are those deliberately imposed by the parents through reward and punishment, by repeated instruction and prohibition. This is the method parents usually adopt to train their children in such habits as cleanliness. Its success appears to depend not only on the obvious factors, of severity of punishment and delight of reward, but on half-submerged influences, such as the strength of opposed values already planted in the child's mind from other sources.

A less obvious example of the effect of reward is what we call 'spoiling.' If parents continually let a small child have his own way, especially when he makes a fuss at being denied, they give a sanction to his self-will.

(d) *Values acquired from the parents' example.* In the fourth and final place the young child is picking up its parents'

THE SCIENCE OF HUMAN NATURE

standards by imitation and identification—at first their standards of gentleness and sociability, and as time goes by, their attitude to anything in existence, from the highest values of truth or love to the smallest details of daily life.

It will be noticed that here we are again dealing with the process of spontaneous imitation or identification that I discussed in (a). There is a big difference between the cases. In the one a child for a moment involuntarily puts himself in another's shoes and does for him what he would have done for himself. Arising out of this temporary identification fresh values will take shape in his mind, preferences for safety say, or adventure. But drawn from this source they will be no more than preferences. Deeper-seated values appear to be taken over only from persons for whom he forms a strong attachment over a considerable period of time, and the word 'identification' is probably best reserved (as the psychoanalysts suggest) for this more lasting and significant form.

It is from the process of identification in the strict sense that the experiences termed by Mannheim 'paradigmatic' derive. Such experiences represent fundamental valuations; that is, certain responses towards the experienced universe are felt as pre-eminently 'to-be-done.' These responses are directed towards certain objects or symbols in terms of which the universe is interpreted. To illustrate concretely: the experience of humbling yourself to misfortune as to a cross laid on your shoulders by a loving God implies first a valuation for this particular response to the troubles of life, and second a certain interpretation of the nature of the universe and the meaning of life. The response or attitude may, however, be caught while the sanction (the world-view or scheme of interpretation) is rejected; or the latter accepted theoretically without absorption of the former. But the importance of the paradigmatic experience—once it has been built as one strand into the cable of tradition—lies in its power to modify, even to transform, all thought and action and later-formed values within that tradition. It becomes one of those unquestioned assumptions felt in your bones in terms of which I defined 'values' in the first place.

THE INDIVIDUAL AND HIS UPRISING

3 COMPULSIVE VALUES

In some cases the standards and habits that the child acquires become compulsive. This appears to happen in two ways, either as a result of a period of special psychological strain, or through the projection of the child's own aggressive feelings into his parents. I will refer to these as Compulsive Values of Type I and Type II.

(a) *Compulsive Values of Type I.* If an infant is kept continually hungry and never fully satisfied, any satisfaction that it can seize on, such as sucking its thumb, is likely to become compulsive. At later stages other actions may become compulsive, the results being serious or trivial according to the circumstances. It does not matter to anyone if you feel impelled to walk on the lines between the kerbstones. But it does matter when a boy of five reaches the state—described in ch. VIII—of having to keep washing his hands from an imaginary stickiness. Between the extremes we may find a child in whom a compulsion has fastened on food, or on his mother's attention, or on a hundred and one other things. These valuations may evaporate in childhood, or they may last into adult life, giving us the woman who has always to be in the limelight, the man who is a miser or a power maniac. The feature common to all these cases seems to be that the action, or sensation, or possession, by affording the child (or adult) some minor satisfaction that he already sets a value on, helps to relieve an excessive strain in his mind. It acts as a kind of substitute for a satisfaction that is denied.

The strain may be traumatic, that is to say, fleeting but overwhelming, or it may be prolonged and only moderate in severity. It may be caused in a variety of ways. It may be due, for example, to the denial of instinctive need (as in thumb-sucking), or to inability to conform to compulsive values of Type II (as in hand-washing). The compulsive urge, and the strain itself, may or may not be conscious. If the substitute is socially approved it is known as a

sublimation ; but in this case it may be quite consciously acquired, as a technique for relieving conflict or strain.

(b) *Compulsive Values of Type II.* Compulsions of this type arise out of the projection of the child's aggressive or hostile feelings into the human world in which he grows up.

How does this conception hinge on to that of identification ? The clue to the situation lies in the different effects of projecting anger and love into the parents. The kind of emotional tie on which identification is founded can only thrive on affection. Consequently a deep willing absorption of the parents' values only follows when the child regards his parents as loving and trustworthy, and responds with his own attachment. If the child attributes exclusively severe and harsh feelings to the parents, he will not absorb their standards through spontaneous identification but under the compulsion derived from his own projected anger, the compulsion being due to unconscious fear of what his parents may do to him if he does not conform ; and that fear is based not on the sanctions that his parents have in fact applied to him (which may be only mild reproof), but on the nightmarish anger that on account of the violence of his own feelings he projects on to them.

We can illustrate this important idea from the New Guinea tribes. The Arapesh seem to absorb their parents' co-operativeness and consideration and ordinary habits without effort ; and Mead records that they are quite exceptionally trustful and friendly towards the world at large. The implication is that they project love rather than hostility into the human world, and therefore acquire their parents' values by identification rather than by compulsion. Among the Mundugumor on the other hand all behaviour, all relationships, are based on rigid rules which have to be learned ; children do not *grow* into the accepted code, they have to be drilled into it. In each of the tribes, as perhaps in every community since the human species appeared, the supreme requirement is that the coming generation shall conform to the standards of the previous one. *But the method a community adopts for inculcating its values itself depends on those*

THE INDIVIDUAL AND HIS UPBRINGING

values. The Arapesh transmit theirs mainly through identification. The Mundugumor pass on their ill-temper by constantly provoking ill-temper in their children (and also sanctioning it by their example), and since identification plays so small a part, they then have to drill their children in the details of their code.

I think it will now be clear what is meant by a compulsion of Type II, that which is due to the child's projection of his own aggressive feelings into the adults who bring him up. One qualification is, however, necessary. I have drawn a sharp contrast between the training of the Arapesh and that of the Mundugumor. In our own country such extremes are rare ; and when I refer to compulsive values of this type I will usually be thinking of standards acquired in part by identification. Picture, for example, an efficient father who perpetually criticises his growing boy for carelessness. He will probably goad him, eventually, into being moderately efficient ; he will set up a compulsive value of Type II. But in our country the compulsion in the mind is not likely to have the absolute and overwhelming quality that it may acquire in a less humane and tolerant society ; for the son is in all probability already quite attached to his father.

The compulsive quality comes out in various ways. For one thing the boy will tend, unwittingly, to erect the standard into an absolute value, a universal imperative. The miser feels no expectation that other people should treasure money as he does. But the youth of our example will implicitly impose his own standard on other people, and become critical, perhaps irritable, towards lapses in them as well as in himself.

The absoluteness of the value will very probably translate itself into a repression of any opposed desire. Notice that this desire itself represents a value ; it has somehow received a sanction and still engages the will. Here we have the basis of a conflict : the will is divided, it is committed to two incompatible values ; and the one gains the ascendancy over the other by reason of the reinforcement by the compulsion.

THE SCIENCE OF HUMAN NATURE

This is what I meant by speaking of the will as 'tied' to incompatible values (p. 112).

The original preference for an easy-going life is no longer acknowledged, becomes banished from consciousness. If this goes far enough we shall find him disguising his own lapses and remaining critical only of other people's. The absoluteness of the standard may also put its satisfaction quite outside the wretched boy's capability, and add to his unconscious sense of guilt or inadequacy.

We also, in a case of this sort, notice the rigidity, the unadaptability of the standard acquired; in later life this boy is likely to be unable to relax his standards over matters where a little inefficiency is of no consequence: instead of enjoying the joke when some harmless comic accident occurs he will tend to be irritated.

(c) *Overlapping of Types I and II.* The same action or possession may become the object of a compulsive value of either type. The miser's valuation for money is a compulsion of Type I; but the thrifty Puritan may well bring up his children to a belief in the necessity of counting every penny, so that they acquire a valuation for money similar to the obsession for efficiency described in (b). Equally the valuation for efficiency might be a compulsion of Type I; serving, for example, to offset a sense of inadequacy. The criterion of distinction may be put as a question: is the value felt as a standard to which other people should conform, or only as a personal necessity?

4 CONDITIONS UNDER WHICH PARENTAL VALUES ARE MODIFIED OR REJECTED

So far I have placed all the emphasis on the ways in which children do in fact come to take over the habits and values of their parents. But it is obvious that the younger generation do not always accept their parents' code: no generation has identically the same outlook as the one preceding it. How does the divergence come about? We can sum up the conditions briefly:

THE INDIVIDUAL AND HIS UPRISING

(a) *The unpredictability of human responses.* We must recognise the amazing unpredictability of even a small child's responses. His parents have a far-reaching influence on him ; yet the influence is rarely what they bargain for. If they underfeed him—to repeat a previous example—the response may range from indigestion to persistent resentment, from thumb-sucking to greediness. They encourage independence and initiative ; and find him venturing down the main street among the traffic. In short there is a *seed* of fresh development in every child, which may or may not come to blossom. The values that put down roots in the child's mind are by no means necessarily what his parents intend, or detect.

Similarly, fresh values may be evolved by the adult, out of the impact of changes in his economic environment, say, or as a result of contact with another outlook or world view.

(b) *Exceptional instinctual make-up.* A child's instinctual endowment may be so one-sided, and so at variance with the prevailing code of his society, as to make it impossible for him to satisfy both his own nature and the values of his community.

(c) *Encouragement of independence.* We must also recognise that we ourselves are apt to exaggerate the difference of outlook between the generations owing to our special circumstances. For one thing it has been a major value of Western civilisation for a very long time to believe in individual choice and judgment, and we therefore have much more scope for growing away from our parents than the majority of human beings get. For another, we live in an extremely complex type of society, where the variety of occupations baulks the imagination, and where consequently scope for the expression of peculiar combinations of human characteristics is exceedingly wide. The smaller scale and greater uniformity of most other societies automatically limit their permitted range of individual development.

(d) *Rejection due to resentment.* Since a child grows into his parents' values most easily through identification with them, and identification is founded on emotional attachment, it follows—as was shown in 3 (b)—that any weakening of

THE SCIENCE OF HUMAN NATURE

this bond is liable to interfere with the process of identification. Any intrusion of resentment on the child's part is therefore likely to make for rejection unless counter-balanced by a compulsion. If both forces are strong the combination is likely to be explosive ; and if economic or other circumstances make the imposed standards intolerable we may get breakdown as in the neurotic, or repudiation of the standard as in the criminal.

Summary of the argument of sections 2 to 4

These sections contain three main points :

- (a) values are acquired in a variety of ways, partly from natural instinctive drives but mainly through the influence of the parents ;
- (b) some values become *compulsive*, in the sense described on pp. 87-8 ; and
- (c) the fact that children acquire their values mainly from their parents does not preclude their diverging radically, in certain circumstances, from their parents' values.

A word or two is called for on the first two points :

(a) Instinctive urges are the source of the value the infant sets on food, or the vigorous child on aggression. But far more important is the influence of the parents. The children get their values mainly from, first, the system of instructions and prohibitions imposed by their parents, and, second, the example of behaviour-patterns set by their parents. The influence of example is most effective when a close emotional tie grows up between parent and child which results in a child's *identification* with the parent. It is through such identification that values fully and freely accepted by the will are acquired.

(b) A child's values become compulsive in two ways : either as a reassurance against some excessive strain in his mind, or as a result of projecting too harsh and severe feelings into his parents. The first gives rise to such a type as the miser, the second to the pharisee who erects his own values into universal absolutes and condemns all who do not conform to them.

CHAPTER XI

THE SUPREME INFLUENCE OF VALUES : THE INDIVIDUAL AND THE COMMUNITY

I THE RELATION OF THE INDIVIDUAL'S VALUES TO THOSE OF THE COMMUNITY AS A WHOLE

IN the last chapter we discussed the means by which individuals acquired their values, from the mutual interaction of their own make-up and their parents' character. Here we pass to the wider question of the relation between the individual's values and those of the community as a whole.

(a) *Negative aspect.* Some people fail, for one reason or another, to fit in with the society they are born into. Such misfits range from lunatics and criminals at the extreme to the mildly eccentric and the slightly neurotic. The study of their disorders has proved one of the richest quarries of psychological information. As we saw in chapter VIII, Freud's discoveries sprang from his work as a doctor handling just such people—his neurotic patients. More recently the anthropologists have compared the mental troubles characteristic of different tribes, and have demonstrated that mental disease is not uniform throughout the human race, but in any country or tribe is *closely related to the prevailing code of values*. This is a very significant conclusion, for which we must now inspect the evidence. Let us begin by tracing the forms of maladjustment typical of the New Guinea tribes that we have already visited.

(i) Let us take the Arapesh first. As we saw before, there is one human motive, or skein of motives, that they banish absolutely : aggressiveness in any shape or form. What then happens to a man who is by nature masterful or assertive ? One such man was Wabe, whom Mead describes as of all the Arapesh she knew, ' the one who approached most strongly to a West European ideal of the male, well

THE SCIENCE OF HUMAN NATURE

built, with a handsome face with fine lines, a well-integrated body, violent, possessive, arbitrary, dictatorial, positively and aggressively sexed,' the man her party always picked for organising transport or taking on any awkward job. By the age of twenty-five he was beginning to develop a persecution mania. Everything seemed to be against him. His blood-brothers had all died. One wife had deserted him; the relations of another did not like the way he treated her and were, he was certain, practising black magic against him, a thing no Arapesh was known to do against another member of the tribe. He was sure that other men were trying to seduce this wife—a suggestion that was so improbable among these people that they laughed at him; and his sense of persecution grew stronger. Anything that went wrong was put down to his neighbours' magic—he became more and more moody and sullen, and was always cursing back at the imaginary curses of his relations; he had become a liability instead of an asset to his tribe. An older man of similar disposition had turned homicidal. Exactly the same course of development was to be seen in women of such temperament.

Two points are worth stressing in this picture. First, the fact that the sufferers became so moody, their judgment and memory so distorted, suggests that they have to some extent accepted the alien values of the tribe into themselves. They are divided in their own mind, they themselves half believe that the fault lies wholly in themselves. Second, it is noticeable that they continually project their own hostility and resentment into their neighbours, with the result that they feel more resentful than ever of the fancied persecution. A's projection of hostility into B in itself rouses A's hostility to B, thus provoking B into hostility.

(ii) Amongst the Mundugumor those possessed of strong feelings or dominating personality are at home. The misfits are the mild and the peaceable, whether men or women. It is useful to compare their lives with the fate of those who deviate from the Arapesh ideal. The less gifted of them hang on to more powerful relatives, forming the

THE INDIVIDUAL AND THE COMMUNITY

retainers, keeping the traditions alive, and in fact, as Mead says, making 'possible the violent competitive life that is really so uncongenial to them.' The more intelligent man devotes his talents to studying his society and learning 'every rule and every loop-hole through which intelligence can outmatch brute strength.' But it is important to notice that the maladjusted people of the Mundugumor never become neurotic or develop a sense of persecution; they can live happy and useful lives and find scope for many of their talents in the shadow of the great, for there is no sense that they *ought* to be tough or pugnacious in accordance with some absolute values. The taboo on aggressiveness among the Arapesh has the effect of turning it sour and vicious; the adoption of an aggressive ideal among the Mundugumor has no such unhappy effect on those who are quiet and sociable.

A final point. You would hardly think that anybody could be too violent for the Mundugumor; but such individuals do occur. Their fate, however, is not to degenerate into persecution mania, but to be killed off by one of their own people on some expedition.

(iii) The Tchambuli also afford us some useful evidence. Among them, as we might expect, we find that the maladjusted individuals are the aggressive and strongly sexed man and the quiet retiring woman. The former may, as among the Arapesh, become homicidal; whereas the woman is able to slip along peaceably on the fringes of the women's community. The women are regarded in this tribe not only as quite distinctive in character from the men but as much more strongly sexed, and it is a fact of some significance that, of the three tribes we have studied, this is the only one where homosexual practices are to be found, and that among the women. The implication is that the inversion of sexual impulses is (when not physiological in origin) connected with the assumption that one sex possesses more urgent desires than the other; and this is supported by evidence from primitive tribes in other parts of the world.

Correspondingly, certain troubles, such as 'hysterical

THE SCIENCE OF HUMAN NATURE

deafness,' which in Western Europe occur among women, in the Tchambuli tribe are found only in men.

(iv) Let us now turn to the maladjustments most usual in our own country.

I think it is an advantage to classify them in the first place according to whether they are introverted or extraverted. The introvert, as we saw in chapter vi (p. 63), tends to be shy, reserved, introspective, uncommunicative. The extravert is typically un-self-conscious, absorbed in the things that go on round him, quick to make fresh contacts, ready to express his feelings.

Possibly the physiological constitution or instinctive make-up predisposes a person towards introversion within a given civilisation. But the fundamental distinction between introvert and extravert seems to be to accept or to reject the feeling of being 'wrong.' Probably the more assertive individual naturally tends to adopt a more defiant attitude to condemnation from outside. But men of outstanding natural force have sometimes displayed introverted characteristics, such as Lawrence of Arabia. At all events, the leading characteristic of the introvert is his readiness to feel that he is in the wrong, or guilty, or inadequate, or inferior, in respect of some standards that he feels obliged to accept.

The proper contrast to make in describing the extravert is to stress his rejection of criticism: he either naturally assumes, or quickly persuades himself, that he is 'O.K.'; and if that is so it follows that the critic is either a fool or a knave. In this sense the extravert may easily turn out to be an introvert who has rebelled, a worm that has turned; some of the most conspicuous extraverts are of this type.

Most people are only mildly introverted or extraverted, and we are not at the moment concerned with them. It is, however, important to point out that the essential difference between the majority of stable people and the minority of pronounced introverts and extraverts is that *both* the latter types react readily and strongly to criticism, whether real or imaginary. They have somehow come to project on to their

THE INDIVIDUAL AND THE COMMUNITY

friends or employers, or it may be the community at large, or the fate that moulds their lives, their own aggressive or hostile or critical feelings. The great French psychiatrist Janet said of his patients that they all without exception regarded the world about them—especially the social world—as a hostile place, ‘*ce monde hostile.*’ It is essential to appreciate that in the following account we are dealing with the extreme cases : most ordinary people can detect similar *tendencies* in themselves, just as we can imagine ourselves to be suffering from a hundred and one ailments when we read a medical dictionary. The descriptions that follow are of the people who have broken down.

The chief introverted troubles are neurasthenia, which is seldom grave, and schizophrenia and paranoia, which are usually serious.

The neurasthenic is the individual who is always tired. The complaint is often put down to inadequate diet or some other physical cause ; but if this can be substantiated the patient is not neurasthenic : the disturbance is regarded as mental because no physical cause can be found. At bottom it seems to depend on an obstinate feeling in the patient’s mind that he is ‘no good,’ itself frequently a conviction arising from failure to conform to the standards of boldness and confidence expected of the male sex—it is typically a man’s complaint.

It is possible to cure neurasthenia if some occupation can be found for the patient where he can gain quick and genuine success and begin to build his confidence and self-respect. It is probably useful to make the sufferer realise that people have as much right to be introverted as to be extraverted, that each condition has its advantages and its special value in a sane society, and that he has no need to try to emulate the extravert’s heartiness and sociability. Detailed statistical analysis has shown that high moral virtues are more closely associated with introverted than with extraverted traits.

Success may depend as much as anything on his finding some friend who will go on believing in him in spite of

THE SCIENCE OF HUMAN NATURE

lapses and despondency. The same applies to the confirmed drunkard ; and it is interesting to read of the success of an ex-drunkard's club in America. The members are people who are trying to break themselves of the drink-habit, or have already done so ; the secret of its success lies in the fact that there is always somebody at hand to provide firm but sympathetic friendship in the difficult stages of the cure.

If neurasthenia goes too far it becomes more and more difficult to treat owing to the patient's loss of contact with the real world. This may happen either through his building up systematised delusions, or through his retiring even more deeply into himself.

The first of these two conditions constitutes the disease known as paranoia. The characteristic form is persecution mania, in which the patient's long-continued projection of hostility into other people has resulted in his building up a coherent system of delusions, that people are plotting against him or persecuting him, or—as we saw among the Arapesh—casting spells on him.

The alternative to delusions is a degeneration into complete apathy towards the external world, sometimes accompanied by queer antics, or indulgence in extraordinary geometrical drawings. The sufferer lives in a dream world of his own. The great ballet dancer Nijinski ended his career in this way. So also did Nietzsche, the German philosopher. The condition is known as schizophrenia, and is rarely curable.

The extraverted disorders are also grouped in two grades of seriousness.

The first group—the ones so fully explored by Freud—are known collectively as 'hysteria.' They are due to the repression of strong desires through social disapproval, real or projected. The continued pressure from outside, even if quite imaginary, results in anxiety lest the forbidden impulses should break out, followed eventually by their disappearance from consciousness. If the conflict becomes too severe, various troubles may develop.

THE INDIVIDUAL AND THE COMMUNITY

In some cases the conscious anxiety becomes so acute that the patient is no longer able to cope with the ordinary affairs of life. Frequently the repressed desire has been shown to be sex ; and since the trouble is most commonly found in women, it seems likely that this kind of maladjustment represents the effect of the stricter ban on illicit sexual desires in women than in men in West European society. At the same time it seems quite possible that aggressive impulses are also involved, since they are so often linked with sex as 'unfeminine.'

In men such disturbances may arise from a dread of being proved a coward, or incompetent—in other words of failing to conform to these general male standards—followed by repression of the fear or indecision.

The conflict may not, however, issue in anxiety-neurosis but in a phobia towards a particular object. A man becomes scared of going into an enclosed space like a lift, or he loses his memory for some distressing aspect of his life. A woman gets it into her head that her house may catch fire, and always drowns the sitting-room fire with a bucket of water before going to bed. In this instance the dread is accompanied by a positive action. Sometimes such an action becomes compulsive, as in a person who washes his hands fifty times a day from a morbid fear of dirt ; quite frequently the compulsion alone remains, without the anxiety. These are the cases that we discussed before (p. 117) ; we saw that it was possible to explain them as a means of reassurance against an intolerable mental strain, and that this often derived from an inability to conform to some standards that have rooted themselves deeply in the sufferer's mind.

In a third type of hysteria the conflict results in a *physical* ailment, such as paralysis of a limb, or deafness. Here again it has been shown that the forbidden emotions behind the troubles are most often sex in women and fear in men. Many shell-shock cases in the First World War were of this type : the repressed desire for escape got its way by putting the man on the sick-list. It must be emphasised that the patient has no suspicion whatever of the cause of his ailment.

THE SCIENCE OF HUMAN NATURE

The ease with which many of these cases were cured under hypnosis is illustrated by the example quoted on p. 83.

Finally we have the more serious extraverted mental diseases. These take two forms, mania and melancholia. Mania in this sense means a state of exaltation in which the patient suffers from grandiose delusions of his own greatness. It often alternates with melancholia, in which the patient is as depressed as previously he was elated. He may suffer from delusions of having committed terrible sins and, broken by the burden of guilt, commit suicide.

There is another type of misfit whom we have not mentioned: the criminal. It has been estimated that 70 per cent of crime in America (reckoned in cost) is committed by persistent offenders—people who seem to have made a profession of crime. What is the essential difference between the two types of misfit, the neurotic and the criminal? As we saw in chapter VIII (p. 90) the evidence indicates that delinquent children who seem to possess no moral sense are really afflicted with too severe and absolute a sense of what they ought to do, so intolerable in fact that they have rebelled against it. In other words, they, like the neurotics, project their hostility on to the world around them, and accordingly meet it with defiance and resentment. *But whereas the neurotics continue to accept the standards imposed by their society, the law-breaker rejects them.* The distinction is parallel to that between the Nazis and the governments of other advanced countries. The latter admit civilised standards even when they violate them, the Nazis publicly repudiated them for a barbarous code.

There is space only for one further note on crime: the methods of treatment of juvenile gangs in America. In that country it has been found that much youthful delinquency is associated with the formation of child gangs. These may be composed of three boys or twenty (girls are rarely involved), and range in age from seven or eight upwards. The age peak comes between the ages of eleven and fifteen. These gangs spring up spontaneously where there are a large number of boys, and the purpose is almost always excitement and

THE INDIVIDUAL AND THE COMMUNITY

adventure, starting, perhaps, in football and visits to fun fairs and grading into burglary and other crimes.

Treatment was at first generally along orthodox lines, sending offenders to Approved Schools, and so on. But it was continually found that the lure of the gang was too strong when the boy returned to his locality, and he fell into further trouble.

The only lasting cure for gang delinquency has been to re-direct the gang spirit to new ends. The gangs have been 'captured' by club leaders, scoutmasters and so on, and turned into boys' clubs and scout troupes. Then, with positive aims and plenty of the right kind of games and activities, there has been no more trouble.

In short, these adolescent boys need gang occupations, and if they do not get them sober, they will get them drunk. And it is far easier to reform the moral outlook of the whole gang than to effect a permanent cure of an individual member who is removed to a special institution, and afterwards left with nothing to fill the blank. The last state of that boy is worse than the first.

(b) *Positive aspect.* To the child the parents are the representatives of the community, and as he grows up the mechanisms of identification and projection may gradually be transferred to the community as a whole.

It might be thought that compulsive values of Type II are as prejudicial in their influence on a large scale as on a small. It depends on what values they are. I suggest that, human nature being as it is, most of us do in fact need to feel that certain major values are inviolable; or we either never reach, or fail to maintain, the higher levels of civilisation. But these major values must be civilised ones, not the savagery propagated by the Nazis, or the money-worship we sometimes find in the democratic countries.

In a society where the higher values are commonly accepted as obligatory they may in fortunate families be mediated to the children by affection, so that they receive the sanctions of experience and example rather than of compulsion, and come to be believed in for their own sake.

THE SCIENCE OF HUMAN NATURE

But without the general sense of their supremacy, we are likely in times of crisis and revolution, if not to repudiate them wholesale in the fashion of the Nazis, at any rate to content ourselves with a second best. Thucydides put it bluntly : ' War proves a rough master, that brings most men's characters to a level with their fortunes.'

But the compulsions erected by the community may have little effect if they are not associated with identification ; and the influence of the individual's identification with his community depends to a great extent on the prestige that he attaches to it.

Take a concrete illustration : imagine yourself as a man with a couple of small children with whom you are apt to be irritable. You may act in two ways : you may vent your irritation on them, regarding it, perhaps, as natural and justified ; or you may restrain the irritation for various reasons. Experience may have taught you that the expression of your feelings makes the children worse. Or you may have been brought up with a compulsive value for restraining anger. Or you may have grown up in a community like the Arapesh where the whole tribe assumes, as one of the fundamental principles of living, that you can and do always practise patience towards your children. In this case you will probably be adopting the principle because you identify yourself with your whole community. The power of the will is correspondingly reinforced by the confident belief that the patience not only *should* be practised, but is the only possible action in the circumstances.

But suppose that your community is a small and not very stable section of a large population, where you come under the fire of all sorts of alien values : your identification with your own community and its special values tends to become loosened—it does not hold your allegiance so wholeheartedly. We see this happening in the children of European peasants who have emigrated to America : their values waver between those inculcated in their early years and those of the new and vast and confident community in which they have become immersed. There is evidence

THE INDIVIDUAL AND THE COMMUNITY

which suggests that the completeness of your identification with your community and your confidence in its values depends on your conception of its 'greatness.' The inhabitants of a very large country tend to have more confidence in their values than those of a small one, unless the latter feel, for example, that they have a specially ancient and honourable history (as is the case in Czechoslovakia) or that they are a divinely chosen people (as in Japan, or among the Jews at the time of Christ).

Our own identification with our community far back into history, as well as in space at the present moment, is (as MacCurdy has pointed out) demonstrated by our use of 'we' to refer to what the English did, for example, at Agincourt.

Thus one of the functions of a leader is to serve as a concrete symbol for that rather abstract entity 'the community as a whole.' The older British Dominions acknowledge an allegiance to the King although they are not bound by the *Government of Great Britain*.

We can see that the conviction of a divine sanction behind a particular value, or an identification with the whole human race, or other assumptions of comparable magnitude, may over-ride all contrary impulses whatever.

The growth of identification with such a community extending broadly into space and time, can be deliberately encouraged by reading, meditation and so on. Thus we gradually come to 'make our own' values that may, or may not, originally have been quite congenial. A country's rulers may spread a knowledge of the deeds of its own heroes, past and present. The academic tradition of this country attempts to transmit a 'culture' which has been defined as an appreciation of 'the best which has been thought and said in the world.' Whitehead summed the matter up in a phrase when he said : 'There is no moral education without the habitual vision of greatness.'

THE SCIENCE OF HUMAN NATURE

2 THE PROJECTION OF BENEVOLENCE

We have devoted a good deal of space in the last few chapters to the subject of projection, and I have emphasised the ill-effects of a man's projecting critical or hostile feelings into the people round him or into the universe at large. The picture would not be complete without an attempt to trace the effects of his projecting loving benevolence into the world outside him. It is not difficult to sketch in a rough outline, for the material is not as scarce as might be supposed. Christianity has always taught that the force behind the universe is a loving benevolence ; and the Church claims that it is the intensity with which the saints have believed this doctrine that has led them to become saints. The following account is therefore an attempt to describe briefly—if I may so far presume—the outlook of a saint.

It is best to start from the three fundamental ideas of the Christian faith : that the universe was created by a God who loves men ; that he does so to the extent of having once become a man himself and let himself be put to death as an ordinary criminal for the sake of that love ; and that man is like God in having an immortal spirit and a free will, but that he is sinful—his will is caught up in wrong-doing and he cannot avoid committing sins.

I must insist that for my present purpose the truth or untruth of these ideas is irrelevant ; what I want to do is to show what kind of effect such convictions have on a man's mind when they are vividly felt and permeate his whole imagination. I must also repeat that ' projecting love into God ' is not the same as ' believing intellectually that God loves us ' : projection means that the person and the quality are as vividly and inseparably tied in our mind as Churchill is with a cigar and a good-humoured bulldog defiance.

First we must consider the effect of a man's projecting love into God. Recurring continually to the idea of God's love for him, he finds an attitude of trust and compliance towards God beginning to spring up in himself. He accordingly comes to regard the events of his life, whether apparently

THE INDIVIDUAL AND THE COMMUNITY

good or evil, as all equally gifts from God. When he receives a kindness from somebody, he is grateful both to that person for the benefit and to God for (as he believes) prompting the good will. When some disaster overtakes him or a great friend dies, he is again as far as possible thankful that his own attachment to natural satisfactions has been further loosened, that the friend has come closer to God. Any bitterness melts under the sense of God's love. The very fact of his belief he regards as the greatest gift of all.

As a further result the unconscious projection of hostility and condemnation which in his childhood generated his compulsions begins to thaw out. With this the compulsions begin to relax their hold on his mind, and the unconscious sense of fear or guilt, or of inadequacy, becomes less unbearable, so that he can better face the fact of his own deficiencies and selfishness. A relaxation of compulsions implies a spread of the area in which the will is free to choose alternatives on their merits, as (see pp. 110-12) it appears to be in a balanced person in dealing with trivialities.

Second, there is the effect of projecting divine love not only into 'God the Father' but into another figure, Christ, who is both man and God. The same sort of all-pervading identification with Christ begins to build up in his mind as may in a small child towards a loved parent. As a result the idea that the frustrations and tragedies of his life are gifts from God becomes tied to the idea that he is to suffer them as if he were sharing in the crucifixion of Christ, that in so doing he is gradually destroying the selfish impulses to which his will is attached, cauterising his own evil side by the suffering.

His attitude to other people follows. In the first place he regards any virtues he may have as nothing to do with his merits: he has no merits. His own evil tendencies or self-will he sees as due to the natural fact that he grew up as a member of a human community, and because that community was, like all others, in his view composed of sinful men and women, he too became corrupted in his will

THE SCIENCE OF HUMAN NATURE

and now shares in the sin of the rest of the human race. But they are all equally children of God, and by virtue of his identification with Christ in the crucifixion he is prepared to forgive even the worst injuries. Being no longer so liable to condemn other people for their failings he is better able to handle them.

It is important to notice that the Christian's idea of crucifying his own evil will involves a *dis*-integration of his personality: he regards certain strands of his personality as evil (but not necessarily the ones that are so regarded by twentieth century English society), and as far as he can he dissociates his will from these impulses. This view is in marked contrast to some current views about the integration of personality and cannot be lightly passed over. The very identification with a divine being on the other hand is likely, as we noted before, to give his conscious will additional strength. Even at that, however, the binding effect of old compulsions may take many years to undo. Even a saint may suffer from them to the end of his life. He regards them as part of his 'cross.' But if the compulsions engross his will too far his capacity for intense conviction about God's love is itself impaired and he is no longer capable of becoming a saint.

You will have noticed that I have imported into this analysis an idea that was not part of the original assumption I made. I set out to illustrate the effect of projecting loving benevolence into the universe at large, and I added in the idea of man's being sinful because it was one of the conditions of the saint's characteristic response. Without this conception the saint becomes the pharisee: the idea of divine love is interpreted as divine approval.

It is important, by the way, to notice that 'forgiveness' is not the same thing as 'tolerance,' still less of 'understanding' (in the sense of the French proverb, 'Tout comprendre, c'est tout pardonner'). If you get on easily with other people or have a ready sympathy with their failings, you do not have to forgive them, because you do not resent an injury. Forgiveness can only come into operation when

THE INDIVIDUAL AND THE COMMUNITY

you cannot tolerate, or do anything but condemn, their action.

It is obvious that much of the saint's attitude is not exclusive to saints or to Christians. When a society becomes impregnated with a tradition the characteristic 'paradigmatic' experiences or responses of that tradition find their way into many unexpected places, and people are infected with them who would not own to any connection with the tradition. Again, many people accept Christian ethics, and perhaps learn to identify themselves with Christ, who do not accept the Christian doctrine that Christ was God. A very important question is raised here - do Christian values depend for their ultimate sanction on the Christian interpretation of the universe? But it is not a matter on which I can offer any solid evidence in either direction. The above discussion does not constitute evidence on this question, nor of course on the even more important question whether the Christian world-view is true or not.

We have now discussed in some detail the sources and influence of our values, and in the next chapter we shall be summing up the evidence on the nature of the human mind and the bearing of science on the matter.

CHAPTER XII

SCIENCE AND VALUES

I THE NATURE OF THE HUMAN MIND

WE have already had occasion in two or three contexts to ask ourselves what sort of a thing the human mind ultimately is, without pushing the question very far. It is time now to sum up our previous conclusions and bring forward some fresh and important evidence.

(a) *The effect of the body on the mind*

(i) Certain areas of the brain are associated with certain senses and movements. Damage to one of these areas injures a sense or memory, or interferes with movements.

But the position is not quite as simple as it looks. If the right half of the movement-area of a monkey's brain is destroyed, the left side of its body is paralysed. Yet if the limbs that can still move are tied up it is found that after a time the paralysed limbs become usable.

If a man loses his right arm his new, left-handed writing will share many characteristics with his old handwriting. If each limb were, so to speak, tied to a precise portion of the brain you would expect the left hand to learn nothing from the previous movements of the right.

This and other clinical experience indicates that the brain-map of Fig. 5 is only a first approximation. The facts appear to support the commonsense view that the mind uses the body for its own purposes.

(ii) Digestive and other ailments affect our mental outlook. The word 'dyspeptic' suggests mental as well as physical characteristics. Again, however, the facts admit of an alternative explanation: the study of mental diseases has shown that these are capable of producing physical troubles. 'Nervous dyspepsia' is a condition that results from worry.

(iii) The ductless glands exert an influence on our outlook.

The amount of hormone present in the blood affects the extent of our physical and mental energy. The sex glands have a more specific effect. On the other hand, it is possible that extra activity of a gland is in some cases due to habitual stimulation of it, as the adrenal glands must be continually stimulated by the life of a guerrilla soldier.

(iv) Drugs also exert an effect on the mind : opium seems to undermine will-power ; evipan is used for inducing hypnosis ; alcohol may induce hallucinations.

(v) Certain diseases, such as syphilis and sleepy sickness, are capable of transforming a person's character out of recognition.

(vi) Finally, certain operations on the brain have been known (as was mentioned on p. 33) to alter an insane personality entirely.

(b) The effect of the mind on the body

(i) Most obvious is the action of the will : you decide to brush a fly off your nose, and you do ; or you decide to see how long you can stand the tickling, and the fly remains. But the commonsense view is not watertight : it is possible to interpret acts of will in terms of responses to past and present experience, or in terms of unconscious compulsions.

The experimental work discussed in chapter x points to the important distinction between cold, whole-hearted choices and emotionally coloured, partial choices ; but although this seems to me to be valuable evidence for an understanding of the derivation of values, it cannot be regarded as contributing anything definite to our knowledge of the effect of the mind on the body.

(ii) Mental diseases produce physical effects, such as paralysis, deafness, immunity to pain or to bleeding in a particular part of the body. Some of the physical effects of hypnosis are closely comparable.

The evidence we discussed in chapter vii showed that unconscious impulses result in physical actions—such as shutting a window. The exertion of the muscles required to produce hysterical paralysis of a limb could be inter-

THE SCIENCE OF HUMAN NATURE

preted in the same way. The prevention of bleeding can be similarly explained as due to constriction of blood-vessels.

But it is more difficult to explain the positive effect of the unconscious mind on the body, such as the raising of a blister on a hypnotised man's hand by a pencil when he is told he is being touched by a lighted cigarette, or the production of a red cross on a woman's chest every Friday for a couple of months. Such a story sounds fantastic, but it is no more spectacular than a case recently recorded in the *Lancet*. In this instance a man of thirty-five was suffering from somnambulism and aggressive behaviour. He had been liable to sleep-walking at the age of thirteen, and again at sixteen, and on the latter occasion he had been subjected to forcible restraint. He went into the Army as a regular officer but after a few years was invalided out on account of a bad outbreak of somnambulism.

This occurred when he was in a military hospital in India for some quite minor cause. The hospital authorities set a guard by his bed to keep him in, but it was difficult to restrain him and he would fight the guard to get away. Finally one night the guard tied his hands behind his back during his sleep to prevent his getting out. However, the patient not only succeeded in getting up from his bed but in eluding his guard in the darkness and escaping from the hospital into the country. In 1940 he was recalled to the Army, and in 1944 he was back in hospital suffering again from somnambulism.

One night he was seen to be tossing and turning in his bed with his hands behind his back, apparently struggling with some imaginary bonds. After an hour he got up and went out into the grounds. He was out for about twenty minutes ; when he came in and went back to bed the nurse noticed weals on his forearms. It was thought that he might have picked up a piece of rope in the grounds and tied himself up with it.

A couple of nights later the doctor decided to try the effect of hypnosis under evipan, and gave him an injection.

Lying on his couch, he again began after a time to toss and turn with his hands behind his back. As the doctor watched him *he saw marks appear on his forearms*, which became *more and more indented until they developed into weals*, exactly as if a cord had been tied round them. Finally the skin became discoloured as it does when bruised. The patient then got up and crept out of the hospital. The doctor followed him. In twenty minutes the patient woke up in full possession of the repressed incident.

Here we have the clearest possible evidence of the mind's power over the body.

(c) *Telepathy and clairvoyance*

By telepathy I mean thought-reading, that is, your learning what somebody else is thinking without ordinary communication. By clairvoyance I mean your learning of some event directly without your witnessing it in the flesh. The implication is that some part of your mind travels to the scene and watches the event. These and related happenings are now collectively known as Psi-phenomena.

Many ostensible cases of telepathy and clairvoyance have been recorded. There is the case, for example, of a brick-layer who had a sudden impulse to run home and arrived just in time to save his small son's life ; the boy had set his clothes on fire. When some terrible accident occurs with heavy loss of life there always seem to be a number of people claiming to have witnessed it in a dream.

But cases like these can rarely be regarded as satisfactory evidence ; the element of chance bulks much too large. How often do we have dreams or fancies of fearful events which do not appear to match any known occurrence ? Where, then, are we to look for a criterion by which to judge the reliability of the evidence ? A good case must satisfy two conditions. First, the actual event and the event of the vision must be recorded independently before comparison is possible. Second, the statistical probability against their identity must be very high. It would not be possible to get a figure for the probability in a spontaneous case, but it is

THE SCIENCE OF HUMAN NATURE

possible to enumerate the details of the vision and the reality and count the points of identity.

Now if the odds against one event are 3 to 1, and against another 2 to 1, and another 5 to 1, the odds against all three occurring together are $3 \times 2 \times 5$, or 30 to 1. A large number of points of identity between vision and reality therefore indicate a very high probability against a chance occurrence.

The case of the bricklayer shows how weak the evidence may be : the man has received no picture at all in his mind, no details of his small boy, or of a fire, that could be compared with the reality. Only one feature is common to the mental impression and the actual event—the feeling of distress. Let me therefore quote a case that comes rather more closely to satisfying these conditions.

First we have the statement written by the girl who saw the vision in question, Frances Reddell :

Antony, Torpoint

Helen Alexander [maid to Lady Waldegrave] was lying here very ill with typhoid fever, and was attended by me. I was standing at the table by her bedside, pouring out her medicine, at about 4 o'clock in the morning of the 4th October. I heard the call-bell ring . . . and was attracted by the door of the room opening, and by seeing a person entering the room whom I instantly felt to be the mother of the sick woman. She had a brass candlestick in her hand, a red shawl over her shoulders, and a flannel petticoat on which had a hole in the front. I looked at her as much as to say, 'I am glad you have come,' but the woman looked at me sternly, as much as to say, 'Why wasn't I sent for before?' I gave the medicine to Helen Alexander, and then turned round to speak to the vision, but no-one was there. She had gone. She was a short, dark person, and very stout. At about 6 o'clock that morning Helen Alexander died. Two days after her parents and a sister came to Antony, and arrived between 1 and 2 o'clock in the morning, I and another maid let them in, and it gave me a great turn when I saw the living likeness of the vision I had seen two nights before. I told the sister about the vision, and she said that the description of the dress exactly answered to her mother's, and that they had brass candlesticks at home exactly like the one described. There was not the slightest resemblance between the mother and daughter.

FRANCES REDDELL

The incident was corroborated by Miss Reddell's employer, Mrs Pole-Carew, as follows :

In October Lord and Lady Waldegrave came with their Scotch maid, Helen Alexander, to stay with us. . . . [Helen Alexander fell ill with typhoid] . . . She did not seem to be very ill in spite of it, and as there seemed no fear of danger, and Lord and Lady Waldegrave had to go a long journey the following day, they decided to leave her, as they were advised to do, under their friend's care. . . . [She became more seriously ill] . . . At about 4.30 [on the morning of 4th October] Reddell looked at her watch, poured out her medicine, and was bending over the bed to give it to Helen, when the call-bell in the passage rang. . . . She heard the door open and, looking round, saw a very stout old woman walk in. She was dressed in a night-gown and red flannel petticoat, and carried an old-fashioned brass candlestick in her hand. The petticoat had a hole rubbed in it. She walked into the room, and appeared to be going towards the dressing-table to put her candle down. She was a perfect stranger to Reddell, who, however, merely thought, 'This is her mother come to see after her,' and she felt quite glad it was so, accepting the idea without reasoning upon it, as one would in a dream. She thought the mother looked annoyed, possibly at not having been sent for before. She then gave Helen the medicine, and turning round, found that the apparition had disappeared, and that the door was shut. A great change, meanwhile, had taken place in Helen, and Reddell fetched me . . . but Helen died a little before the doctor came . . .

Reddell told me and my daughter of the apparition, about an hour after Helen's death, prefacing it with, 'I am not superstitious, or nervous, and I wasn't the least frightened, but her mother came last night,' and she then told the story, giving a careful description of the figure she had seen. The relations were asked to come to the funeral, and the father, mother and sister came, and in the mother Reddell recognised the apparition, as I did also, for Reddell's description had been most accurate, even to the expression, which she had ascribed to annoyance, but which was due to deafness. It was judged best not to speak about it to the mother, but Reddell told the sister, who said the description of the figure corresponded exactly with the probable appearance of the mother if roused in the night, that they had exactly such a candlestick at home, and that there was a hole in her mother's petticoat produced by the way she always wore it.

F. A. POLE-CAREW

THE SCIENCE OF HUMAN NATURE

To what extent does the incident satisfy our two conditions? Strong points in the evidence are these : (a) Mrs Pole-Carew states that Miss Reddell gave her a detailed account of the vision an hour after Helen Alexander's death ; (b) the details recorded are numerous : (1) The apparition was the mother of the sick girl. (2) The candlestick was made of brass. (3) The candlestick was of a particular design. (4) The apparition wore a red shawl. (5) Her petticoat was of flannel, (6) was red, (7) had a hole in front. (8) The woman was short, (9) was very stout, (10) was dark, (11) was elderly, and (12) had an expression of annoyance on her face.

Can we reckon up the odds against a hallucination having just these characters? Let us take one or two of them. What about the brass candlestick? To see what the chances are that Miss Reddell would have imagined a *brass* candlestick anyway, we would have to know what the custom of the time was : did nine out of ten people of her social background use brass candlesticks? or only one in ten? The same applies to the petticoat. On the other hand the hole in the petticoat and the expression on the face are both details against which the odds might well be put high. But to get a figure for the probability is obviously impossible.

Let us look at the weak side of the evidence. We see on examining the dates that Miss Reddell's account (14. xii. 1882) was not written down by herself for more than two years after the event (4. x. 1880), nor Mrs Pole-Carew's for three years (31. xii. 1883). In other words we have to rely on memory over a fairly long span of time ; and experiment shows conclusively how unreliable memory can be.

The above account shows plainly how difficult it is to assess the value of 'spontaneous' cases, and how lame a report may appear when the criteria specified on p. 141 are applied. The evidence is not 'scientific,' in the sense used in chapter 1, but 'historical' ; and the critical question in weighing up any historical evidence is the reliability of the witnesses.

It becomes clear that any rigorous checking of the facts,

SCIENCE AND VALUES

or of probabilities, is extremely difficult, unless these can be brought within the conditions of a laboratory experiment. I want, therefore, to turn next to a remarkable series of experiments conducted by an American psychologist, J. B. Rhine, which have revolutionised the study of this subject.

Rhine's idea was to test telepathy and clairvoyance by guessing cards from a pack. The cards used were a specially designed pack of twenty-five consisting of five suits, known as the Zener pack. They are illustrated below.

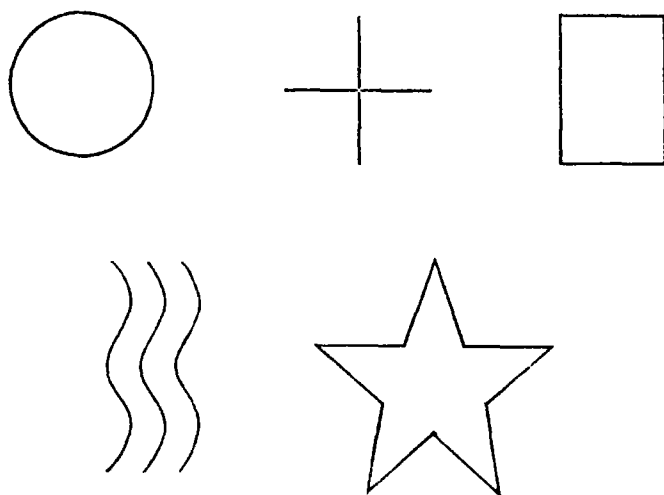


Fig. 19 The Zener pack

For telepathy experiments observer A, the agent, turns up a card, thinks of the picture and notes it down, while observer B writes down what he thinks it is. For clairvoyance A picks up the card and places it in a new pile without looking at it. B guesses and A records the guess.

Rhine and his team varied the conditions in a great many ways: they put A and B in the same room at one table, in different parts of the room, in different rooms. They made the experiment of not touching the pack at all during clairvoyance tests—merely counting down through the pack

and checking afterwards. They shuffled the pack at various intervals during a test. A mechanical shuffler was used to ensure proper shuffling.

The results are to be interpreted in statistical terms. The chance score will be one right in five, or five out of twenty-five. In other words, a particular design turns up five times in one run through the pack, and therefore *if no factor but chance operates to make us guess one card rather than another* we must expect to average in a large number of trials a score of five per run. In fact Rhine checked the shuffling by calling two mechanically shuffled packs against each other. When the tests were extended to a large number the chance score was very closely matched.

Rhine's method of presenting his results is not quite the same as that which we used in chapter II. His aim, like ours, was to calculate the odds against a given result being due to chance, and this involved the calculation of the chance errors. Instead of using the Standard Error, however, he used a quantity known as the Probable Error, which is $0.6745 \times \text{S.E.}$. Its meaning can be explained as follows. If we make 1,000 calls with Rhine's pack the chance score is 200. The S.E. is then calculated from the formula $\sqrt{(n \times p \times q)}$, where n is the number of trials, here 1,000; p the probability in favour, which is $\frac{1}{5}$; and q the probability against, which is $\frac{4}{5}$. The S.E. is therefore 12.65 and the P.E. 8.5. If we then repeated this experiment a large number of times we would expect to find that two-thirds of all the scores lay within 12.65 of 200, or half within 8.5 of 200. The odds therefore are even that the score obtained in an experiment will lie between 191.5 and 208.5. They are 22 to 1 against our getting a score which deviates from 200 by more than three times the P.E., i.e. by more than 25.5. The ratio of the experimental deviation from chance (D) to the P.E. he calls X ; the odds, therefore, against our getting a value for X of 3 are 22 to 1.

A selection of results is shown in Table 5 opposite :

We see here that the experimental deviation from the chance score (column 4) is enormously greater than the

Persons Tested	Number of Trials	Number of Hits	Experimental Deviation from chance (D)	Probable Error P.E.	Ratio $\frac{X}{D} = \frac{X}{P.E.}$	Approximate odds against this value of X	Average Score out of 25
Miscellaneous individuals	18,100	4,200	580	36.2	16	10^{22} to 1	5.8
Linzmeier	8,724	2,077	332	25.2	13	10^{14} to 1	6.0
Stuart	14,700	3,575	635	32.7	19	10^{24} to 1	6.1
Pearce	17,250	5,486	2,036	35.4	57	10^{320} to 1	8.0
Five others	26,950	9,026	3,636	44.3	82	10^{668} to 1	8.4
Total	85,724	24,364	7,219	78.9	91	—	7.1

Table 5 Selected scores obtained in Rhine's experiments

THE SCIENCE OF HUMAN NATURE

Probable Error (column 5) ; and column 7 shows how fantastically high the odds are against such deviations being due to chance. Such results over such large numbers of trials cannot in my opinion be accounted for except by telepathy and clairvoyance.

A few additional points are worth making.

First, Rhine tried many experiments on people who did not score more or less than chance. The high scores quoted were obtained with people who seemed to have a special capacity, 'second sight' or 'psi-faculty.' These observers in many cases seemed to lose the capacity after a time, and under experiment it was shown that they were quite likely to lose the capacity temporarily if the conditions of trial were not favourable. If the experimenter became less friendly, badgered them to get on and so on, the scores quickly fell to chance.

Second, a good deal of experimental work has now been done on similar lines in this country which shows that some people do not guess the card the agent is thinking of at the instant of guessing, but the one that he will be thinking of in a few moments' time. This astonishing result provokes fresh speculation about the nature of time, but it would take us too far from our argument to pursue the matter any further here.

(d) Conclusions

For myself, I cannot escape the conclusion that the human mind, although tied to the body and dependent on it, is something non-material that can operate independently of the body. Perhaps the analogy suggested by Spearman for intelligence can be extended: the mind is something 'immaterial' or 'spiritual' which operates through the physical 'engines' of the body, but it depends on these to different degrees in different operations. Telepathy is at one extreme, sense-perception at the other. If the 'engine' is damaged, as by glandular disease, the mind can no longer function properly through it. *We cannot be certain that the picture is true, but it is a plausible suggestion.*

We began this section of the book with the question of good and evil. What sort of a being is man? What is 'good' for him? What are his needs? What are our criteria to be in discussing the cure of the evils that surround him? Has science anything to say on these points? We must now draw together the threads of our argument.

2 SCIENCE AND HUMAN NATURE

To begin with, it is evident that science can establish facts about the nature and working of the human mind. We have inspected plenty of instances.

We can go on to recognise that the psychologist can from his observations recommend certain courses of action. He can say, for example, of the bully . arrange for him to join a club where he can get boxing under sensible supervision ; or to get a job on a farm with firm kindly people. He will probably be reformed in a year. We notice, however, that these recommendations do not give any reason for regarding bullying as good or bad ; they simply offer a means of attaining moral purposes which are part of the framework of assumptions and values accepted by our society.

Is it possible, then, for the scientist to lay down any criterion of good and evil? Waddington has suggested that the 'direction of evolution,' which has been analysed by geologists and biologists, gives us such a standard. Evolution, he points out, has been towards adaptability, towards greater 'subtlety and precision of movement,' towards greater 'capacity to react to the relations between objects'; and he accordingly defines the 'good' of any species, including man, as being action that conduces to this development. Since internal conflict within the species might well preclude further evolution, harmony between the members of the species must also be a 'good.'

But such conclusions are even vaguer than the Greek ideals of Beauty, Truth and Goodness : they are not a creed a man could live by. Could the scientist reach greater precision in some other way? In, for example, establishing

THE SCIENCE OF HUMAN NATURE

precisely how human nature is constituted? This question has been the target towards which Part I of this book has been directed. If the answer is affirmative, can the scientist go on to lay down clearly and categorically what constitutes the 'welfare' or 'well-being' or 'optimum' life of the human species? I have used three scientific-sounding words there, but you may have noticed that two of them contain the word 'well,' the adverb of 'good,' and the third is merely the Latin for 'best.' In short, we are asking whether the scientist could establish also what constitutes the 'good life' of the species and of the individual. A third question follows: would the scientifically established knowledge of the good life be enough to lead men to act in the best interests of themselves and of the species? Would it be a sufficiently compelling sanction to persuade them to act rightly?

Let us take these three questions in turn:

(a) *Can science establish precisely what human nature is?* For myself, I think that if we emphasise that word 'precisely,' the answer is 'no'; but if we are content to put 'roughly,' we can say 'yes.' We have seen all along the line that science can establish facts on which theories can be erected, but the theories always get on to ground which *by its nature* is not amenable to scientific investigation: the relation between the conscious self and the electrical impulses in the brain-cells; the connection between the intelligence that perceives relations and the images or sense-impressions between which the relations subsist; the relation between one mind and another in telepathy; and more important still, the sources of values, the influence of projection, the nature of the will. Or are we wrong to include these last three as intrinsically unamenable to scientific investigation? We have seen how after chapter x we were obliged to pick our way through a quicksand of speculation. Can we convince ourselves that science can establish theories on these subjects? I feel doubtful, but it is perhaps not beyond the bounds of possibility, and for the sake of the argument it is worth replying 'yes.'

(b) *The scientist, we will suppose, has established precisely*

how human nature is constituted ; we ask ourselves *whether he can define the 'good' of the species and of the individual*. Here it seems to me is the crux of the whole matter. The scientist may see that the Arapesh live a more peaceable and friendly life than the Mundugumor or the English, but what criterion has he for saying that the one is 'better' or 'worse' than the other ? or that one 'satisfies' or 'fulfils' human nature better ? Why should human nature be satisfied anyway ? Can he discover a criterion that will enable him to say that a materially prosperous life in a totalitarian society is better or worse than a less comfortable life in a free society ? Can he establish any principle that a man should, with full knowledge and certainty, die for ? I cannot see how the answer to these questions can be 'yes.' I cannot conceive that the criterion offered by the 'direction of evolution' should give us exact guidance.

Waddington has suggested that an ethical precept is of the same nature as the precept : 'You are an animal of such a kind as to need not less than 7 mgms. of vitamin C a day.' I take it that he means an equivalent ethical statement would be : 'You are an animal of such a kind as to need to be honest.' It seems to me that Aristotle or Aquinas would have agreed with this proposition. Where Aquinas would have parted company with Waddington, I suspect, is over the possibility that human beings could ever have *sufficiently compelling evidence to establish* that the good life lay in obedience to Christian (or any other) ethics ; he would have said that a major purpose of God's irruption into human society was to give a compelling sanction to ordinary people for values that the saint or sage recognised by intuition.

(c) This brings us to our third question : *would the scientist's conclusions be enough to lead men to act rightly ?* The scientist would now be in a position (we are supposing) to say : if you want to be happy, *this* is what you must do. If you insist on doing something else, it will bring its own ill-reward ; it will come back later and hit you like a boomerang. Tolstoy illustrates the process in the account of the bear-trap in his short story, *The Godson*. Is this enough ?

THE SCIENCE OF HUMAN NATURE

There are two schools of thought on the question. One says : yes ; men are by nature good ; only evil circumstances distort their desires and set up conflicts. What they have to do is to set up a just society in which everyone gets a square deal ; and then people will be happy and reasonably good. Those who want to, will set about achieving their own integration, their own perfection. The other answer to the question is : no ; men are by nature neither good nor bad ; but every living individual is in fact more or less distorted, and he cannot avoid passing on the taint to his children. Consequently he is incapable of setting up a society that is just and stable ; for even if he knew what to do to create such a society he would still have the kink in his nature which, having exorcised brutality and cruelty, would fall into smugness and self-satisfaction ; and that too would eventually prove disastrous.

Is the second answer more realistic, or merely defeatist ? What evidence is there ? The historian who takes the second view will point out how short-lived the peaks of civilisation have been, in the Athens of the fifth century B.C. and the England of Elizabeth. But if he takes the optimistic line he will remind us that our economic productivity had not yet reached a condition that would maintain a reasonable and stable standard of living for the whole country.

A psychologist will probably also support both answers. He will insist that when the neurotic adult, the bullying child, is put in the way of satisfying his self-respect, he becomes a tolerably balanced person, and that a condition of general self-respect and contentment in a community is that the members shall be reasonably able to live up to the best traditional standards of the community. He is also, on the other hand, bound to point out the extreme unlikelihood of anyone growing up without conflicts, without a strong current of resentment somewhere in his system. He will also draw attention to the powerful compulsions we are all subject to, and to the extreme difficulty that everyone appears to have who tries to alter himself—whether his aim is to cure himself of the tobacco habit, or to stop himself

SCIENCE AND VALUES

pulling his drives at golf, or to practise kindly tolerance when he is by nature exacting and irritable.

For myself I cannot avoid the conclusion that we need, not *recommendations* about what will be good for the community, or what will bring us happiness, but a sense of an absolute *obligation* to do certain things and avoid others. A recommendation is not strong enough : it only touches the surface of the mind ; and unless in fact we keep making right choices we never come to appreciate which the right choices are. When true values are no longer obligatory we lose the yardstick by which to measure our own lapses ; and so we lose the awareness of our own compulsions.

3 CONCLUSIONS

I suggest that the evidence I have presented in this section of the book supports the following conclusions :

(a) The physical basis of human character has the same sort of relation to the mature personality as the painter's materials have to the finished picture. We can make our analogy closer if we suppose that he comes to his box with his inspiration on a Sunday morning when the shops are shut, or at the end of a war, when things are in short supply. He then finds that the materials he has to work with are not perfectly balanced : there is plenty of red, but not much green, his only canvas is long and narrow, the only brush a thin one. These conditions make it impossible for him to produce certain results . a large bold composition with green predominating, for example. But within the range of possible effects there is an infinite variety of pictures that he could paint . in other words the *crucial* factor is the human one. Similarly the crucial factor in a man's development is his human environment, the complex of customs and habits and values and ideas which are brought to bear on him by the people amongst whom he grows up.

(b) We continued with the idea that every community tends to select and lay special stress on some values rather than on others, and we saw how overwhelming (whether positive

THE SCIENCE OF HUMAN NATURE

or negative) was the influence on every individual of the values prevailing in his community. It became clear how important it was that these values should be 'civilised'; that this conception involved some quality of 'gentleness' or 'respect for personality' which would permit of growth by identification; and that the individual's confidence in these values should be backed by an adequate sanction, whether the authority of a large country or of a great tradition, or of the sum of human wisdom, or of a God.

(c) Our third general conclusion about human nature was that different values tend to root themselves more firmly, for one reason or another, in different people's minds; and that a man's principal need is to feel that he is living up to his dominant standards—in other words to maintain his self-respect.

Denial of these satisfactions leads variously to apathy, anxiety or resentment, and eventually to mental disturbance or crime.

The chief hindrances to self-respect result from three features of the human mind: the compulsive nature of most people's dominant values; the fact that different values take precedence in different people; and the prevalence of the mechanism of projection. As a consequence mutual condemnation and hostility are endemic in human societies.

The most important single means of satisfying the need for self-respect is membership of a group of like-minded people—perhaps a family or a circle of friends or a group that works together at a job. The greater our capacity for getting on happily with other people the more likely we are to weave in well with such groups. Here mutual approval confirms our self-respect, while agreement on values reinforces the sanction for them. In such a group, agreed on the pursuit of the highest civilised values, the individual may reach the peaks of human fulfilment and achievement.

PART TWO
THE SCIENCE OF HUMAN SOCIETY

CHAPTER XIII

THE HUMAN CRITERIA OF SOCIAL DEVELOPMENT

I LOCAL VERSUS UNIVERSAL VALUES

IN this section of the book we return to the question from which we set out in chapter I : what has science to say about the evils that face human society? Part One has given us both statistical methods for analysis of the causes, and human criteria by which to judge any proposed remedies. We should therefore be equipped for our task.

How are we to apply the human criteria that we summed up in the last chapter? We notice at once that we have two potentially contradictory principles to apply simultaneously. On the one hand every community or country or tribe has its own characteristic code or outlook, which it is both difficult and dangerous to violate. That is a well-supported, if not scientifically established, conclusion. On the other hand there are certain values that nobody imbued with the characteristic traditions of West European civilisation would deny as essential to a civilised life : honesty, a belief in law, respect for human personality, and so on. But this is not a statement for which we can bring forward any clear-cut evidence at all. These are the values to which we have been taught allegiance. We have been brought up to these just as the Arapesh and the Mundugumor have been brought up to theirs, and the fact that we feel them in our bones cannot be regarded as evidence for their validity.

Can we find any sort of evidence? We might refer to the fact that neurotics or criminals when rehabilitated into normal life are much happier people. But even if the grounds for such a statement were entirely conclusive we could not infer from it more than we inferred in the case of the Arapesh misfit : the man will be happier if he can conform to the

THE SCIENCE OF HUMAN SOCIETY

outlook of the society he belongs to. We are no nearer showing that the values of our society are absolute or universal. Toynbee has pointed out how the technical power of Western man has given him material supremacy over all other centres of ancient culture, with the result that inhabitants of those regions have become aware of the parochial qualities in their own traditions ; and Western man alone is left with the assumption that his own tradition has no parochial limitations.

But I think we can get legitimate evidence from another source : the comparative study of the teachings of men commonly recognised as ' good ' or ' wise.' Here we are appealing to the verdict, not of the intuition of West Europeans only, but of members of other civilisations, China, India, Egypt and so on. As we shall see in chapter xviii, the economic and social framework of a society influences its moral outlook, and therefore similarity of code between different societies may reflect similarity of social structure. But this suggestion offers no explanation why, of two societies living in similar economic circumstances, one becomes ' civilised ' and one remains primitive. I think, therefore, that we are justified in pointing out that the universally recognised sages and religious teachers of a number of civilisations appear to agree on the validity of a few leading values. C. S. Lewis has collected a number in *The Abolition of Man* :

- 1 The Law of beneficence : the virtue of good will towards other people, the iniquity of murder.
- 2 Duties to parents and elders, and to children.
- 3 The Law of justice and good faith : honesty, truthfulness and sexual justice.
- 4 The Law of mercy.
- 5 The Law of magnanimity : the virtues of courage and loyalty.

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

2 METHODS OF ASCERTAINING LOCAL VALUES

Whatever the validity of such absolute values, we ourselves are inescapably concerned with one part of Western civilisation : Great Britain. And, since the predominant values of this community are a datum-line that we can never ignore, our next job must be to present a very brief outline of these values.

How are we to get at the facts? This is a difficult business, full of pitfalls. We can give two methods of investigation which have been used : (a) the Sample Poll or Social Survey ; and (b) Functional Penetration.

(a) *The Sample Poll.* The technique first elaborated by Gallup in America has proved most fruitful. The investigator sends out questionnaires to certain individuals (or he calls at their houses and asks his questions more informally), who have been selected in such a way that all important sections of the population are represented *in the proportions in which they occur in the country as a whole.*

The two most striking features of this type of sample survey have been : first, its success in predicting election results when other polls have been hopelessly wrong ; and second, the fact that the investigators only interview an extremely small percentage of the population to get their results.

The whole technique hinges on the selection of the individuals to be interviewed. If selection is not properly worked out, the poll will be worthless, as can be seen from the gigantic experiment conducted by the American magazine *Literary Digest*, in connection with the presidential election of 1936. This magazine sent ten million ballot cards to people whose names were in telephone directories and lists of car-owners, and it received nearly two and a half million replies. The voting of this sample pointed to a clear win for Landon ; but in the event the forecast of Landon votes proved to be wrong by nearly 20 per cent, and Roosevelt was elected.

Where did the *Literary Digest* forecast make its mistake ?

THE SCIENCE OF HUMAN SOCIETY

It is easy to see that owners of cars and telephones would not be *representative of the voting population as a whole*. Unemployed workers and unskilled labourers would probably be entirely unrepresented. And therefore quite irrespective of which classes were likely to support which candidate, the *Literary Digest* sample was certain to be unreliable if you wanted a picture of political opinion over the whole nation.

In this country the British Institute of Public Opinion (which is linked with the Gallup Poll of America and publishes its results under that name) divides the population into a number of categories :

- (i) Income group : before 1940 incomes were marked off in three groups, the lines being drawn at £4 and £10 a week. The unemployed were treated as a separate section.
- (ii) Geographical region : Great Britain was divided into eight regions
- (iii) Town or country dweller : allowance was made for your living in a city or suburbia or elsewhere.
- (iv) Sex and age were also taken into account.

A representative of the B.I.P.O. in Central London, for example, would be instructed to interview twenty-five people in one day. Of these two would have to be unemployed, eleven in the lowest income group, eight in the middle group and four in the highest. Six would have to be between 21 and 29 years of age, eleven between 30 and 49, eight over 50. The unemployed they would probably pick up at the Labour Exchange, men in the middle and lower income groups on their way to work or to lunch, women from these groups out shopping. To find the wealthy the interviewer might have to exercise a good deal of ingenuity.

[It is a useful exercise, if you belong to a school or work in a large firm, to break down its membership into categories such as would enable you to get an accurate cross-section of its opinion on a vexed issue.]

The importance of balancing the poll correctly must

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

now be clear. How is the accuracy of the poll related to its size ?

Suppose 20 per cent of the population of this country would in fact reply 'yes' to a certain question ; then the probability p of a particular individual's reply being 'yes' is 1 in 5, or 0.2. The probability q of the answer not being 'yes' is 0.8. If then the question is put to a random sample of 1,000 people, the Standard Deviation of their replies is given by the formula $S.D. = \sqrt{(pqn)}$ (where n is the number in the sample), and this comes to $\sqrt{(0.2 \times 0.8 \times 1000)}$, or 12.65. This means that the odds are 2 to 1 that any random poll of 1,000 people will give a score within 12.65 of the chance score. The chance score being 200, the odds are 2 to 1 that the poll-score will lie between 187.35 and 212.65. (Now turn back to p. 146 and compare the different meanings of the above set of figures in the two examples.)

As we have seen before, the odds are approximately 20 to 1 that an experimental result will lie within a distance of $2 \times S.D.$ from the chance score, and 100 to 1 that it will lie within a distance of about $2\frac{1}{2} \times S.D.$ This means that if we took 100 such polls, we would expect 95 of them to yield scores between 174.7 and 225.3, or 99 of them between 168 and 232.

You will notice that this does not precisely represent our question with a Sample Survey. We do not know what the actual vote p of the whole population would be ; we only know the observed vote P . Our question should therefore be framed . what are the odds that p will fall within such-and-such a range of P ? In fact, however, this modification does not make a very large difference to the calculation of the limits, and for our present purpose we can take the figures worked out above as reasonably accurate.

Our next step must be to decide what odds we regard as making our results sufficiently sure. This depends on the purpose for which we are doing the poll : calculating a cost-of-living index or discovering what proportion of people believe in God—itself an ambiguous question. For one

purpose 20 to 1 odds may be satisfactory; for another, 997 to 3 (i.e. a range of error equal to $3 \times \text{S.D.}$) may be desirable.

We have then to calculate the size of the sample that must be taken to give the required accuracy.

Let us take $3 \times \text{S.D.}$ as our limit of error, and suppose that we want our results to be accurate within 4 per cent (of the total number in the poll, as above). In other words we want to be able to say that the odds are 997 to 3 that the true figure lies within 4 per cent of the observed value. Then as $\text{S.D.} = \sqrt{(pqn)}$, and $(3 \times \text{S.D.} \times 100)/n = 4$ (per cent), therefore $3 \times \sqrt{(pqn)} \times 100/n = 4$, and $n = 900$.

We can therefore say that if our poll is to be correct within 4 per cent, and the 'yeses' are going to work out at about 20 per cent, we must take a sample of about 900 people. The qualification about the percentage of 'yeses' is important, for the size of the poll depends partly on the values of p and q . In practice, therefore, a pilot-poll must always be taken to show roughly what values p and q are likely to have.

Tables of sample-size for various values of p and q have been calculated by statisticians, and Durant quotes one of these in his pamphlet on the British Gallup Poll. The above example may be compared with the figures given on p. 13 of the pamphlet.

This kind of conclusion has been tested by various poll-organisers, and such results as the following have been obtained.

In 1936 the Gallup Poll of America asked 30,000 people: 'Would you like to see the National Recovery Act revived?' The replies were as follows:

		<i>Percentage voting against</i>
First	500 votes .	54.9
"	1,000 " .	53.9
"	5,000 " .	55.4
"	10,000 " .	55.4
All	30,000 " .	55.5

Table 6 Relation of size of poll to accuracy

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

The increase in accuracy after the first 500 votes is negligible.

Since doubling the size of a sample will double the expense of conducting the survey, it is essential in practice to decide beforehand the limits of accuracy and scope of sample required.

Finally we must note the effect of choosing our sample from a small 'population,' say the 1,000 men in a college or factory. In calculating the value of the S.D. in a case like this we must replace n by the formula $N(M-1)/(M-N)$ where N is the size of sample, and M is the size of population. We can then work out the value of the S.D. and so on as before.

Not all social surveys follow the above pattern (which was first worked out in America by Gallup) ; but if they do not, they cannot have any *representative* character, and economists and other social scientists have to be cautious in drawing conclusions from the results.

Such surveys have been used for a variety of purposes. The economist has used it for finding out the way in which people spend their incomes, the large manufacturing concern for discovering the demands of its consumers. 'In affairs of Government,' as Lord Woolton has said, 'we have passed away from the state where political conclusions could only be based on vague impression to the stage where both opinion and legislative action can be guided by statistical evidence.' The organisers of a poll make no suggestion, by the way, that a majority of votes for a certain political course means it is the right course for the country ; what they claim is that the vote shows the state of opinion on the subject among the public.

The sociologist uses the poll for the kind of purpose we are discussing here : attempting to ascertain people's attitudes on different aspects of their lives, such as marriage, the cinema, the purpose of life, and so on. We can see at once where the chief snag lies : we know from our own experience that the opinions we express in public are not necessarily those we would reveal in private conversation.

THE SCIENCE OF HUMAN SOCIETY

It is to get past this barrier to people's real feelings (without of course attempting to intrude on private lives) that the method of Functional Penetration has been worked out.

(b) *Functional Penetration*. This technique grew, not so much out of the shortcomings of the Gallup Poll as from the masses of valuable but impersonal, lifeless figures of over-crowding, tuberculosis frequencies, lack of sanitation and so on which the earlier social workers accumulated. These statistics, it was felt, gave no indication of the *human* problems involved. Adventurous investigators, taking a leaf from the anthropologists' notebook, went and lived among the people they were studying, and recorded human responses as well as material conditions. One of the first was Bakké, an American who investigated unemployment in Greenwich in 1931-3. Other pioneers of the method were the staff of Mass-Observation, who, seeing that the individual's judgment was often one-sided, formed a team to study a given area, each member concentrating on one aspect of the life and all taking jobs in the locality and comparing notes from time to time.

Finally comes the technique of Functional Penetration evolved by Oeser. The main features are the following :

(i) A research team is built up of various experts—a psychologist, a geographer, an economist, a sociologist, etc. They have a single defined group of problems to work on in the locality they are investigating ; they all read one another's reports regularly in order to get to know all sides of the human life they are studying ; and they have periodical meetings out of which they can build up a coherent picture of the community.

(ii) They take on different types of jobs in the locality, some as lorry drivers or workers at the factory bench, some in managerial positions and so on, and they fully identify themselves with the class they go into. Thus they are able to get 'accepted' by their new community, and to get past the 'shop-window' opinions to the real feelings behind. Their findings have to be checked by statistical methods ; but they go into matters that are not usually touched by Sample Polls.

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

The two methods described above, the extensive and the intensive, will eventually yield scientific information about our current values ; but they have not as yet been much used for this purpose.

Thus the evidence available on the subject is scanty, and a good deal more research needs to be done on it. Some typical results are given below.

(i) A Gallup Poll conducted in 1947 asked : ' In general, how happy would you say you are—very happy, fairly happy or not happy ? ' People who gave one of the first two answers were asked to give their reasons for their happiness. Below is the analysis of the reasons given by British people ; the percentages add up to more than 100 because some people gave more than one reply :

33	Happy family life
20	Contentment
6	Having friends, being friendly
20	Security, having enough money
14	Enjoying work or hobbies
13	Having good health
3	Religion and a clear conscience
16	Miscellaneous

(ii) Another recent Gallup Poll asked : ' Which of these things (out of a list of nine characteristics) would you most like a child of yours to be ? ' The percentage distribution of replies was as follows :

57	Honest
40	Intelligent
27	Able to stand up for their rights
25	Considerate for others
24	Having a sense of humour
22	Reliable
19	Ambitious
17	Industrious
16	Affectionate

THE SCIENCE OF HUMAN SOCIETY

(iii) The Mass-Observation investigators have classified current valuations as 'independent' and 'interdependent.' They put into the former category the disposition to set a high value on pleasure, on wealth, on making up your mind what you want and getting it. Into the second group they put, for example, doing good, family life. They have collected evidence which suggests that the former are pursued by men rather than women, by the young rather than the old, and by people without religious affiliations rather than by church people.

(iv) Researches conducted on the life of girls in a factory employing 400 workers have demonstrated the overwhelming social pressure on a new entrant towards conforming to the standards already prevailing in the working group, which are quite different from those they have been taught at school.

I have not quoted any figures for the variation of outlook with social class, age, education or sex, such as that mentioned in (iii), but this is sometimes very marked and should not be ignored. In the Gallup Poll quoted in (ii), for example, the answers showed a much greater emphasis on 'standing up for rights' among the poor than among the well-to-do.

3 VALUES CURRENT IN BRITAIN

I suggest then, largely (in default of better evidence) on the basis of personal observation that the leading values in this country are the following. Before reading my guesses you should record your own.

(a) Before anything else I would put the belief that you should get along reasonably well with other people. With this I link two other values—that you should be honest and reliable, and that you should have a sense of humour.

I am not sure if it is legitimate to link these three together; the evidence is very uncertain. I feel myself that they are closely related as the basis of satisfactory personal relationships.

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

(b) Intimately connected with the above is the very high value we set on personal independence. This has many facets, and varies according to whether you are thinking of your own independence or other people's. For yourself it means that you feel you have a full right to do what you like and think what you like as long as it does not hurt anyone else ; that if you want to keep a walrus in your back garden, or walk down the main street in a top hat and yellow trousers, you are perfectly entitled to. There are many other facets : you feel you have a right to please yourself to some extent in what you do, to control your own life, to exercise your own deliberate choice ; that you are entitled to a certain share in the ordinary pleasures and comforts of life.

Another member of the cluster of values centering on personal independence is the belief in self-reliance : you feel that your first job in a difficulty is to try to get out of it on your own, just as you expect other people to fight their own battles. A proverb puts the attitude well : ' God helps those who help themselves.' Closely related is the idea of standing up for your own rights.

When you apply the standard of independence to other people, you think of their right to do and say what they like. In other words we expect both to give and to get a high degree of respect for personality, simply because we believe that every human being has a right to behave as he chooses as long as he does not injure other people. It seems to me that this is one of the most important and characteristic of British values ; and that it is a condition of fulfilment of our first value.

Another point about respect for personality is its importance for the successful handling of children. English parents are generally slow to adopt coercive methods, and this policy makes growth through affection and identification easier and more widespread than it might otherwise be. Continental observers frequently remark on the fact that we do not exact the prompt unquestioning obedience of children that is general on the Continent. It is worth reading the section on the Mundugumor and Arap,

methods of bringing up their children and comparing them with your own attitude on the subject.

Yet again the combination of these first two values is the basis of our willingness to compromise on all matters of practical action, which, when we look round us at the rest of the world, must strike us as one of our most precious traditions.

(c) There is a widespread conviction that you should be able to feel that you are doing a worth-while job. Here again we can distinguish several aspects, varying in importance with the individual : a sense of being important to the community, of making a vital contribution to the common welfare ; a sense that you are finding scope for special talents that you possess ; a sense that you are better than somebody else ; a sense that you are embarked with your whole nation, or with some particular group within it, on the defence of some great cause or on some splendid mission. These are motives that usually find their satisfaction in your occupation, either in what you make your living by or in some spare-time job like helping to run the Rotary Club or the Mothers' Union. In men the need for this kind of satisfaction sometimes takes first place.

(d) There is a strong feeling for law and order. In its crudest form it means the demand for protection against robbery and violence. But it also shows itself in a deep engrained respect for customary procedures for getting things changed, and a strong disapproval of unconstitutional methods of obtaining what we want. An important modern reflection of this same valuation is the demand for economic security, that is to say security of tenure in your job, security of your pay, your hours of work, your social status and so on.

(e) Finally there is a widespread assumption that men should be more pugnacious than girls, more forceful, more logical, readier to take the lead, more strongly sexed. As a result men tend to be more decided in getting their own way than women. Hence the fact that the most frequent complaint of wives is of their husbands' selfishness and inconsiderateness,

HUMAN CRITERIA OF SOCIAL DEVELOPMENT

and of husbands that their wives nag : nagging implies a lack of firm assertion in stating your views or wants.

In this section (3) it is only too clear that I have left far behind the straight and narrow path of scientific argument. The fact is that our previous conclusions show decisively the importance of such an examination as the above ; and the lack of systematic work on the subject obliges us to venture on an intuitive analysis. Equally, from another standpoint, I am conscious of the relative superficiality of the analysis I have given. The volcanic conflicts that threaten us arise from deeper sources than I have shown. Sir Fred Clarke in a recent analysis has exposed some of these sources to our view. He has particularly stressed two features of the English tradition : the fact that it has always tended to attach greater value to community than to individuality ; and that it has always preferred to solve problems by trial and error rather than by intellectual analysis. But this book is not the place to explore these matters further, and those interested are referred to Sir Fred Clarke's penetrating discussion.

We have sufficiently surveyed the base-line from which we must work, and we can now go on to discuss what light science can throw on the way in which modern social evils affect men's happiness, and the methods by which those evils can, and cannot, be remedied.

CHAPTER XIV

SOCIAL EVILS OF ECONOMIC ORIGIN

I STARVATION AND POVERTY

STARVATION is not a disaster confronting us in this country ; but the economic disorganisation of China and the rapid growth of population in India imply a continual threat of starvation in those countries, and therefore also of the diversion to them of our potential supplies. In addition, soil erosion has damaged millions of acres of productive land in North America and South Africa, and substantially reduced food supplies in those parts of the world.

Three questions arise : (a) how do the evils of poverty affect men's outlook and happiness ? (b) how is food shortage to be overcome ? and (c) how are the evils of industrial poverty to be combated ?

(a) *Psychological effects of poverty.* The first point to notice is that the material degree of poverty is not the main factor in determining the human reactions. The Arapesh, as we saw, live on a very meagre diet, much more limited than that of the unemployed in Britain before 1939 ; but they are a remarkably carefree and contented people. Nor is it simply the contrast with what you are used to that counts, for saints have frequently denied themselves all but the barest minimum of food and have yet given the impression of stable happiness. What counts is, I suggest—following the arguments of chapters xi and xii—the *sense of being deprived of something you feel you are entitled to*. In other ages and other countries peasants and slaves have often apparently been content to admire the rich and the mighty from a distance : you do not suffer from envy or resentment if you have no sense of a *right* to what you have not got. But the mood of the world has changed : human beings are no longer regarded as entitled to own other human beings as slaves ; and I believe it would be true to say that millions

SOCIAL EVILS OF ECONOMIC ORIGIN

of people feel now that they have a right to a certain minimum standard of living who 2,000, or even 200, years ago would not have dreamed of such a thing.

You will notice two points of doubt in this last statement: is it a fact that so many human beings now feel in this way? And are they justified in so doing? It seems to me that the move of Eastern peoples, in India, Burma, Java and elsewhere, towards independence is sufficient evidence to warrant an affirmative answer to the first question. The second question is a matter for our own moral judgment. How the fruits of the earth should be distributed among the peoples of the world is not a question that science can answer.

The effects of poverty have then to be estimated in terms of the values and expectations of the people concerned. In a country where everybody is inescapably conscious—if only through Hollywood films—of a clean and decent manner of living, it is perhaps inevitable that such standards should be widely accepted. When, therefore, economic conditions make conformity to these standards difficult to attain, we are likely to find anxiety, resentment, and/or apathy developing (see p. 154). And in the slums, where the squalor and overcrowding make it almost impossible to live up to the prevailing level of decency and self-respect, or to feel that you are of any importance to the community at all, the rejection of current standards is only too likely to follow. The wonder is (as Temple pointed out) that when slum-dwellers are moved into decent houses 'more than half of them rise fully to the fresh opportunity and three quarters of them make a reasonable use of it.'

I have emphasised the importance of the purely psychological factors in determining the effects of poverty on happiness because the evidence suggests that these factors outweigh the direct effects of inadequate diet on outlook. But poverty, through undernourishment, does undoubtedly affect a man's outlook in other ways.

For one thing, an inadequate diet may reduce drastically the energy available for the performance of daily activities. Observations on two East African tribes living under similar

THE SCIENCE OF HUMAN SOCIETY

material and climatic conditions but subsisting on very different diets revealed a much higher standard of physique among the tribe having the better food. Experiments on school-children have demonstrated the effect of adding milk to an insufficient diet : not only has their rate of growth increased considerably but their attendance at school has become more regular and they have been in higher spirits. These may be important factors in a child's development.

In the second place, vitamin deficiency and other forms of malnutrition have apparently been proved to have direct psychological effects in producing despondency, moodiness and lack of concentration.

We cannot estimate precisely the effect of inadequate diet on human happiness. But in a sense the depth of such effect has become irrelevant, for the climate of values has altered in this respect also in the last fifty years ; we now regard a sub-standard diet as bad *in itself*.

(b) *How is food shortage to be overcome ?* In 1798 Malthus put forward the thesis that human populations must always multiply in geometrical proportion, but that food supplies could only increase in arithmetical ratio. Let me illustrate the idea by a numerical example. Let us suppose that a pair of rabbits always produces 10 young. Then a group of 20 rabbits will produce 100 offspring. These make 50 pairs, and therefore the next generation will consist of 500 individuals. We get the numbers in successive generations by multiplying the previous generation by 5. Malthus supposed that human reproduction followed the same law, though the multiplier might be less than 5. Food, on the other hand, could only, in his view, increase as more land was brought under cultivation, and this was not a process that multiplied geometrically. The conclusion he reached was that starvation was inevitable for a large part of mankind.

We can admire his attempt to introduce measurement into this economic problem, but we can see now that his assumptions were not valid.

In the first place the fall of the birth-rate within Western civilisation shows that a continuous expansion of the human

SOCIAL EVILS OF ECONOMIC ORIGIN

race is far from inevitable. It is obvious that the rabbit analogy is not valid if the average human couple produces only two children.

In the second place food supplies have been hugely increased by the application of science to agriculture. In the seventeenth century, in this country, wheat yielded 10 bushels an acre. The introduction of a rotation of corn crops with turnip and clover in the next century raised the figure to 20. Land drainage and the use of chemical fertilisers in the nineteenth century raised it to 30. The Cambridge School of Agriculture consistently gets 60. In South Europe and North Africa the average is about 15. From these and other reports it follows that the mere application of already established agricultural science could raise food yields all over the world by very large amounts.

Could it produce enough for an optimum diet for the whole human race? Lord Boyd Orr has argued that Great Britain would require about 20 per cent more than its 1938 consumption to achieve this standard, or about three times as much as is produced by our own 12 million acres of farmed land. If we take this to imply a requirement of one acre per head of population throughout the world, the total amount of cultivated land needed would be 2,000 million acres, which, as Bernal points out, is less than half the present cultivated area of 4,200 million acres. This area is itself only 12 per cent of the land surface of the globe. Bernal goes on to quote evidence for the view that the systematic application of science could increase food production even far more than is suggested above.

Soil erosion was referred to earlier in this chapter. Soil erosion is the loss of the top layer of the ground, the layer that contains the humus and other plant foods that support our crops. Through unwise use the soil is either washed away by heavy rains or blown away in dry spells by the wind. However, though the menace is still serious, the work of the Tennessee Valley Authority and other pioneers in America has shown that it can be countered and the soil restored to productivity within a few years.

THE SCIENCE OF HUMAN SOCIETY

The scientific and technical knowledge is already available for raising productivity everywhere by huge percentages. Why then is it not applied? Is it because of negligent governments, or selfish business interests, or short-sighted trade unions, or the mere pig-headedness of the average human being? In so far as these are political questions they run outside the scope of this book, but their very urgency, the vastness of the gulf between technical potentialities and normal achievements, obliges us to recognise that here lies a major problem for the scientist himself. Why do ordinary men and women not take advantage of the genuine benefits science can offer? What are the conditions under which human communities grow wiser, or more efficient, and stagnate or decay? This is where the social scientist comes into the picture - it is the job of the physical and biological scientists and technicians to establish the technical knowledge and methods for raising living standards; it is the job of the social scientist to study the ways in which human communities live and work and change and grow. The conclusion to which the evidence seems to lead us (to anticipate later pages) is that changes have to be accepted by the community as a whole, freely and probably tentatively, and the approach has to be made by people who not only are technical experts but can put across their ideas in terms of the experience and outlook of the local community.

The same seems to apply to poor-whites in America as to black men in Africa or Kalmucks in Siberia. This is one of the great lessons that have come out of the Russian Revolution¹: the immense effect of the participation of backward peoples in the raising of their own living standards. It was implicit in democratic organisation already, and had been from the time of the Greeks, but its application in remote parts of Asia blazed a new trail and showed how the material advantages of science could be conveyed to backward regions.

Since that time the movement has spread to China and

¹ I think this is a matter of historical fact, not of political conviction.

SOCIAL EVILS OF ECONOMIC ORIGIN

Mexico ; the British Colonial Office has published its famous White Paper on *Mass Education in African Society* ; and the monumental experiment of the Tennessee Valley Authority has been pushed through in America. The account of this last, written by its great administrator Lilienthal, shows very clearly how bad living conditions can be transformed by the application of science *when the administrators and technicians realise that their biggest problem is to work out a technique for winning the active participation and co-operation of the local farmers and business communities themselves.* The technicians have to go and live and work among the people they are supposed to be advising and helping. The administrators must win the active support of communities : the effective social unit is the village rather than the individual or the family. The human side of the process is in the last resort far more important than the analysis of soils and the building of dams.

The evidence for the principles on which the above conclusions are based will be discussed in later sections of this book.

(c) *How are the evils of industrial poverty to be combated ?* The enthusiasm of the backward people building its own railway, of the TVA employees constructing dams, is infectious and inspiring. Is it possible to key up the urban population of a highly industrialised country like ours to the grim task of pulling down slums, the dreary business of saving dollars, with a like energy ? In the last page or two I have to some extent been anticipating a later chapter, and the question of incentive and inspiration in an industrial community will be dealt with then.

2 UNEMPLOYMENT AND ECONOMIC INSECURITY

Lord Beveridge sums up the consequences of unemployment in these words : ' The greatest evil of unemployment is not the loss of additional material wealth which we might have with full employment. There are two greater evils :

THE SCIENCE OF HUMAN SOCIETY

first, that unemployment makes men seem useless, not wanted, without a country ; second, that unemployment makes men live in fear and that from fear springs hate.'

You notice that both these last evils are psychological or spiritual.

The conviction that you are 'not wanted' is the very negation of self-respect. Temple called it a 'moral disaster.' It makes stable self-respect practically impossible. The middle-aged unemployed man accustomed to a regular occupation has often preferred to take any kind of constant job, even at a wage less than the dole—if he is not tied by a trade union regulation—for the sake of getting back a recognised status. But the young man who has never had a lasting job is likely to acquire a strong distaste for the discipline of regular work, and to become profoundly self-centred and perhaps sullen or apathetic into the bargain. Unemployed men who have held jobs with a higher social prestige are correspondingly more severely hit by unemployment ; the loss of memory in the case referred to in chapter viii was occasioned by such circumstances. During slumps suicide rates have been shown to rise steeply.

The sheer intensity of contrary feelings embitters all human relationships—old friends quarrel, homes break up. Here is the case of a Derbyshire miner's wife : ' My husband is a good man and he does a lot for me in the house. . . . But he is a changed man these last two years. He never complains, but I wish he would. It makes me unhappy to find him becoming quieter and quieter, when I know what he must be feeling. . . . We quarrel far more now than we have ever done in our lives before. We would both rather be dead than go on like this.'

The fear of unemployment, or of bankruptcy, or of only being able to get another job at a lower social level, is what I mean by economic insecurity—the second great evil of unemployment. It breeds psychological insecurity, the dread of losing status and self-respect. For as we suggested in chapter xiii, most people in this country probably treasure their social status as one of their dearest possessions. Its

SOCIAL EVILS OF ECONOMIC ORIGIN

maintenance is a condition of their self-respect. One effect of this class stratification is to accentuate the psychological repercussions of economic insecurity.

An unemployment figure of three millions means perhaps—when you include families—six millions directly touched and millions more infected with anxiety. Since the three millions is an aggregate figure at a particular date it fails to show the much larger numbers passing in and out of unemployment. Beveridge has shown that between the wars 'in an average year three out of every ten work-people, and in a bad year five out of every ten, would experience some unemployment. . . . Two out of every three work-people made a claim for unemployment benefit between July 1924 and December 1932.' To have half the population living under adverse psychological influences of this kind is, as everyone is now agreed, intolerable in a civilised country.

Since 1940, however, the problem has not been one of unemployment, but of over-employment: man-power is short. What has science to say on the causes and the effects of the change, and on the likelihood of its being permanent? This is in part a question of economics, and we will be returning to it in the next chapter.

3 UNSATISFYING WORK

(a) *The problem.* Every job has its share of drudgery or boredom. But the amount varies with the job and with the man who is doing the job. What are the chief sources of satisfaction, and causes of dissatisfaction, in work? Can science do anything in the way of diagnosis, or help to raise the general level of satisfaction in work? These are difficult questions to answer; the facts are hard to come by.

In a report on *Neurosis in Industry* brought out by the Medical Research Council in 1947, the main sample of 3,000 workers (a random sample from about 30,000 workers in the light and medium engineering industries) were asked their attitude to their work. 58 per cent reported that they

liked their job, and 13-14 per cent that they disliked it or were bored by it.

Are we right in concluding from these figures that between half and two thirds of the population are satisfied by their jobs? The fact that the investigation was restricted to the engineering industries must make us cautious. But more important than this is the consideration that even if you like your job it does not necessarily imply that you derive any deep satisfaction from it. In the Gallup Poll quoted on p. 165, only 14 per cent gave work or hobbies as a cause of happiness.

Some evidence suggests that the more skilled a job is the more enjoyment it affords. Workers' written accounts of their own reactions support this conclusion, but the samples have been small and not checked as random. Mass Observation reported that in a sample of people of above-average intelligence and thoughtfulness, 20 per cent felt that their chief aim in life was fulfilled in their job. The Neurosis Report already quoted showed that over 70 per cent of men and women on skilled jobs liked their job (if their intelligence was up to the skill demanded), compared to 58 per cent of the whole sample who liked their jobs.

These facts are not conclusive in their implications, but they lead us to one line of investigation which has been fruitful, the matching of the man and his job.

(b) *Vocational guidance and selection.* This is a sphere in which scientific work has shown clear benefits.

People go into their jobs for a great many reasons. A very small percentage know exactly what they want to do and do it: it is hardly possible to imagine the composer Mozart as anything but a musician. A large number go into their chosen occupations because they have grown up in an environment that *expects* them to take to these occupations: the son of the business man or miner may have taken for granted for years that he will follow in his father's footsteps; the girls in a jute-weaving family assume that they will be better weavers than the men. A still larger proportion of people go into their occupations because they have

to take the best-paid job they can get as quickly as possible. There is consequently a great deal of misfitting : neurosis is found to occur much more frequently among factory workers who are in jobs they find boring than among those who like their work, and the attitude to work depends to a considerable extent on the suitability of the worker's intelligence to the skill required.

There are two sides to the problem of vocational guidance and selection : what qualities are required for certain kinds of job ? and what qualities does any particular individual possess ? The job has to be analysed and the qualities required for it estimated. The candidate has to be tested and his range of capacities assessed.

First the candidate—say a boy leaving school at sixteen. He is put through a series of intelligence tests, and tests of special aptitudes like manual dexterity, speed of reaction and so on. He is tested for attainments in the main school subjects. And from school records, an interview, and a further battery of tests the main qualities of his personality are gauged. A profile of his abilities is drawn up. The left-hand side of Fig. 20 shows a specimen.

How can the qualities required for the job be estimated ? The method adopted is to put several successful performers of the job through the same kind of tests and draw up an average profile. The right-hand side of Fig. 20 shows how closely the profile for a suitable job will fit that of the candidate.

In experiments conducted on these lines in London before the war it was found that 83 per cent of those who took jobs of the kind recommended were contented, while 2 per cent found the work distasteful. But among those who took jobs of a kind they were not recommended to, only 39 per cent found the work congenial and 42 per cent found it distasteful and unsatisfactory. The verdict of the employers was even more emphatic.

These examples give you an idea of the modern approach to the problem. The main difficulties have lain in the measurement of personality traits and in extending the

THE SCIENCE OF HUMAN SOCIETY

practicability of aptitude tests to large-scale use. In both respects the experience gained in the war of 1939-45 has put vocational guidance on an entirely new footing. One of the best-known developments has been in the estimation of personality by the house-party test—where candidates spend a couple of days living and working together in informal circumstances under friendly observation. But a high degree of reliability was obtained in the assessment of

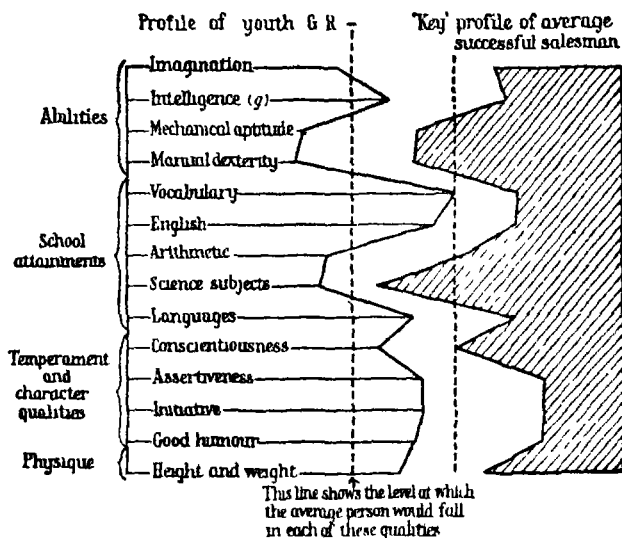


Fig 20 Profile of abilities of a boy

personality for special purposes, such as appointment to officer rank or to a parachute regiment, by interviews conducted by psychiatrists and lasting only half an hour or so.

The facing chart shows the combination of test scores for a variety of jobs in the Services during the Second World War. We see that the potential signaller (3) may have slightly less than average intelligence (3 -), but must have slightly more than average arithmetical and verbal gifts (3 +). TR stands for training recommendation and 'Inst.' for capacity for carrying out instructions.

Before leaving the subject of vocational guidance we

T.R.	TEST MINIMA							Min. Ht.	Other requirements
	Medical Categories	Math	Ben-net	Arith	Verbal	Inst.	Agility	Confirm-atory tests	
1 Driver	A1 A2 A3 B1 B2 B2A	4	3—	any	any	4	4	Assembly 23	No illiterates
2 Mechanic	All to B6	3—	3+	3—	any	any	any	Assembly 40	—
3 Radio signals	All to B2A	3—	3—	3+	3+	3—	4	Morse Aptitude 50	Max. age 35 years
4 Joiner	All to B2A	4	4	4	4	any	4	—	No illiterates
5 Typist	any	3—	4	3—	3+	3—	any	—	—
6 Infantry	A1 A2 B1 B2	any	any	any	any	any	3—	—	—
7 Cleaner	any	any	any	any	any	any	any	—	Prefer not above SG3+

Table 7 Diagram showing test minima required for allocation of recruits to Army

must remind ourselves that nobody claims the methods described to be perfect : there are many failures. But the question was whether science can improve the average man's contentment in this way ; and I think there is no doubt about the answer to this.

(c) *Inherently unsatisfying work.* Vocational testing, however, cannot completely solve the problem of unsatisfying work : its function is closely connected with the selection of special talents to meet demands for developed skills. It is in the sphere of unskilled and semi-skilled jobs that the problem of unsatisfying work becomes most acute.

For example, in a machine civilisation a frequent cause of frustration at work is expressed by the following report by a screen hand in a coal mine : ' Coal comes past me on an endless belt, and it is my duty to separate any dirt there may be from the coal. The belt sets the pace at which I must work. I have no feeling of power when working at the machine ; on the contrary, I feel dwarfed, and I feel that the machine, instead of serving man, has become the master.'

Besides such jobs as that there are the dreary mechanical ones, machine-minding or performing repetitive processes, which are wholly monotonous. How far is the trouble due to the predominance of the machine ?

It seems doubtful whether dreary automatic jobs are any more frequent now than they ever were. It is often not realised, by people who hanker after the good old days of craftsmanship, that for half a dozen masters of stone-carving who created the gargoyles on our Gothic cathedrals there were a multitude of labourers quarrying and trimming the stones, transporting them to the site, and hoisting them up, all with extremely crude equipment. Similarly, the Chippendale chairs whose beauty we admire were made on something approaching mass production lines, with a crowd of joiners specialising on some one detail—a leg or a seat—all the time. The lovely hand-made Persian carpet was in 1911 being created by children of five and six years old employed in appalling conditions for twelve or fourteen hours a day.

SOCIAL EVILS OF ECONOMIC ORIGIN

Nor is the machine always a source of frustration. It can offer the same sense of mastery and professional skill that the individual cabinet-maker gets. 'There are some machines,' says an electrician, 'which I enjoy manipulating. . . . It is satisfying to one's desire for power to be able to pull a lever or a switch, and lo ! steel bends like cardboard, or shrieks off in curling blue-and-orange shavings ; or a flat piece of steel is thrown from the " innards " of a machine as a finished article !'

An engine-fitter says : ' Machine work varies. The greater the degree of accuracy required, the more individual the job, the greater the interest I feel.'

It is not the machine in itself that is at fault, but the way it is used. There seems to be no inherent reason why purely repetitive jobs should not be eliminated by intensive research on the design of machinery. But will this development eliminate the problem of unsatisfying work ?

I do not believe it will. The fact is that the job *in itself* is not the major factor in determining the satisfaction you get from it. This is clearly shown by the Arapesh and the Mundugumor. The two tribes made their living in much the same way, by primitive agriculture and hunting ; but Mead leaves us in no doubt whatever that the Arapesh get far more enjoyment from every aspect of their life than the Mundugumor.

Is there any sort of evidence that the same holds good in Western civilisation ? Yes ; a series of important researches conducted in America have yielded strong confirmation for this conclusion.

These researches, like many others resulting in historic scientific advances, started off with quite different aims. They were organised by the Business Research Department of Harvard University in conjunction with the Western Electric Company at the Company's Hawthorne Works in Chicago. The object was to see whether output would be improved by the introduction of a break in the middle of the morning's work, how long such a rest-pause should be, and whether others also were desirable. These experiments were

much the same as many others that were being conducted by large firms at that time on the physiological conditions of high output—lighting, heating, ventilation, length of hours and so on. Frequently these had produced rather contradictory results. In some instances output rose for a time and then relapsed. A particularly glaring case had occurred at the Hawthorne Works, and is described by Elton Mayo as follows : ‘ A highly competent group of engineers refused to accept defeat when experiments to demonstrate the effect of illumination on work seemed to lead nowhere. The conditions of scientific experiment had apparently been fulfilled—experimental room, control room ; changes introduced one at a time ; all other conditions held steady. And the results were perplexing : Roethlisberger gives two instances—lighting improved in the experimental room, production went up ; but it rose also in the control room. The opposite of this : lighting diminished from 10 to 3 foot-candles in the experimental room and production again went up ; simultaneously in the control room, with illumination constant, production also rose. Many other experiments, and all inconclusive ; yet it had seemed so easy to determine the effect of illumination on work.’

It was the consciousness of these facts that led to the performance of the crucial and now famous experiment that I have mentioned and must now describe.

The research team at this factory selected a group of girls to do their job in a special observation room. Over the course of two years these girls worked with rest-pauses of varying length, for periods of a fortnight to six months. It was found that production went up slowly but steadily. Towards the end of the experiment, in Period 12, the experimenters reverted for three months to the standard working hours, i.e. without rest-pauses. But now ‘ *the daily and weekly output rose to a point higher than at any other time* ’ [my italics] ; and in the six months of Period 13, when the rest-pauses were restored, the output curve soared to even greater heights over the whole period.

This experience brought home to the research team that

SOCIAL EVILS OF ECONOMIC ORIGIN

the over-riding factors controlling output were the psychological and social ones. When the group of girls got on well together and formed a good team, and when the researchers established good relations with them, and regularly consulted them on changes of experimental conditions, output rose without the girls being aware of any greater effort or rate of work. Elton Mayo sums the matter up in the following passage :

‘ The major experimental change was introduced when those in charge sought to hold the situation humanly steady (in the interest of critical changes to be introduced) by getting the co-operation of the workers. What actually happened was that six individuals became a team, and the team gave itself whole-heartedly and spontaneously to co-operate in the experiment. The consequence was that *they felt themselves to be participating freely and without afterthought, and were happy in the knowledge that they were working without coercion from above or limitation from below* [my italics]. They were themselves astonished at the consequence, for they felt that they were working under less pressure than ever before.’

These results led the investigators to launch a new series of experiments, first into the attitudes of workers to their work, and then into the way in which a group of men evolved their own social relationships when put together under experimental conditions.

In the former they adopted an entirely fresh approach. Feeling that they needed to know a lot more about the workers’ motives they invited a large number of individuals to talk quite freely in confidential interviews. Thus they showed that dissatisfaction was far more often due to psychological causes than to any others, and that in fact individual expressions of grievances about material conditions—canteen food, stuffy rooms—were usually only an unwitting cover for discontent arising out of the individual’s personal life, or from his unsatisfactory relations with the group or the foreman and management. We saw a case of this kind in chapter VIII, that of the typist (p. 94). In general, widely voiced grievances indicated unsatisfactory human relationships in the workshop.

THE SCIENCE OF HUMAN SOCIETY

In the second series of experiments, those of the Bank Wiring Observation Room, a dozen men were selected to work in a special room. Their jobs involved their working in small groups, each with its own specialists for certain operations. The researchers showed that the dominating factor in the life and work of the group was the system of informal relations which sprang up spontaneously within the group. They demonstrated that *an individual's output varied much more closely with his relations to the rest of his group than with his own special talents, with physical fatigue or with any such incentive as wages.*

One further illustration of the conclusions reported above is worth quoting. In 1943 a team of researchers from Harvard were officially asked to investigate serious absenteeism in three companies engaged in war production in a particular town. The investigators showed that absenteeism was greatest among the men who had been relatively recently recruited to the companies ; and that it was much less in one company than in the others—let us call it Company C. On comparing conditions in the three companies, they discovered that for twenty years the management of Company C had taught their foremen that it was just as important to be able to handle human situations as to be technically competent ; and had instructed them to follow such rules as, ' Be patient ', ' Listen ', ' Avoid emotional upsets.' As a result of this policy team spirit was strong and morale high. In such circumstances workers regularly report that they feel free from the pressure of supervision, though in fact they may be more thoroughly supervised than before.

These are some of the principal results obtained by the Harvard Business Research Department. I have quoted them in some detail because of their pioneer character : they have opened up a great new field of research in the problems of human organisation. One point, however, that they have not illuminated is the effect of the head of a concern on the spirit within the concern. It is not easy to see how this question could be examined directly, but my own personal experience convinces me of its importance,

SOCIAL EVILS OF ECONOMIC ORIGIN

and this is supported by the following indirect evidence. It is an account of an experiment conducted in America in 1939.

Twenty 10-year-old boys were recruited to form out-of-school 'clubs'; they were divided into four clubs of five and chose to do mask-making during their meetings, which extended over some months. Four adult leaders conducted the clubs, each taking a different one for six weeks. The purpose of the experiment was to test the effects of three techniques of handling the boys: 'authoritarian,' 'democratic,' and '*laissez-faire*'; and each leader used one technique for one group and another for the next. The boys' behaviour was observed by assistants who were apparently doing some job quite unconnected with the clubs. Additional experimental situations were created when the leader went out 'on business,' or arrived late, or a visitor arrived who criticised the boys' efforts.

Under authoritarian leadership the boys showed either much less or much more aggressiveness among themselves, and tended to vent their feelings on some particular scape-goat. Initiative and enthusiasm were conspicuous by their absence. When supervision was removed work stopped at once.

Under *laissez-faire* treatment the boys seemed vague and purposeless and horse-play became more frequent.

When the leader adopted the 'democratic' technique the boys became more co-operative and sensible, interest and initiative grew, and the group continued to work whether there was anyone watching them or not.

How far can we be sure that this last experiment would yield identical results with men? Or that any of the American results would apply equally in Britain? We may expect there to be a basic similarity; but we must not assume an exact correspondence. As yet research on these problems has not developed very far over here; but the post-war economic crisis has focused attention on the problems involved, and in 1947 the Government set up a committee of scientists to give advice on Industrial

THE SCIENCE OF HUMAN SOCIETY

Productivity, including among its terms of reference the human factors affecting production.

(d) *Conclusions.* What is the upshot of the evidence quoted above? No single policy will serve as a panacea; human beings are too varied. But I think it will bear the following conclusions as to the most promising sources of satisfaction for all kinds of workers, but especially for the unskilled and semi-skilled:

(i) Even the dreariest job can be made enjoyable if the working group builds up satisfactory human relations within itself and towards its immediate superiors, the charge-hands and foremen. Whether this in fact happens depends largely on the handling of the group by those supervisors, and this in turn on the policy of the higher management and their actual treatment of the supervisors. One of the most unpopular types of repetitive job is the sort where conditions allow of no conversation with other workers.

These remarks will probably find an echo in your own experience; they certainly dovetail in with the conclusions we reached in chapter xii.

(ii) In the second place we have to recognise the satisfaction that is to be gained from even the worst jobs when there is a clear over-riding purpose for doing it. For example, a man wrote of his experiences in the 1914-18 war: 'Filling sand-bags and building new trenches far behind the lines was a dull and unexciting job and one which led rapidly to fatigue. In a trench, on the other hand, that was being heavily bombarded, one filled sand-bags for hours, throwing them into the gaps in the parapet made by shells without any feeling of fatigue at all.' Similarly, when a man has the necessity of feeding a family, or the objective of giving his son a better chance in life than he had himself, the clear personal goal is sufficient to eliminate the sense of drudgery. The same idea was expressed by Milton:

Fame is the spur that the clear spirit doth raise
To scorn delights, and live laborious days.

In fact, however, these personal objectives are no longer

SOCIAL EVILS OF ECONOMIC ORIGIN

as compelling as they used to be. Full Employment and Social Security have reduced the pressure of economic necessity ; the 1944 Education Act will have made many a father's ambition for his child's advancement seem rather irrelevant.

Conscious of this, certain firms have experimented with conducted tours round the buildings, periods of work in different departments, picture tableaux of the destination of the different products, and so on, as part of the initial training of their recruits. All these things have helped to give the workers a consciousness of the bigger purposes they serve. Wall-newspapers giving factory news have also been found helpful.

Profit-sharing schemes probably depend more on this appeal than on the financial, for the yield is not usually great. In any case the Hawthorne and other investigations have shown that high wages are not a major incentive to hard work.

Lord Beveridge has put forward the thesis that the big patriotic or social objective must to a great extent supplant the failing personal motive. He maintains that the Government should set up as targets the four giant evils of Want, Disease, Squalor and Ignorance, as a peace-time substitute for the target of the Nazi evil. There undoubtedly is some evidence to support his view : the response of whole communities of unemployed people in 1931 voting for a cut in their dole to help the country ; the response of a host of individuals to the challenge of the Tennessee Valley experiment in America in the early 1930s.

In spite of this it appears—if we can judge by the munition factories outside the bombed areas during the war—that only a small proportion of the population are touched by such calls.

(iii) I myself hold that the evidence supports a further conclusion.

The biggest single difference between the modern worker, industrial or other, and his pre-industrial ancestor lies in the fact that the latter ' could begin and stop [work] at

will, and without regular hours. He could divide up the work as he chose, come and go, rest for a moment and even, if he chose, be idle for days together.' *He was his own master.* His descendant of today is often no more than a wage slave.

There was no pressure on the cottage worker to achieve a finer precision in his work than he found congenial. But nowadays any fitter in a factory, any typist in her office, is expected to maintain not only a much higher average standard of accuracy but to keep it up 8 hours a day, 5½ days a week, 50 weeks a year. Human beings have natural individual rhythms and rates of working ; in factories where separate electric motors are installed in place of the usual single drive with a single speed, it is found that every worker runs his at a different pace, and that the pace varies from day to day.

In earlier centuries, too, there was far more holiday in the year. The usual thing now is to get 52 Sundays and half-days, 6 Bank Holidays and 12 days full holiday, a total of 96 days. In the fourteenth century there were generally 160-180 days holiday—nearly twice as much, or the equivalent of another day off each week and an extra 3 or 4 weeks of full holiday.

In short, while the pressure of the impersonal forces of nature on the human individual has been greatly reduced, the pressure of the demands of human institutions has enormously increased. This is a factor influencing almost everybody in modern society. It reflects the universal tendency of human institutions to grow in scale. In the Middle Ages a town of 10,000 inhabitants was a rarity, a giant among towns ; now it is quite small fry. The same change is to be seen in industry. In 1948 more than four-fifths of the industrial employees in the country belonged to firms employing more than 100 people ; and this despite the fact that 90 per cent of the manufacturing firms employed less than 100 people. Units of Government and administration are continually expanding. Our conclusion might well be : never were so many controlled by so few.

This means a denial of what we saw was one of our most

SOCIAL EVILS OF ECONOMIC ORIGIN

precious values : freedom for deliberate choice, a say in the control of our own life.

I believe a good case could be made out for asserting that this factor is one of the fundamental causes of frustration and apathy in industry. The Hawthorne researches make quite clear that one of the functions of the working groups that spring up spontaneously where many people are employed together is to serve as a protection against change. All such groups develop their own habits, codes and loyalties ; but management in the interest of production is constantly bringing in changes which disrupt those habits and codes and often create an irrational sense of exasperation at all change.

The fact is that *large-scale organisation tends to reduce the average man's scope for responsibility and deliberate choice in his work* ; and this circumstance will in any country, but especially in the Western democracies, generate a sense of frustration.

If this analysis is correct, we must look for reforms that will increase the ordinary man's sphere of responsible action.

A line of action that is sometimes advocated is the encouragement of the small producer, the family firm, the lesser units which do the greater part of the distribution of goods and services for the community.

The issue here is the difference in efficiency between the small firm and the large firm. There seems to be evidence for the view that something like two-thirds of the goods produced in our civilisation could be made and distributed as efficiently by small units as by large. If this is in fact true, there is no inherent reason why work should not be organised in smaller units. But the concentration of capital and of economic power in the hands of a small fraction of the population, together with the sheer technical feasibility of large-scale operation, makes it seem most unlikely that the trend towards large-scale operation of business can be permanently reversed. If this is the case, we must think again.

The only line of action that seems to me to go to the root

of the matter is the extension on a big scale of the contribution that the average employee can make to the running of the organisation he belongs to. In Temple's words : ' every citizen should have a voice in the conduct of the business or industry which is carried on by means of his labour.'

How can this policy be put into practice ? It is not at all an easy matter. There is a long tradition of mutual distrust between management and worker which, though less acute in Britain than elsewhere, cannot be dissipated by a word. There are faults on both sides. You are apt to get apathy, unco-operativeness and obstructionism on the workers' side, and a lack of genuine consideration for the workers' outlook and needs on the part of management. A case or two will show you what I mean.

Earnings for a certain job were originally based on its performance in 5 hours. The workers finished it in 4 hours, whereupon the time-rate was cut to 4 hours—so that they could make no more in wages than they had before. They then managed to finish it in $3\frac{1}{2}$ hours, and the rate was immediately cut to $3\frac{1}{2}$ hours. The workers whittled the time down even further, to 3 hours, but the rate was again cut. This taught them a lesson ; and the job now took 7 hours. The time rate was raised to 4 hours, but without effect. Then to 5 hours ; whereupon the workers finished it in $3\frac{1}{2}$ hours. Once again the rate was cut, and once again the job took 7 hours to complete !

On the workers' side you find this sort of thing. In the workshop of a certain factory 5,000 of a certain article were produced weekly. The management decided to open a new workshop, in which the mechanical conditions were practically the same as before ; but they engaged an entirely fresh batch of workers for the job. At the end of six months' training this shop was producing 13,000 of the articles per week. The old hands knew how to go slow.

Three principal methods have been used at different times for enabling the employee to contribute his quota of ideas to the running of his organisation. The first is the informal contact of the manager of a small firm who knows

SOCIAL EVILS OF ECONOMIC ORIGIN

all his men individually and is always ready to listen to their opinions. This kind of attitude is still found in many small family businesses.

The second is the trade union organisation, which operates by collective bargaining and often covers a whole industry in a single agreement.

The third is the machinery of consultation within a particular business or factory, which has grown up mainly in the two great periods of maximum productive need in the two world wars. The Joint Production Committee generally consists of equal numbers of representatives elected by the workers and appointed by the management.

The three types of relation are not mutually exclusive ; each has its own part to play. Nor is the above classification exhaustive ; many variations have been worked out in practice. But no machinery is sufficient in itself to ensure good relations : what counts is the spirit, and that only grows with the persistent exercise of goodwill on both sides. And the spirit in a firm seems to be the crucial factor, not only for output but for the satisfaction the employees get from their work, and the sense of responsibility they show towards public issues. In firms where the spirit is good the men can be counted on to attend against all counter-attractions or obstacles.

(e) *Summary of argument.* Let me try to sum up the argument. We have recognised that the whole idea of satisfaction in work is extremely vague. We cannot measure this satisfaction ; we cannot even separate it out from satisfaction in the other departments of our life. We have seen that the individual's reports on the causes of his dissatisfaction may be quite unreliable if taken at their face value, and we have had to rely a good deal on indirect evidence, such as absence from work, size of output and incidence of neurosis. In such circumstances it is clear that none of our conclusions can be regarded as *established*. At the same time we have noted very strong evidence for the view that although suitable hours of work, rest pauses, selection and training for jobs, and other such policies

THE SCIENCE OF HUMAN SOCIETY

may have a beneficial influence, yet the dominating factor is the nature of the human relationships. If the last alone may not, the former certainly cannot, bring about that state of affairs described by Bernard Shaw, where 'work is play and play is life.' This is in itself an important conclusion. It means that the only hope of radical improvement in this matter of satisfying work lies in the building up of a new morale in places where people work together, a sense of partnership in pursuit of a common purpose. But this does not enable us to say which of the many factors that go to create a set of relationships are the most important. However, given the social values and the economic conditions actually prevailing in this country at the present time, the conclusions presented above seem to offer the most promising line of advance.

CHAPTER XV

SCIENTIFIC METHOD IN ECONOMICS : THE CAUSES OF SLUMPS

I THE CHOICE OF ECONOMIC PROBLEMS

WE have seen how pernicious the effects of economic troubles may be on human lives and human happiness. Our next job must be to see what light can be thrown on these economic maladies by scientific inquiry. How far are we justified in using the word 'scientific' for any economic analysis? Is it possible to apply scientific methods to economics?

It is no use discussing such questions in the abstract; we must examine specific economic problems and see how in fact they are to be tackled. I have chosen two that are suitable: the composition of the National Income, and the causes and cures of under-employment and over-employment. The first will serve conveniently as an introduction to the second, which is the more complex and the more important. Unemployment, in fact, has been the greatest economic scourge of our industrial civilisation during the last hundred years and continues to dominate the fears and policies of millions of people. Over-employment, on the other hand, has been producing far-reaching social changes since 1940 and many of the experts insist that it has come to stay. The double question of under- and over-employment is therefore one of the major economic questions of the time, and will have touched the life of every reader of this book. Between them, these two questions of the National Income and Full Employment illustrate very clearly the nature of economic method and its relation to scientific method.

THE SCIENCE OF HUMAN SOCIETY

2 ANALYSIS OF THE NATIONAL INCOME

(a) *The meaning of 'National Income'*

It is best to begin by studying the National Income for 1938—the last full year before the Second World War—and seeing how it is made up.

First, what do the words 'National Income' mean? Roughly, it means the sum-total of the incomes of all the people in the country. But this vague idea will have to be refined as we go along, and right from the start we shall find ourselves in a world where very few figures are cut-and-dried and quite certain. It is not possible to state an exact number of £ millions for the National Income; it is difficult even to decide what moneys to include in our figures. Since 1938 the Central Statistical Office of the Government has prepared several estimates of its size for that year and has published these in a series of White Papers from 1941 (Cmd. 6261) to the present time. As more information has become available judgments have changed and the results have been revised. In this section (2) I shall mainly follow Professor Hicks' well-known textbook *The Social Framework*, since this is not only based on the White Papers but much more widely available and a great deal easier to understand. The figures, however, are still often debatable, and at a later stage we shall have to come back to the question of their reliability. Let us get down to the arithmetic.

The total of all incomes in 1938 was £5,095 m. We can break this figure up in various ways.

(b) *Analysis by sources*

	£ m.
Wages and salaries	2,870
Profits and rents	1,725
Transfer payments	500
	5,095

Table 8 Analysis of national income by sources

THE CAUSES OF SLUMPS

The second and third of these items require some explanation.

'Profits and rents' include :

- (i) the dividends received by shareholders of companies ;
- (ii) the undistributed profits of those companies. These are the reserves of money that are put by against a rainy day, for extension of plant and so on. (See also pp. 308-9.)
- (iii) Incomes in the shape of rents for houses and land which people own and let out. Very often these incomes accrue to municipal authorities, to churches, to trade unions, even to the Government, but they are still counted in under this heading.
- (iv) Profits received by farmers and shopkeepers from their businesses.
- (v) Earnings of doctors, lawyers and other people whose income takes the form of fees.

The incomes of (iv) and (v) appear under the heading of 'Profits' because they usually involve return on invested capital as well as payment for work done : the grocer lays out capital on his shop and stock and a doctor may do so on his practice.

Hicks suggests that we ought to allow £375 m. of the £1,725 m. as earnings of labour rather than of invested capital. This would make our table

		£ m		App. %
Earnings of labour	wages and salaries	2,870	3,245	70
	payment for work under (iv) and (v)	375		
Earnings of capital	Profits and rents	1,725	1,350	30
	less payment for work under (iv)			
	and (v)	375		

Table 9 Analysis by sources, revised

'Transfer payments' are incomes that are counted twice. If a man earns £3,000 a year and makes his son an allowance of £400, the paper figure for their combined incomes is

£3,400. But it is obvious that the real money income of the pair is only £3,000. The £400 is known as a transfer payment. In the same way when we reckon up the income of the country as a whole we must deduct old-age pensions, unemployment pay, interest on war loan and so on, for these are sums that have simply been transferred from the taxpayer's pocket via the Government, and they have already been counted in the taxpayer's income.

[They are distinct from civil servants' incomes because no work is done for them ; and from dividends because there are no capital goods corresponding to them.]

(c) Analysis by expenditure

How much of the National Income was left in the hands of private persons to spend as they chose ?

To begin with, a large fraction never came into the hands of private individuals : £60 m. was rent received by the central Government and local authorities ; £290 m. was undistributed profits retained by companies.

Then we have to allow for taxation, in which we must include not only the taxes we pay to the Government but the rates required by our local authority. Taxes are raised in two different ways : directly, in the form of, for example, income tax ; and indirectly, as purchase tax, say, or entertainment tax. When we buy a packet of cigarettes part of the cost goes to the Government as an indirect tax. The total raised in taxation in 1938 was £1,225 m., of which £580 m. was obtained directly and £645 m. indirectly. (Rates are included in the second.) This latter we paid out as part of our day-to-day expenditure, whereas direct taxation is taken before the money reaches our pockets.

Summing these up we find that £60 m. + £290 m. + £580 m., or £930 m., never reached the private individual's pocket at all ; which leaves us with £5,095 m. - £930 m., or £4,165 m. What happened to this ?

We can use our money in various ways : (i) We can buy food and clothes and entertainment and so on with it. These things, which include both goods and services, are

THE CAUSES OF SLUMPS

known as *consumption goods*. Part of this expenditure goes (as we have just seen) in indirect taxation. (ii) We can buy *capital goods* (or *investment goods*), such as a house or a shop or a small works or a new tractor. The money so spent is legitimately regarded as savings. Notice, however, that some of the capital goods bought are productive—the tractor and the works—while others, such as the house, are not. The latter are termed *consumers' investment goods*, which stresses the fact that they represent savings, or *durable consumption goods*, which stresses the fact that they are not productive. Also, we need not buy the productive or capital goods ourselves but buy shares in a company, i.e. lend the money to a company to put into the goods. (iii) We can hoard the money—wrap it up in a stocking and hide it in the teapot. This is commonly done in France, but in England the equivalent is to put the money into the bank 'on deposit,' where it is not available for industrial development as it would be if we bought shares with it. (But it does enable the bank to lend more and is therefore not entirely unproductive.)

We paid out our income on the first two items in the following proportions :

Consumption goods and consumers' investment goods	£4,040 m.
Investment goods	£ 125 m.

These figures deserve a couple of comments. First, they do not sort out in quite the same way as our analysis : group (ii) is split. The reason for this is our sheer ignorance of how much money is spent on consumers' investment goods.

Second, the nation is not as improvident as this table suggests. There is not only the £125 m. of personal savings but the unknown amount spent on consumers' investment goods and the £290 m. of undistributed profits which never comes into our pockets at all. The Economic Survey for 1948 published (Table 26) the following revised estimates for savings in 1938 : undistributed profits £186 m., personal savings £153 m. The necessity for this revision illustrates

THE SCIENCE OF HUMAN SOCIETY

vividly how little is known with accuracy about some of the most important features of our economic life.

(d) Analysis by expenditure on consumption goods

It is worth recording how much we spend on the various consumer goods and services we buy :

	£ m.
Food	1,258
Drink and tobacco	462
Upkeep of home, household goods	974
Clothing	446
Motoring and other travel	287
Miscellaneous	832
	4,259

Table 10 Analysis of expenditure on consumption goods

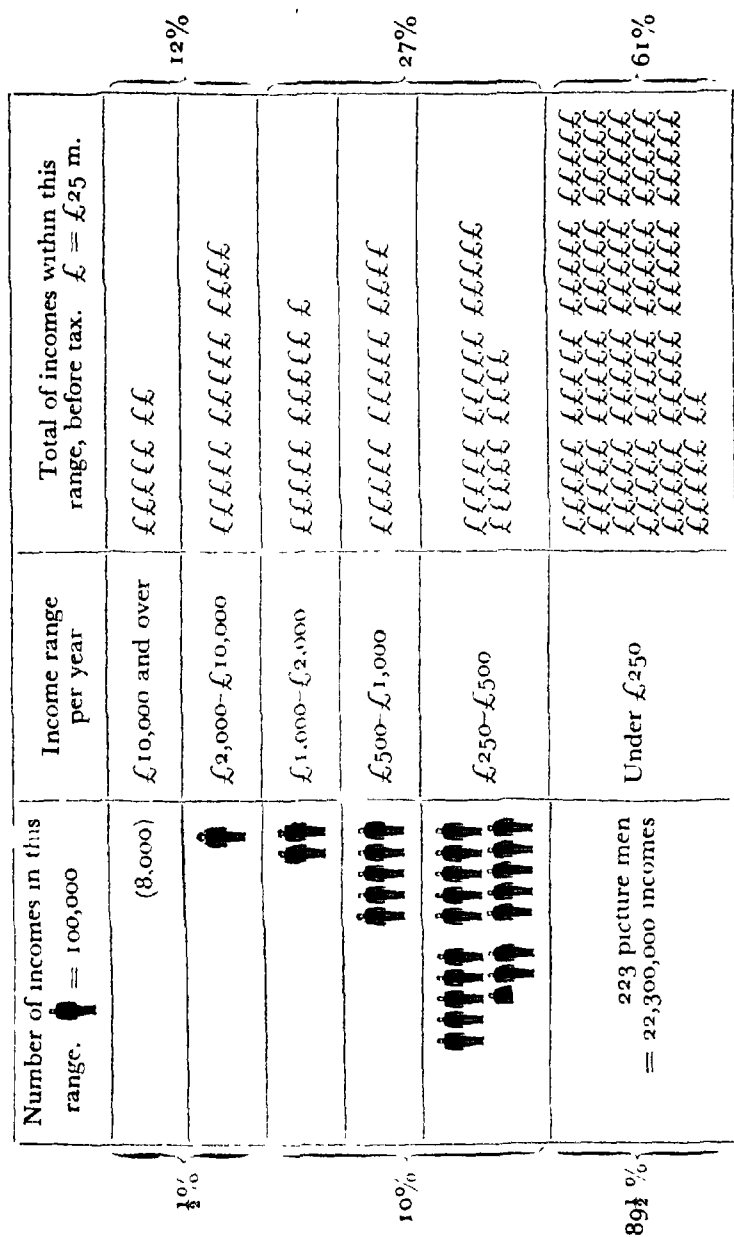
You will notice that the total of £4,259 m. does not agree with the £4,040 m. shown in our last table as spent on consumption goods. The reason is that the figures in the above table are taken from the 1947 White Paper on National Income (Cmd. 7099, Table 13), which includes revisions not available for the White Paper quoted by Professor Hicks.

(e) Analysis by distribution among personal incomes of different sizes

Everyone is curious to see how personal incomes are distributed among the population and the facts are most important. The diagram opposite gives the figures for 1938.

The table is taken from the 1947 White Paper (Cmd. 7099, Table 10) except for the figure for the number of incomes of less than £250 a year. This is an estimate given by Hicks of the number of incomes under £250 a year in 1937 ; it includes unemployed and old-age pensioners.

It is a remarkable fact that $\frac{1}{2}$ per cent of the population received 12 per cent of the income, and it is very instructive to analyse the causes of this occurrence. At first sight you might think that it was due *only* to the variation of human



ability : the man with great business ability gets a large income ; the man with small ability gets a low one. But we can easily check this theory by a statistical method. If it were true we ought to find that the curve of distribution of incomes is more or less identical with the curve of distribution of talents, shown on p. 81. In fact this is not so, as appears from the diagram on p. 201. But perhaps trade union pressure has resulted in the artificial raising of the lower incomes ? This explanation will not do ; for it will not apply to the drawing out of the curve in the upper incomes : the 'skewness' of the curve is outside anything that could be accounted for in this way.

An alternative theory is available.

People get their income, as we have seen, in two ways : either as earnings for their work or as a return on their invested capital. We saw in the table on p. 197 that in 1938 the total of the former came to about £3,245 m., while the return on capital amounted to about £1,350 m. This latter sum, however, goes mainly to a very small fraction of the population : for 53 per cent of the total property of the country is owned by 1 per cent of the adults over 25 years of age (representing perhaps 2 per cent of the population), who thereby secure 14 per cent of the National Income. Altogether 80 per cent of the property is owned by 6 per cent of the population. It becomes clear that the main source of the very large incomes at the top of the scale is the possession of property. At the other end of the property scale are the 75 per cent of the adult population over 25 years old who own only 5 per cent of the total property.

Can this theory be verified ? It could be fully checked if income tax returns were analysed and published in a suitable form. It could also be verified by a Gallup Poll method, by questioning a representative sample of the population on the amount of income they draw from different sources. Sufficient confirmation has, however, been obtained from the income tax returns to allow us to regard the explanation as established : in 1937-8 married taxpayers in the income-range £200-£500 a year received

THE CAUSES OF SLUMPS

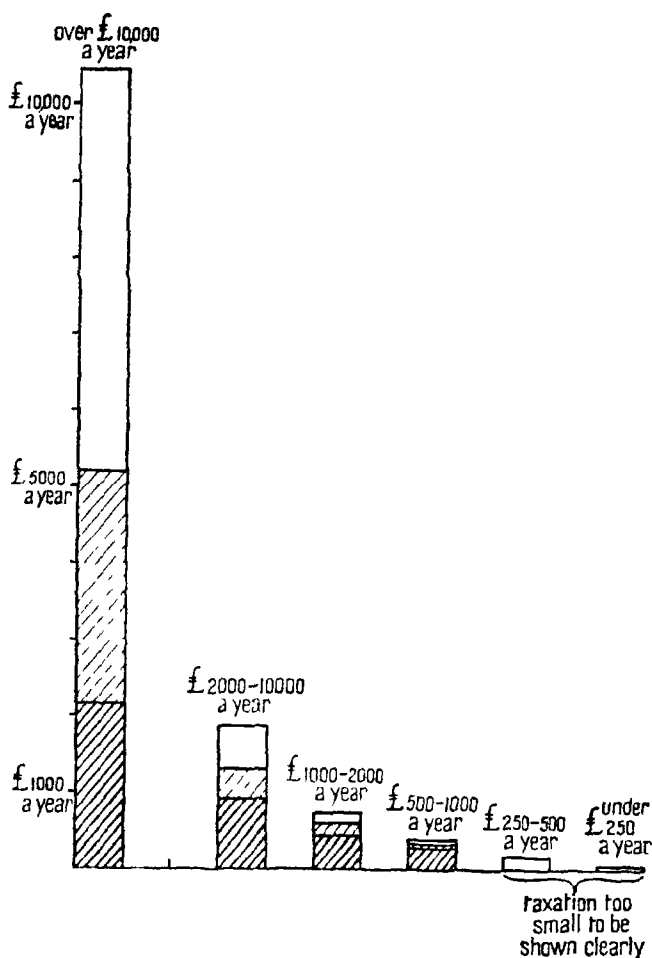


Fig 22 Diagram showing how the average man in each income group was affected by taxation in 1938 and 1945. Top line shows income in 1938 before taxation. Second line shows income after taxation at 1938 rates. Third line shows income after taxation at 1945 rates.

altogether £720 m., composed of £669 m. 'earned' and £51 m. derived from dividends and rents. In the income-range over £5,000, on the other hand, the total of £209½ m. received was composed of £75½ m. earned and £134 m. derived from investments.

Fig. 21, however, does not represent the incomes that we actually enjoyed in 1938 or the real ratio of the standards of living of the rich and the poor, for taxation hits the higher incomes much more heavily than the lower. When taxation is deducted we get figures that are expressed in graph form in Fig. 22. You may or may not think that taxation of the wealthy was severe enough in 1938; the lowest portion of the diagram shows how much more drastic it became during the war.

In fact the increase in taxation of the rich was not the only change produced in the income structure of the country by the war. The next table illustrates another change: the great rise in the numbers of people in the middle reaches of the scale. This, combined with the new taxation, has resulted in the re-distribution of available money through the population which is revealed by the percentage figures. They should be compared with the percentage figures of Fig. 21.

But the staggering thing about this table is the rise in the total of incomes—something like 75 per cent. We know well enough that we were not 75 per cent better off after the war than before, for prices rose steeply too. Our next job, therefore, is to look at the connection between income-rises and price-rises.

(f) Index Numbers: higher incomes may not mean a higher standard of living

Prices rose very unevenly during and after the war. White bread, for example, went up from 4½d for a 2-lb loaf in 1938 to 4½d for 1¾ lb. in 1946—21 per cent. But while you could get cheap sweets for 2d a quarter-pound in 1939, you were not likely to pay less than 6d in 1946—a 200 per cent. rise. How can we tell whether we were better or worse off as a whole in 1946 than in 1938, i.e. whether incomes or prices rose more? We want to be able to compare the cost of living in the two years

This is where we come to index numbers. An index number is a device for comparing the *buying power* of money

THE CAUSES OF SLUMPS

Income range before taxation	Number of incomes in thousands		Total of incomes in £m.		Percentage of all incomes in 1945	
	1938	1945	1938	1945	Number of incomes	Total of income
£10,000 a year and more	8	8	170	138	1 ½ %	4 %
£2,000-£10,000 a year	97	124	360	462		
£1,000-£2,000 a year	195	410	270	535	30 %	43 %
£500-£1,000 a year	500	1650	350	1140		
£250-£500 a year	1745	5400	595	1895		
Under £250 a year		[13808]	2681	3565	69½ %	53 %
Total		[21400]	4426	7735		

Table 11 Distribution of incomes of different sizes in 1938 and 1945 (Compare Fig 21)

in different years. To see if we were better or worse off in the country *as a whole* we would need to know whether the total National Income was able to buy more or less goods and services in 1946 than in 1938. The difficulty of making such a comparison is that so many things changed in our living conditions between the two years: houses were destroyed, sheets and towels and paintwork wore out and could not be replaced, and we were therefore spending

disproportionately large sums on these things in the second year. In addition many goods were rationed and this fact in itself gives the phrase 'buying power' of money an altered sense: we do not know what money would have bought if the market had not been thus controlled.

What really counts, however, is the cost of living—the cost of the necessities of life to the ordinary family. Our best guide to the country's standard of living in different years should therefore be the cost-of-living index. This was devised by the Board of Trade in 1904 to symbolise the cost of a representative 'basket' of different foods eaten by a 'normal' working-class family. The question arises: how are you to decide what foods shall be included as representative, which prices as typical and what families as 'normal'? What the Board of Trade did was to make investigations among a large number of working-class people and to base their figure on the facts collected. In other words they used a rough Gallup Poll method for a particular layer of the population. In 1914 they decided that the index must be broadened to include other necessities of life besides food, and included such expenses as clothes, rent and amusements. But in the stress of war the facts were not as carefully checked as in 1904, and the changes of living-habits during and after the First World War made the revised index out of date long before the Second War. Food, for example, accounts for a much smaller percentage of the average family's expenditure now than in 1914.

In 1937, therefore, the Board of Trade began a new and elaborate inquiry into people's ways of living and habits of expenditure, and the Interim Index of 1947 was based on the results of those investigations. In addition the war-time Social Survey gathered further data, and it has been suggested that the cost-of-living index should be regularly checked by sample polls in this country as it is in America.

The use of the index is simple enough. You work out the ratio

$$\frac{\text{Cost of 'basket' in second year}}{\text{Cost of 'basket' in 'base' year}}$$

THE CAUSES OF SLUMPS

which gives, for 1938 and 1946, the figure 1.32. Then if you call the cost in the base year (1938) 100, the index number for 1946 becomes 132. This index, however, as we have just mentioned, was out of date before 1939 and did not represent the true cost of living in 1946. A more reliable index, calculated by the Government statisticians from fuller information, was 155. (But even this is far from perfect, and eminent economists have maintained that the 'real' National Income, as calculated in the next paragraph, went down between 1938 and 1946.)

To get the value of the 1946 National Income in terms of 1938 prices we must therefore divide it by 1.55; which gives us a figure of £7,974 m. $\div$ 1.55, or £5,144 m. £7,974 m. is the figure for the National Income for 1946, given in the 1947 White Paper, Table 1. The corresponding figure for 1938 was £4,671 m. We see, therefore, that we were in this respect at any rate better off as a nation in 1946 than in 1938. The benefit went to the lowest income groups: miners and agricultural labourers were getting wages something like two and a half times as high as before.

We must evidently keep a weather eye open for the effects of changes in prices on economic trends of other kinds. The history of the slump affords us a good example. As we saw in chapter xiv the effect of the slump on men's minds was catastrophic. And the average income earned per head of occupied population in the country (i.e. National Income divided by number of occupied persons) fell sharply during the slump. You can see the shape of the curve in Fig. 23. But if we divide this figure by the cost-of-living index we get the 'real' income per head of the occupied population between 1924 and 1938; and this (the lower curve in the figure) shows that the standard of living in the country as a whole *rose substantially* during this period. It did not, unfortunately, change uniformly throughout the country; it fell for the unemployed and rose more for other classes. But even for the unemployed we can see that the psychological effects of the slump were far more severe than the material.

THE SCIENCE OF HUMAN SOCIETY

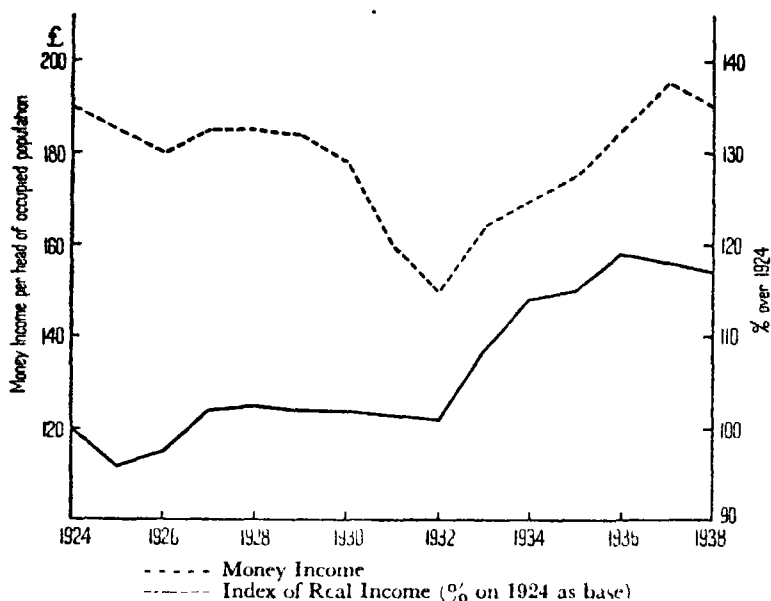


Fig. 23 Graph showing movement of money income and real income 1924-38

We now have a picture of the income structure of the country and have cleared up our ideas on some of the more important topics in economics. We have also seen how difficult it is to get exact figures for many of the quantities we want to know. But we have largely ignored two topics : the sources of our evidence, and the relations of the economic trends to the habits and outlook and values of ordinary people. We will be coming to the latter in a later section of the book ; the former we will deal with now.

(g) Sources of data quoted

(i) Government statistics. Modern governments are obliged, for the purpose of day-to-day administration, to collect vast quantities of statistics. A good many of these they publish, since this is the easiest way of making them available to their own departments and to the local government bodies requiring them. Among their most useful returns are the

THE CAUSES OF SLUMPS

Population Census, Import and Export data, the Revenue and Expenditure accounts which come up for review at the time of the Budget, and the Census of Production, which records a mass of facts about the output of certain industries, the productive plant they possess, the wages they pay and so on. We have already made indirect use of several of these. For example, the tables of income sources and of numbers of incomes of different sizes come from income tax returns. The distribution of private property is estimated from death-duty returns. It is obvious that government departments have access to a great deal of information which other people cannot get at unless it is published ; and we can see how easy it would be for an unscrupulous government to falsify its statistics if the civil service became corruptible or the public failed in its vigilance.

In spite of the masses of statistics collected and published by government departments, however, it is clear from our remarks on pp. 199 and 207 that some of the most important figures can only be guessed at

(ii) Statistics compiled by non-government agencies, such as the trade unions, large firms, trade associations, the Stock Exchange, or the League of Nations between the wars. The details of trade cycles in the last century are obtained from the records of trade unions.

Information of this kind is rarely collected with the same purpose in view as that of the economists who study it, and consequently the latter find many gaps in the facts which they have to fill in either by judicious guesswork or by collecting further information for themselves. We shall see how one set of government figures—the population census—has been used by economists to correct another series—the unemployment returns.

(iii) Statistics obtained by sample surveys. We have already discussed the methods by which sample polls are carried out and have mentioned examples of their use.

The first two of the above sources of facts are essentially historical in the sense defined on pp. 11-15 : they are records of particular events such as the income tax actually

find new jobs, economists have calculated that such 'normal' or 'transitional' unemployment will account for a total in the country of about 400,000 at any one time. This number therefore represents a reasonable target to aim at.

(b) *The causes of unemployment.* How is it that in 1932 employers wanted fewer men than were looking for work, yet in 1947 could not find enough to fill all the vacant jobs? What determines whether employers will or will not want to employ all the labour that is available? The answer lies in another question: do the employers want to keep up so large an output of goods and services as to require the whole labour force to produce it? The answer to which is yes, if they can sell the wares they have to offer at a reasonable profit. The critical factor therefore turns out to be the size of the total demand for goods and services, i.e. how much money is actually being spent on them. Small demand—or small spending—means small production and therefore small employment. Chronic unemployment shows that demand or spending is consistently too small. Cyclic unemployment shows that it fluctuates too much.

Our question of the causes of unemployment therefore resolves itself into the question of the factors governing the demand for the goods and services that we produce.

(c) *Factors affecting demand.* In war-time demand is unlimited. The Government, on behalf of the country, is ready to buy up all the war materials (planes, ships, shells and so on) and all the war services (fighting by the men in the Forces, First-Aid by the A.R.P. casualty teams and so on) that we can produce. During the Second World War there was also an increase in civilian demand because unemployment had disappeared and the lowest incomes had therefore risen.

We can classify types of spending as follows:

A Spending by private persons on consumption goods, partly durable and partly non-durable.

B Spending by business firms on, first, investment goods and, second, stocks of raw materials and other consumption goods and services.

THE CAUSES OF SLUMPS

C Spending by the Government and local authorities on consumption goods and on investment goods.

D Spending by foreign customers on our exports, both of consumption and of capital goods.

In each category we have divided the goods into ones that are quickly used up and ones that are relatively permanent. Let us see how fluctuations in spending on consumption goods arise in each class.

(i) Variations in demand for consumption goods

A Private spending on consumption goods. We have already seen (p. 199) that spending on durable consumption goods is one form of saving. Alternative forms, but much less widely spread among the population, are to put the money in the bank on deposit, or to lend it to business firms to spend, i.e. buy stocks and shares.

It has been shown in America that the ordinary man with a steady income saves a regular small fraction of it, i.e. his expenditure on ordinary non-durable consumption goods is steady while his income remains steady.

At different income levels, however, people do not save the same fraction of their income. The higher their income, the bigger the percentage that they put by. The diagram overleaf, the figures for which were obtained in social surveys conducted by Government agencies in America during 1935-6, shows the proportion of different incomes saved and spent in America in that year. There is no reason to suppose that the picture would be substantially different in this country, or of course that it would be identical.

We see that while income remains steady, consumption remains steady. On the whole the variation of incomes is not great, or sudden, but it has its importance, especially for its effect on saving.

During a boom the general level of incomes rises, and with it the overall demand for ordinary consumption goods. The reverse happens in a slump. During the war, as we saw in Table 11, the net effect of the various changes was to raise the lowest incomes and reduce the highest. Whatever

THE SCIENCE OF HUMAN SOCIETY

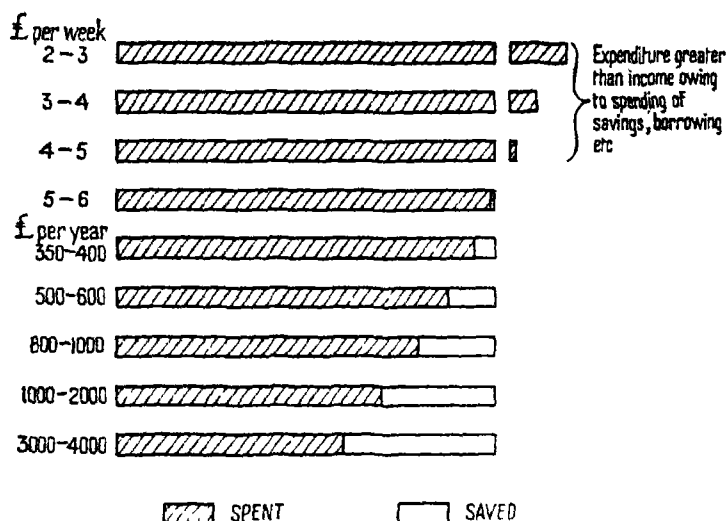


Fig 25 Proportions of incomes saved at different income levels in the U.S.A. 1935-6 (after P.E.P.)

the direction of change, the demand for consumer goods follows the variation in income.

Savings follow the same pattern. If incomes rise (and prices do not rise in proportion), the average man will shift into the next category of income, and he will therefore tend to save a larger proportion of his income. This effect will be most pronounced at the top end of the income scale; a larger proportion of the new money will be saved by the rich than by the poor. At the same time the increase of savings does not prevent a rise in the total amount of money spent. The effect of a *levelling* of income, on the other hand, will be to reduce the total of savings; for the percentage of income saved is less at low than at high income levels. (See p. 219, where an arithmetical example is given.)

B Spending of business firms. One cause of fluctuation in this category is speculation on the prices of raw materials. In a stable economy a fall in prices of raw materials results in an increase in the demand of business firms: they see an opportunity for building up their stocks at less cost. Prices

THE CAUSES OF SLUMPS

then tend to rise again. But in an unstable economy you get firms buying stocks in the hope of making a profit when the prices rise ; if instead the prices fall this may be taken to herald a slump, and these firms will begin selling out their stocks. This causes a further fall in prices and accentuates the fluctuation in demand for this particular type of consumption goods.

C Public spending on consumption goods and services is not liable to large or sudden variations.

D Foreign demand for our goods. This factor is outside our control except in so far as we make long-term contracts with foreign buyers. We will come to this later.

(ii) Variations in demand for investment goods

We have seen that only a small fraction of the National Income went into savings in 1938—not more than £350 m. out of £5,000 m., or just 7 per cent (see p. 199), if we ignore durable consumption goods ; and it has been estimated that probably only half of this went into new investment goods. But the demand for capital goods exerts an influence out of all proportion to its size : the striking thing about it is not that it does fluctuate, but that its fluctuations are so violent and apparently so capricious.

The graphs on p. 216 show how the money spent on investment goods fell and rose in different industries between 1929 and 1936.

We notice that in two and a half years the total sum spent on capital goods fell by 20 per cent, and then in the next four years rose by 33 per cent. In shipbuilding the changes were even more catastrophic : over a period of three years the outlay fell to a mere third of its peak value. It is obvious that violent changes in the demand for such goods involve violent changes in the numbers of men employed in the industries producing them. Here is one of the underlying causes of the trade cycle.

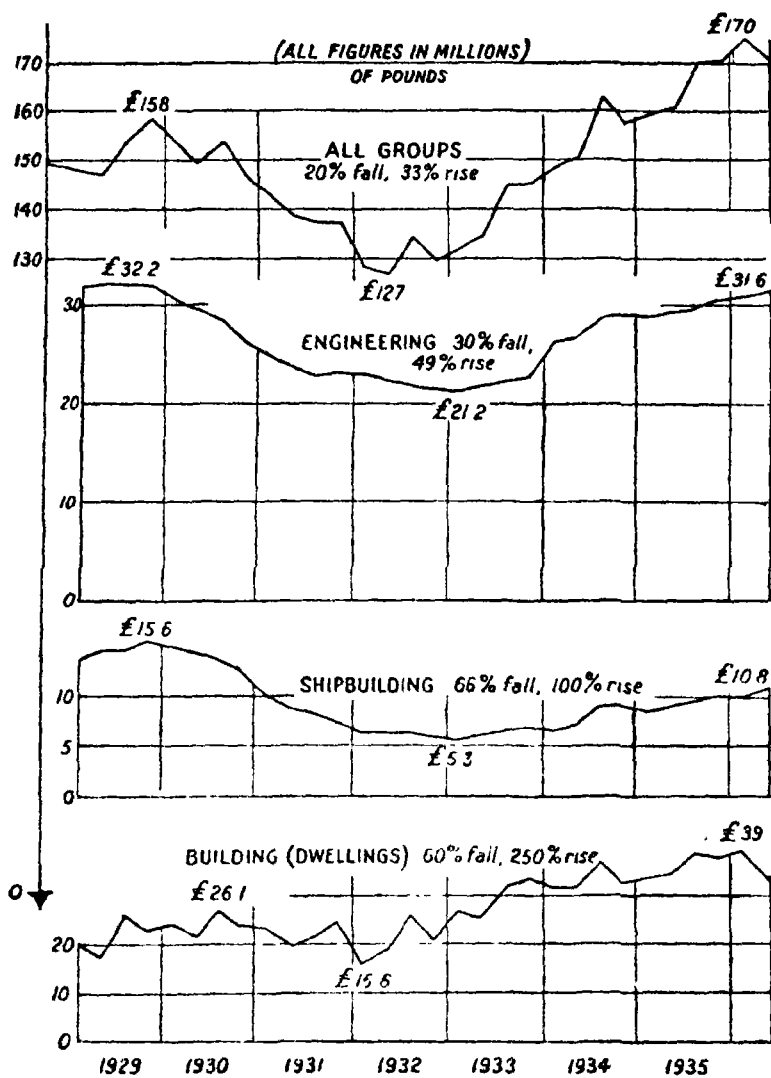


Fig. 26 Variations in expenditure on capital goods during the slump

THE CAUSES OF SLUMPS

4 THE TRADE CYCLE

(a) *The course of a trade cycle.* The main stages in the cycle of boom and slump can be put as follows :

(i) First—in the trough of the slump—there is a rise in the demand for consumption goods. What causes this is uncertain. It may be a decline in the stocks of wholesalers, who during the slump have been selling out old stocks without ordering more. Only the records of a representative sample of wholesale firms could tell us if this was the case. There are other possible causes. It has been suggested that an increase in the volume of money in circulation would have this effect. But however willing the banks may be to give credit (and reduce their rate of interest in order to invite borrowing, see p. 314), or potential shareholders to invest their savings, no manufacturer is going to borrow their money and put it into circulation (i.e. into the pockets of his employees) unless he sees a prospect of a return on it. This appears to mean that a rise in demand for consumer goods must come first.

(ii) This first faint breeze of a demand has one main effect : it induces manufacturers of consumption goods to step up production. This means more employment, more money circulating and therefore a further improvement in demand. The breeze freshens and steadies. The manufacturer of consumption goods begins to want more factory space or new plant ; and the capital goods industries go into production. To do so they have to draw on the unemployed for labour, and on bankers or investors for cash to pay them. Money flows. Prices rise because production lags behind demand. The boom is under way.

(iii) The rise in prices makes living dearer. The demand for labour strengthens the hand of the trade unions, and they secure higher wages. Thus demand increases yet further, and the boom accelerates faster still. There is a wave of borrowing to expand businesses ; and the bankers, though willing to support this as long as they can get their security, begin to raise their rate of interest to discourage an excess

of borrowing. But what does a rise from 5 to 6 per cent matter to a man who sees all his rivals making 20 per cent ? The banks in America did in fact raise their rate of interest from $3\frac{1}{2}$ to 6 per cent during 1928-9 without checking the boom.

(iv) And then eventually there comes a stage when demand fails. It cannot actually fall, for the same amount of money is still going into the pockets of the consumers ; and though prices are rising, their rise is due to the continued demand. In short, demand does not suddenly peter out ; it fails *relative to the producing power that has been created to meet it*. Business men are building factories faster than the demand for their products is rising.

That this is a fact appears to be proved by the following two graphs of output in the consumption and capital goods industries from 1927 to 1935. They also illustrate how much more exaggerated the process was in America than in Britain.

Business men therefore now have no inducement to build further factories and plant. Demand for capital goods falls and employers in these industries pay off their men. These men go on the dole ; their income drops sharply ; and so does their demand for consumer goods. Stocks of goods begin to pile up in the shops—shops cut orders—manufacturers cut production and employment. Creditors begin to call in debts and banks their loans ; the volume of money in circulation contracts. Prices fall. The boom has broken ; the slump has arrived.

(b) *The causes of trade cycles.* Three important questions demand discussion :

(i) Why should production increase faster than demand ? In other words, why should the demand for consumption goods not rise fast enough ? The answer is not certain, but it is probably to be found in Fig. 25 and the statistics given on p. 202.

During a boom there is a general tendency for all incomes to rise ; those derived from profits on capital rise most, and as the greater part of the capital assets of the country are held by a small percentage of the population

THE CAUSES OF SLUMPS

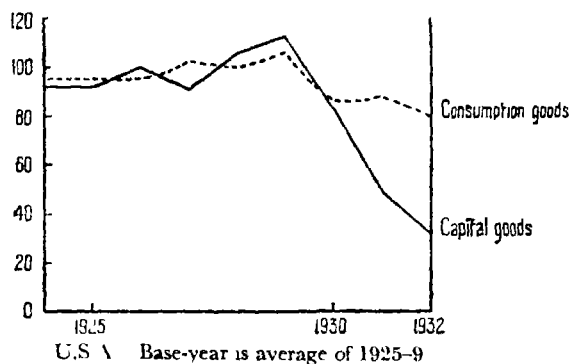
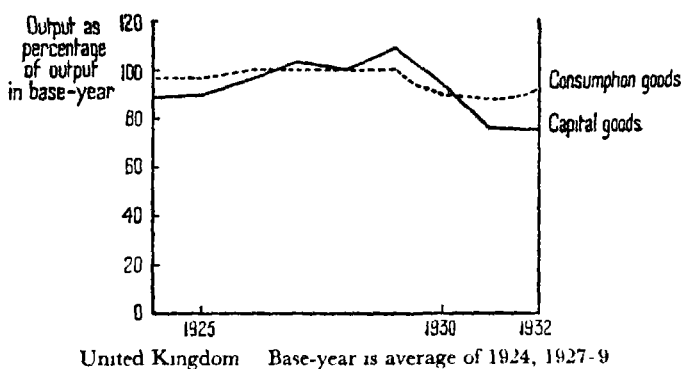


Fig 27 Output of capital goods industries rises and falls more steeply than that of consumption goods industries (after P.E.P.)

(see p. 202), the biggest increases come at the upper end of the income scale. Colin Clark has shown that the inequality of incomes does in fact increase during a boom. The effect of this trend has already been mentioned (p. 214), but its importance demands the illustration of a numerical example.

Suppose that during a boom a firm makes an *additional* profit of £10,000 in a year. What proportion of this money would be saved (to spend on investment goods), and what would be spent on consumption goods, if it were distributed among 100 men earning £550 a year, or among 10 men earning £1,500 a year? The £550-a-year men will now get £650. The amount they are likely to save when their

income is £550 is about $1\frac{1}{2}$ per cent ¹ of £550 or £8½ each, making £825 among the 100 of them. When they receive £650 they are likely to save 4 per cent or £22 each, making £2,200 altogether. An extra £1,375 is available for investment in capital goods ; i.e. £1,375 out of the £10,000 is likely to be earmarked for capital goods rather than consumption goods.

But what happens when the £10,000 is paid out to the 10 men earning £1,500 ? On £1,500 they are likely to save 30 per cent or £450 each, making £4,500 amongst them. On £2,500 they will probably save 39 per cent or £975 each, and the 10 men together will invest about £9,750. The increase is now £5,250 instead of £1,375 ; these men are likely to want to spend £4,750 on consumption goods and put £5,250—more than half—into investment. In other words, when a certain profit is distributed among high incomes a much larger amount of money becomes available for investment than when the same profit is spent in raising lower salary or wage levels. Hence if too large a proportion of the profits of a boom goes into the high incomes, the demand for consumption goods will suffer. It was, for instance, estimated in America in the 1930s that if the National Income rose from 60 to 80 billion dollars a year, i.e. by 33 per cent, savings would rise by nearly 100 per cent, from 6 billion to nearly 12 billion dollars.

The figures of savings given on p. 199, with the comments that follow them, probably make up the rest of the explanation of the cycle. There we saw that personal savings are exceeded in amount by the undistributed profits of business firms, which are put by against a rainy day. It looks as if cautious business management may be in part responsible for the excessive diversion of income from consumption to investment during a boom ; the fear of a slump causes extra caution and therefore exaggerates the slump. Certainly the

¹ For the purpose of this imaginary example I am using the percentages of saving shown in Fig. 25. I am not, of course, suggesting either that the figures would be precisely the same for England, or that every individual receiving this income would save precisely this fraction. The calculation shows the general trend.

output of industry rose in America between 1923 and 1929 by 25 per cent, while wages rose only by 5 per cent.

We can sum up the causes of the trade cycle in the phrase *over-saving*. Under the capitalist system, which depends for its motive power on the prospect of a profit, too high a proportion of profit goes into savings. Here is one of the causes of the growth of mammoth firms and combines : only these now have the resources to tide them over the evil days. Before the war it was reckoned that three businesses out of four failed within three years of founding. (ii) Is there no stable balance between consumption and investment ? The fact is that as long as a pool of unemployed exists which can provide labour for a boom, there is bound to be instability in the relation of consumption and investment. This is very clearly shown by a nice example devised by G. R. Taylor.

Imagine 100 men on an island, living by cutting bananas : 95 cut the bananas and 5 make and repair knives for them, being paid in bananas by the 95. The 5 are just enough to keep the 95 going. Suppose another 100 men are shipwrecked on the island. How are we to provide knives for them ? Eventually, it is obvious, there will be 190 men cutting bananas and 10 keeping up the knife supply. The question is, how many men are we to put on to the job of making knives before everyone will be fitted out ? To put only 5 men on it will mean keeping the unemployed without work much longer than is necessary. To put, say, 30 men on it is to expand employment in the capital goods industry from 5 to 35 to begin with, and to contract it again later to 10. The first increase is a multiplication to seven times the original size, the final contraction a fall to less than a third of its maximum size. The mere existence of a pool of unemployed is a contributory cause of the instability of the capital goods industries, and thus of the cycle.

It would evidently require careful calculation to decide what proportion of the National Income would most beneficially go into capital goods in different circumstances. It does not look as if it can be left to chance.

THE SCIENCE OF HUMAN SOCIETY

(iii) Is there any connection between the scale of modern society and the scale of modern slumps?

The answer would seem to be definitely yes; for the sheer size of modern markets, and of the profits that can be made, means that when demand is on the upgrade the sums of money that become involved are correspondingly colossal. And similarly the numbers of people that are going to be affected when the crash comes. The sums of money and numbers of people do not rise in direct proportion to the population but faster; for the controlling factor is not the size of population but the size of business or financial organisation that can operate as a unit; and this is to a great extent a function of technical developments such as telephone communication and rail and air transport.

The atmosphere, or fever, of boom-confidence and slump-distrust which takes possession of business communities looks like a crowd-psychology effect. The orgy of buying on a rising market, the continuation of optimism past the peak of inflated values and the frenzy of selling on a down-swing, show just the exaggeration of an excited crowd. The spontaneity of the trend of opinion is nicely illustrated by a remark made by a member of the firm of J. Pierpont Morgan in evidence on the American Power Trust: 'I would not say, if I were you, that there was anything in the nature of a Trust. There is not anything like that at all; what I would say is just simply that we and the banks and certain other companies interested in Power are all standing around in a co-operative frame of mind.'

(c) *Means of ironing out the trade cycle.* Many suggestions have been made for dealing with this. They are all directed towards keeping up *somebody's* spending power. They can be divided conveniently into several classes:

(i) Keeping up the supply of money. If there is plenty of money available, demand will keep up. The policy in this case is to stabilise the spending of category A on p. 212.

Some recommend keeping up the supply of money by stabilising the cash issue of the Bank of England. But how is the money to reach the public unless it is paid to them in

THE CAUSES OF SLUMPS

salaries or wages? Perhaps by being paid out to everyone as a 'national dividend' irrespective of work done? What effect is this likely to have if the ratio of consumption to investment remains unregulated as before?

Others advocate raising wages at the onset of a depression. How is this policy likely to affect costs of production and the profitability of manufacture?

(ii) Increasing the profitability of investment. The idea is to induce manufacturers to open up business. The aim of this policy is to stabilise spending of category **B** on p. 212.

Some suggest that wages should be cut at the onset of a depression, so as to keep up the business man's profits and induce him to go on manufacturing. What is likely to be the effect of this policy on the general demand for consumption goods?

Others advocate a lowering of the bank-rate. As we have seen, the prospect of paying only 2 per cent interest on a loan to start production leaves a manufacturer cold when he sees no demand for his goods and the certainty of a dead loss.

(iii) Replacing private investment by public as the former tails off at the approach of a slump. The object now is to balance a fall in categories **A** and **B** of p. 212 by increasing outlay of category **C**.

The idea is that when private business begins to back out of the manufacture of capital goods, then is the moment for the Government to step in with large-scale public works—new roads and bridges, schools, slum-clearance—to keep up the employment rate, purchasing power and prosperity. This is the course officially advocated in the 1944 White Paper on Employment policy. What sort of public works could be turned on and off at a moment's notice? How would their opening be timed?

The above policies are directed at staving off a slump when one threatens. The following aims at prevention:

(iv) Planning the investment programmes of the main industries in the country, either through their nationalisation or by means of an Investment Board. This policy aims at

controlling the whole flow of money into investment by means of a single interlocking scheme. What snags can you see in the shape of its probable effects on private enterprise and initiative, and personal responsibility?

We notice that category **D** of p. 213—foreign spending on our goods—has been omitted from all these calculations. We shall be returning to it later.

It is also worth remarking that the mere fact that an all-party Government undertook in 1944 the responsibility for stabilising employment, means that speculation in price changes will be reduced and a greater confidence in stability can perhaps gradually be encouraged.

CHAPTER XVI

SCIENTIFIC METHOD IN ECONOMICS : THE SWING TO OVER-EMPLOYMENT

I THE ELIMINATION OF CHRONIC UNEMPLOYMENT

(a) *The problem.* The boom year of 1927 still saw 1 $\frac{3}{4}$ million unemployed in this country—more than four times the working minimum of 400,000. We have examined the causes of cyclical unemployment. Why is it that even the upswing of a boom fails to absorb all the unemployed into jobs? How is it that even then demand does not rise far enough to require everybody to be employed?

One part of the answer we have already seen: an increasing fraction of the country's rising income gets diverted to saving, so that demand tends to level off; yet the profitability of investment is not great enough to draw all the savings into action. We must now go into the reasons for this deficiency of investment.

It is a matter of history. The industrialisation of a country out of its own resources takes, perhaps, 100 years. When a certain stage is reached the country is able to supply the greater part of its current needs of goods from the capital resources it has already built up. Thus the capital goods industries come to be wanted only for making replacements to the factories, railways and so on already in existence. A state of 'saturation' has apparently been reached. Its arrival may be put off by a continuing increase of population; or by technical discoveries which create a fresh type of industry—motors, for example, or radio. But these do not alter the general conclusion; the evidence for which has been published by Colin Clark and is summed up in the diagram overleaf.

THE SCIENCE OF HUMAN SOCIETY

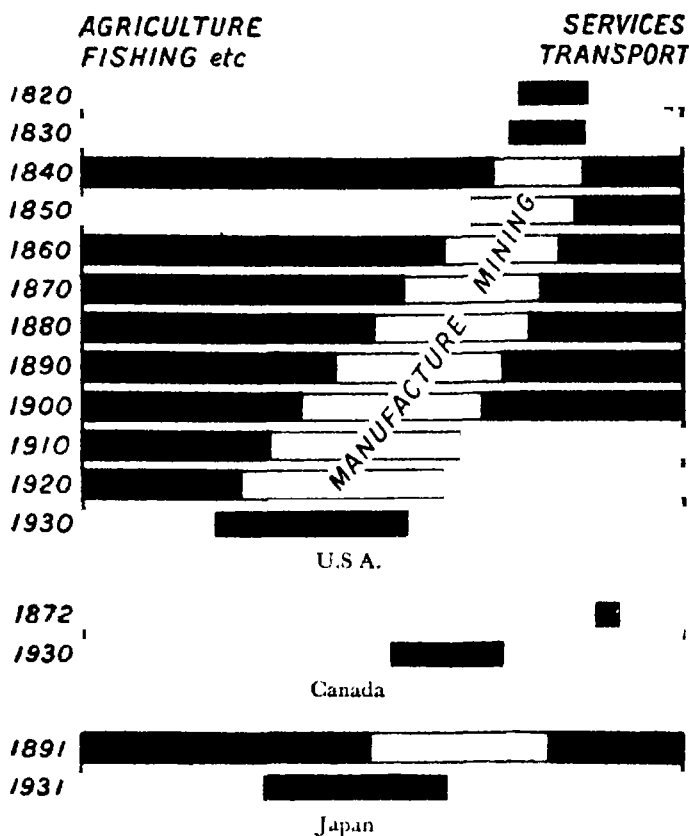


Fig 28 Diagram showing the proportions of population in the three main occupation groups in three countries

The upper diagram shows how the U.S.A. has gradually changed from a predominantly agricultural to an industrialised country. No complete information is available for any other country, even Britain, but the diagrams show that the same tendency has been at work in Canada and Japan.

When this stage of development is reached we find there is no longer the scope for profitable investment that there was before. Manufacturers are naturally anxious not to scrap their plant more quickly than they are obliged; and since the one thing that will oblige them is successful

THE SWING TO OVER-EMPLOYMENT

competition and undercutting of prices by a rival, they begin to close their ranks against newcomers—potential rivals. Industries tend to link up into trusts, monopolies and other combines, with the object of holding prices at a profitable level while capital replacements are kept low. And since the chief sources of savings are the incomes of the big shareholders and the undistributed profits of the big firms, and these are mostly controlled by the same people, it is difficult for a man with a new idea to get the capital to start a competing industry. 'Free competition' has disappeared with the arrival of the 'capital-saturation' stage.

It is easy to see why Great Britain invested 14 per cent of her national income at home during the nineteenth century and has averaged only $4\frac{1}{2}$ per cent since 1910.

(b) *How to rectify the position.* Does this idea of saturation with capital mean that a country reaching that stage, and unaffected by war, is doomed to a high unemployment rate? Common sense rebels at the notion

(i) The unemployment may be spread over the whole working population by cutting hours of work. But this obviously converts permanent unemployment into a permanent ceiling to production. We keep down spending in all the categories of pp 212-13, and increase our leisure at the expense of our standard of living.

(ii) The volume of savings can be reduced by making the distribution of incomes more equal, i.e. we can increase outlay under category A of p. 212. But if the country's wealth and its income continue to rise, what is going to happen to the volume of savings? If savings increase at a higher rate than spending, the outlay of category B is likely to fall again. The same snag appears likely if consumer demand is kept up by issuing everyone with a 'National Dividend.' In both cases we are obliged to turn to spending under categories C and D.

(iii) Can spending in category B be kept up by preventing industry from forming combines? The policy of prohibiting large combinations was adopted years ago in America; but it has always by one method or another been evaded.

THE SCIENCE OF HUMAN SOCIETY

Alternatively, can the monopolistic industries be nationalised and run in such a way that every competitive improvement is in fact utilised? What snags can you see here in the form of over-large and over-centralised working units?

(iv) The arguments under (ii) and (iii) above, all obliged us to turn to outlay under categories C and D. Can the unused savings of the country be turned on to a deliberately planned scheme of capital improvements of the sort that pays no profits, such as schools, hospitals, slum-clearance projects? This is the plan that was put forward by Beveridge in *Full Employment in a Free Society*. He picked on four giant evils—Want, Disease, Squalor and Ignorance—as targets for attack, psychologically and economically equivalent to the enemy we had to fight in the war. To deal with them he proposed a planned (and therefore steady) outlay of private and public capital over a number of years, which would ensure the absorption of all the unemployed and a high demand for consumer goods. But how would the Government spending be financed from private savings? What snags can you see in the way of parting the individual and his savings either by taxation or by borrowing?

(v) Can our excess savings be lent abroad? This is what we did with them for 200 years; why have we stopped? This question brings us to a topic whose discussion we have so far deferred, that of Foreign Trade. It is now time to take it up.

2 THE RELATION BETWEEN EMPLOYMENT AND FOREIGN TRADE

(a) *Types of foreign trade*

We can distinguish two species of foreign trade:

(i) **Balanced trade**: each country exchanges its surplus products with others in such quantities that its imports and exports balance each other in value.

Each country gains goods that it could not otherwise have had (or not as cheaply), and raises its standard of living.

THE SWING TO OVER-EMPLOYMENT

The process may be bilateral or multilateral. A bilateral balance means that each pair of trading countries balance their trade between themselves, Britain and France say, or Britain and Sweden. A multilateral balance means that several countries have a *group* trading balance, e.g. Britain exporting more to France than she imported, France more to Sweden than she imported, and Sweden more to Britain. (ii) Unbalanced trade. one country exports more than it imports, another imports more than it exports. The first builds up a credit or 'favourable' balance, the other becomes a debtor. The first may be prepared to lend its money to the second or invest it there. The process then is exactly equivalent to a wealthy man's lending his money to a business firm. The wealthy man receives a regular interest on his capital while the business firm is enabled to produce goods which it could not otherwise have done. The wealthy country similarly receives a regular return while the debtor country raises its own productive power and standard of living. The interest on a certain quantity of invested capital is much greater in a backward country than in an advanced one, and this quantity of capital is likely to have a much greater effect on the standard of living of the backward country than it would have on the standard of living of the advanced country. The backward country raises its productivity and standard of living much more rapidly and with less hardship than if it had to find the capital by its own belt-tightening.

Now the question that faces us in the present section is the relation between employment and foreign trade. We can best explore this by considering the three possible conditions of a country's foreign account - exact balance, credit and debit. This is too broad and complex a subject to treat in detail here, but we can again illustrate the main points of our argument by reference to the recent economic history of our own country.

(b) *Exact balance of imports and exports*

It is not easy to keep our foreign balance under control

THE SCIENCE OF HUMAN SOCIETY

except by bilateral agreements, but bilateral trade is naturally less extensive and flexible than multilateral. Let us see how the process worked in our own specific case before 1939.

In Great Britain in 1938 we spent £835 m. on imported goods. This sum was made up approximately as follows¹ :

	£ m.
Food, drink and tobacco	405
Raw materials, fuel and industrial equipment	380
Miscellaneous manufactured goods	50
	835

Table 12 British imports in 1938

These things we imported in order to keep up our standard of living. In addition to this sum we spent another £16 m. on military and diplomatic expenditure, £80 m. on shipping, £30 m. on interest on foreign investments in this country, £7 m. on films, and £40 m. on holiday travel abroad. The total was £1,008 m. How did we pay for them? The following are the goods we sent abroad and the services we rendered to other countries in return .

	£ m
Manufactured goods	533
Shipping	100
Banking etc	100
Interest on our investments abroad	205
	938

Table 13 British exports in 1938

Here we see an example of (very nearly) balanced trade. We imported food to increase the quantity and variety of our diet. We imported raw materials and so on to enable us to keep up our output of manufactured goods. These last we sold abroad to pay for the things we imported.

In fact our foreign account was not quite balanced.

¹ It is difficult to get the exact figures. Cmd 7099 does not break down the £835 m. The official publication 'We live by exports' (HMSO 1947) gives a breakdown but makes the total £912 m

THE SWING TO OVER-EMPLOYMENT

The total (of earnings) fell short of the value of our imports by £70 m. This sum we made up by calling in part of our foreign loans ; or, if you like, by selling out part of our foreign investments. We were living beyond our income and we made up the balance by drawing on the capital that had been invested abroad by our grandfathers. In short, foreign countries were not buying as much of our goods as was necessary if we were to avoid living on capital.

(c) Credit balance : exports greater than imports

If we export more than we import, the receiving country cannot carry on the trade unless we lend them money, in the form of capital equipment, which will increase their productivity and enable them to pay us back gradually.

In the last century we held the position that America holds now in superiority of productivity and exporting power over the rest of the world. For years on end we exported more than we imported. In order to enable our customers to buy our goods we lent them money, the interest on which they paid us either in cash or in food and raw materials. Since we were exporting to countries with a lower standard of living than our own, the cost of production of food was lower in their country than in ours, and we could therefore import it more cheaply than we could produce it ourselves. This had a double effect, of ruining our agriculture (see p. 235, on 'dumping') and of enabling our export-trade workers to exist on lower wages, thus keeping our export prices down. The interest that our customers paid us was the 'interest on foreign loans and investments' which has frequently appeared in our tables. By this means we induced the world to put itself in (very nearly) permanent debt to us and to provide us with a steady 'unearned' income. This was from some points of view eminently satisfactory, but the sort of results you get from the process may be illustrated by the following case :

In 1845 a million people, out of a population of 8 millions, died in Ireland from starvation. Yet in that same year Ireland exported 779,000 quarters of wheat and flour,

93,000 quarters of barley, $2\frac{1}{2}$ million quarters of oats—enough to feed four times as many as died from starvation. This food was sent to Britain to pay, largely, the rents of the landlords, many of whom were English, in the same way that the owners of a railway, say, in Argentina, were for a century largely British. (It was also, in part, to pay the interest on mortgages that had been taken out by the Irish to meet the heavier British taxation required to pay for the Napoleonic wars.)

When a country was unable to pay its interest the result was default. Either a public authority in that country just stopped paying interest, and possibly repudiated the debt also, or else private borrowers and individual firms became mortgaged to the British.

This is, roughly, the process of 'economic imperialism' of which the world has nowadays become apprehensive and suspicious. This need not happen. What is wanted is an International Bank or other Authority that will ensure that the flow of capital to the backward country is steady, is used for increasing productivity and not squandered, and that enough of the extra production is set aside to pay the interest on the loans. But an International Bank, like any other international organisation, cannot in the present state of the world have an easy job in carrying out the above functions; nor can the debtor countries always feel confident that the International Authority itself is not being run in the interests of the two or three nations which supply the credit.

(d) Debit balance : imports greater than exports

Let us this time consider our own position in 1946.

During the war we turned over our industries as far as we possibly could to serving our immediate war needs. Instead of making goods for export we made them mainly for the Services; and the value of our exports early in 1943 was only about 30 per cent of their value in 1938. But we continued to import a vast quantity of stuff—partly for food and partly for supplying our war-industries with raw materials. A lot of them we did not pay for at all: they

THE SWING TO OVER-EMPLOYMENT

were sent to us by America under the terms of the Lend-Lease Agreement without any decision about the means of payment. A lot more we paid for from the remaining capital that we still had invested abroad.

As a result, when we came to 1946 the balance looked very different from that of 1938 :

BALANCE OF TRADE 1946			
EXPENDITURE		RECEIPTS	
	£ m.		£ m.
Imported goods .		Exported goods	890
Food, drink and tobacco	625		
Raw materials, fuel and industrial equipment	420		
Miscellaneous manufactured goods	65		
	1,110		
Government expenditure abroad .			
Military, administration of Germany, etc	300		
Shipping	140	Shipping	150
Interest on foreign investments in England	70	Interest on our investments abroad	150
Films	17	Banking, etc.	72
Holiday travel abroad	25		
	1,662		1,262

Table 14 Balance of trade 1946

The deficit had now risen from £70 m. to £400 m. What were the reasons for this great increase ? It is most instructive to examine them :

(i) Changes in the quantities of goods involved. The quantity of goods imported in 1946 was only two-thirds of that of 1938 ; but the quantity of exports was 90 per cent of the 1938 figure. If this had been the only change the 1946 balance would have stood as follows .

EXPENDITURE		RECEIPTS	
	£ m		£ m
Imports of goods, just under two-thirds of £835 m	529	Exports of goods nearly nine-tenths of £533 m	454
Other sums as in 1938	173	Other sums as in 1938	405
	702		859

Table 15 Hypothetical balance for 1946

The 1938 deficit would have been turned into a surplus of £157 m. We have to explain the gap between this surplus of £157 m. and the actual deficit of £400 m., i.e. a gap of £557 m.

(ii) Increase of Government expenditure abroad. This went up from £16 m. to £300 m.—a rise of £284 m. We have therefore still to explain the difference between £557 m. and £284 m., or £273 m.

(iii) Loss of income on investments and services.

Interest on our investments abroad fell from £205 m. to £150 m. (Notice that it did not vanish altogether : many of our foreign investments were tied up in such a way that they could not be withdrawn, and they still yielded an income.) We had to pay out more in interest on foreign loans to ourselves : £70 m. instead of £30 m.

In 1938 we earned more for banking and other services (£200 m.) than we spent (£127 m.), giving us a balance of £73 m. In 1946 this had fallen to the difference between £222 m. and £182 m., or £40 m.

The total drop on these counts comes to £55 m. + £40 m. + £33 m., or £128 m. We have therefore still to account for £273 m. - £128 m., or £145 m.

(iv) Changes in the prices of goods.

This last sum of £145 m. is significant. It points to an important factor which we have not up to now considered : the movement of prices in the world market. Between 1938 and 1946 prices of the kind of goods that we export went up by 96 per cent, and of the sort that we have to import by 110 per cent. If the only change had been in *volume* we would, as we saw under (i), have spent £529 m. on imports and received £454 m. for exports—a deficit of £75 m. As it turned out we spent 210 per cent of £529 m., or £1,110 m. on imports, and earned 196 per cent of £454 m., or £890 m. for our exports. As a result the deficit rose from £75 m. to £220 m., and the difference of these is the final £145 m. that we have to account for.

Now let us see how these figures bear on our employment problems.

THE SWING TO OVER-EMPLOYMENT

The crux of the matter is the ratio of export prices to import prices. This ratio is known as the 'Terms of Trade.' When it is high, i.e. over 100 (the ratio is used as an index, that is, it is called 100 when the value of the fraction is 1), it means that we are selling at higher prices and buying at lower, and therefore a given quantity of exports will pay for a larger quantity of imports. We do not therefore need to do so much work (in producing exports) to keep up our previous standard of living. For this reason the terms of trade ratio is called 'favourable' when it is over 100. To the country as a whole this clearly represents a gain in material comfort. It means that prices are lower and therefore we can buy more goods with our cash. In fact, between the two world wars there was, taking the picture as a whole, a big upward swing of the terms of trade. Accordingly imports showed, over the period, an upward tendency and exports a decline. In 1913 they were roughly equal in quantity, and if we call the 1913 figure 100, the average for the years 1934-8 was 125 for imports and 65 for exports. Thus imports for these years were nearly double our exports, and we see this reflected in the values of imports and exports for 1938.

But this potentially advantageous position has its snags.

(e) *Disadvantages of 'favourable' terms of trade*

(i) The export industries find that as their prices are higher than the general run of world prices, the volume of their trade dwindles. This means they begin to reduce output and throw men out of work. Tinplate, shipbuilding and cotton are examples. Similarly industries that produce for the home market are apt to be undercut by the foreign goods that can be imported more cheaply ('dumped' on our markets), and they too fall into unemployment: agriculture is the most persistent sufferer from this cause, but such manufactures as cutlery and tools have also been victims. (These effects are apparent even in prosperous times, but they are much accentuated when a world-depression reduces our customers' purchasing power.)

In short, *certain industries and certain parts of the community*

bear the brunt of the changes in world economic conditions, while the rest of the country gains. But it is perhaps as well to add that if we had had full employment in the 1930s, demand would have been bigger and our foreign deficit would probably have been two or three times what it was.

(ii) The joint influence of widespread unemployment and a general upward trend of the standard of living is to encourage slackness. The threat of unemployment prompts people to spread the work they have as far as it will go ; and the fact that the overall standard of living remains steady means that the connection between hard work, high output and a high standard of living is obliterated. You are no worse off in spite of your slackness. The morale of the country as a whole is likely to decline.

(iii) The fact that terms of trade are favourable may mean that the world (outside the U.S.A.) is too poor, as a whole, to spend much on imports and that our prices are staying too high for other countries because we are not keeping down our costs of production. This is likely to be the position of Britain if world prices (now, in 1949, still phenomenally high) fall drastically and enable us to import more easily again : for prices will only go down if the demand of importing countries falls off, and since the call for a higher standard of living is universal, it is improbable that demand will drop unless importing countries are too poor to buy the stuff.

So much for the snags of a 'favourable' value of the terms of trade. Let us now glance at the implications of the reverse position—when import prices are higher than export prices. Now we find we have to produce a lot more than before for export if we are to bring in the same imports. This has been the British position since the Second World War, and it is one of the chief reasons why we have had to keep down our imports, and therefore our standard of living.

It becomes clear that to balance foreign accounts by borrowing from abroad is not a comfortable state of affairs for a backward country whose resources are thereby being

THE SWING TO OVER-EMPLOYMENT

developed ; but it is a highly unsatisfactory position for a heavily capitalised country like our own where it is not easy to raise productivity.

3 OVER-EMPLOYMENT AND THE STANDARD OF LIVING

We are now in a position to appreciate how dependent our own country is on its foreign trade. We cannot grow more than two-thirds of our own food here ; we cannot get anything like the variety of goods and amenities that we are accustomed to from our own resources. In order to buy these things from abroad we must export manufactured goods ; to make these goods we must import the raw materials, which increases our dependence. If the terms of trade ratio goes against us we may have full employment *and yet* have a low standard of living, for we may have to spend our earnings on the raw materials we need rather than on food and amenities. This means we are not earning enough from abroad ; that is, we are not producing enough. This is the condition I mean by the term over-employment : the country has full employment, but the situation demands greater production than is in fact being spontaneously achieved even with everyone at work.

Let us then sum up the causes of over-employment :

(a) *A relatively level distribution of personal incomes.* This reduces the total of savings of private individuals (but not of business firms) and raises the demand for consumption goods. Many people begin to demand goods which they could not have afforded before the change of income structure.

(b) *An unfavourable value of the terms of trade.* This obliges us to produce more to pay for the imports we want. The value of the terms of trade reflects the ratio of the world demand for industrial goods to the world demand for food and raw materials. And since there has been a universal food shortage, particularly amongst the massed populations of Asia, since 1945, the world prices of primary goods have been inflated.

THE SCIENCE OF HUMAN SOCIETY

(c) *War-time destruction and lack of replacement of consumption goods, durable and non-durable.* This has exaggerated the demand for many goods.

(d) *War-time deterioration of capital equipment.* Another effect of the war was to reduce the productivity of our capital equipment through destruction and non-repair.

(e) *Call for improved public services.* The public in this country has become more acutely aware of the need for better education, clearance of slums, better health services and so on.

(f) *Insufficient productivity with the resources we possess.* Certain experts claim that the resources we possess in man-power and materials should enable us to produce more than we do.

What chance is there of a reversal of any of the above trends? We can see that (a) and (e) are likely to be permanent causes of high demand, and that (c) should gradually lapse. What about (b)? I suspect that the world-wide demand for food reflects not only the shortages caused by the war but a swing of world opinion in favour of a higher standard of living for backward races. The allocation of large grain supplies to Asiatic countries since the war is perhaps evidence of such a swing, and the movement of Indian and other Asiatic peoples towards independence may be part of the same trend. But the question is debatable and we can reach no conclusion here. (d) has proved a bigger obstacle than was expected. (f) has attracted increasing attention. There is a general feeling and some solid evidence that people do not work as hard as they used to thirty or forty years ago, quite apart from working shorter hours. This is a matter of morale, which has been a recurrent theme in this book.

But there is also evidence that sheer improvement in organisation could work wonders in certain spheres of the national economy, and this brings us to our next topic: Operational Research.

Meanwhile it rather looks as if we are not going to be faced again for a long time by the questions raised on pp. 227

THE SWING TO OVER-EMPLOYMENT

and 228 : how can we get over capital-saturation? and can we lend our excess savings abroad? We will be returning later in the book to other problems raised for our country by full employment.

4 OPERATIONAL RESEARCH

Here we see an application of science in the field of economics and administration which promises to have far-reaching effects.

What does the phrase stand for? A leading Operational Researcher during the war was the biologist Professor Zuckermann. Zuckermann is credited with having captured the island of Pantellaria—the small island off the toe of Italy on which were tried out the invasion techniques devised for the assault of Italy and France. How did he do it? Not by inventing any new weapon or thinking up any fresh ruse but merely by calculating the ‘disposition and fire-power of the ships and the numbers of aircraft and bombs necessary to reduce the island.’ This is a branch of military tactics which had never before been handed over to the direction of scientists and the success of the new control shows just how far this fresh intrusion of science into practical affairs has been carried.

How did this intrusion come about?

Quite early in the war it was realised that new weapons met with very different success in different units and under varying conditions *without any obvious reason*. The scientists who designed the weapons were called in to see where the snags lay. They at once began to work out systematic techniques for analysing these practical problems.

We can divide their procedure into stages, illustrating these from incidents actually encountered in the different fields of war.

(a) The first stage is always to *analyse the problem*. Take a concrete example : the scientist is asked what total force of aircraft is needed to deal with a given formation of enemy tanks. He must break this question down into single items

THE SCIENCE OF HUMAN SOCIETY

which can be tackled separately, for example : What are the losses of aircraft likely to be from anti-aircraft fire in forward areas? How many planes are needed to dam the railways and block the roads to stop supplies reaching the tank formation? How long are the enemy likely to take to clear the communications again? How long can their tank force go on fighting without fresh supplies? How many planes are needed to deal with the tanks alone? Then each of these subsidiary questions can be tackled on its own.

(b) The final stage is *calculation*. Sometimes this can be done straight away from the figures already known. For instance, in choosing between different patrolling routes for aircraft escorting convoys, the scientists attached to the Royal Air Force were able to calculate at once the limits of the area from which it was *possible* for a submerged U-boat to reach the convoy unseen.

(c) In other cases intermediate stages of investigation are necessary. Before the calculation can be done the records of operations already accumulated must be subjected to *statistical analysis*. In 1944, for example, it was suspected that enemy night-fighters were picking up the radar signals sent out by our bombers over Germany and using them to find our own planes. One way of settling the matter would have been to conduct an experiment : to send out a series of bomber forces among which some planes used their radar and others did not. If the one set had significantly larger casualties than the other you would know the answer. In fact, however, it was quite unnecessary to do anything so wasteful : the Operational Research team systematically analysed the pilots' logs *already filed* and were able from the resulting statistics not only to get a conclusive answer to the original question but to compare the effects of a number of other factors too.

So important is this method of statistical analysis of reports already accumulated, plus calculation of conclusions, that an example of the practical procedure is desirable.

When the U-boat war in the Atlantic was at its height,

THE SWING TO OVER-EMPLOYMENT

Naval O.R. were asked to advise on the safest size of convoy—which was commonly assumed to be small.

O.R. proceeded to analyse the records of 381 convoys that sailed during 1941-2.

The first table shows the variation of losses with size of convoy :

Number of ships in convoy	Mean number of ships in convoy	Total ships	Number sunk	Percentage sunk
44 or less	32	8,913	220	2.5
45 or more	54	5,530	61	1.1

Table 16 Variation of losses with size of convoy

The obvious conclusion is that by increasing the mean size of convoy from 32 to 54 you can reduce losses from 2.5 per cent of the ships crossing to 1.1 per cent, i.e. by more than half.

But perhaps other factors affected this result : what about weather, escort strength or number of U-boats in the attacking packs ? Further analysis gave the following results :

(1) The proportion of convoys attacked was calculated : of small convoys 25 per cent suffered attack, of large 20 per cent. This difference is not statistically significant, as can be shown in the following way .

For the large convoys :

$$\text{S.D.} = \sqrt{pqn} = \sqrt{\left(\frac{1}{4} \times \frac{3}{4} \times 102\right)} = 4.0$$

(compare pp. 146 and 161)

$$\text{Hence Standard Error} = 4.0 / \sqrt{102} = 0.40$$

(compare p. 27)

For the small convoys :

$$\text{S.D.} = \sqrt{\left(\frac{1}{4} \times \frac{3}{4} \times 279\right)} = 7.2$$

$$\text{S.E.} = 7.2 / \sqrt{279} = 0.44$$

Hence the Standard Error of the *difference* of the two scores

$$= \sqrt{0.44^2 + 0.40^2} = \sqrt{0.19 + 0.16} = 0.59$$

THE SCIENCE OF HUMAN SOCIETY

But the difference between the two scores was (in decimals) $0.25 - 0.20 = 0.05$. Since the S.E. of this difference is many times as great, we can conclude that the observed figures of 20 and 25 might very well have been reversed in another set of convoy logs.

(ii) The number of U-boats in the attacking pack was calculated for different sizes of convoy :

<i>Size of convoy</i>	<i>Mean size of pack</i>
34 or less	5.0
35-44	5.8
45-54	5.2
55 or more	7.5

Table 17 Relation of size of convoy to size of submarine pack

There is no systematic relation between the figures.

(iii) The relation was worked out between size of convoy and number of escort vessels :

<i>Size of convoy</i>	<i>Mean number in escort</i>
10-19	5.5
20-29	6.5
30-39	5.6
40-49	6.5
50-60	5.8

Table 18 Relation of size of convoy to size of escort

Again there is no regular relation. Other factors similarly showed no significant effect.

The probable reasons for the safety of the larger convoy were then analysed. It was known that if convoys were made regularly larger, it would be possible to assign a larger number of escort vessels to each convoy. And it was shown that this would help materially.

<i>Number in escort</i>	<i>Number of ships sunk per U-boat in pack</i>
3.4	0.88
6.7	0.75
11.1	0.34

Table 19 Relation of size of escort to effectiveness of submarines

THE SWING TO OVER-EMPLOYMENT

The larger convoy had opposing disadvantages, such as greater waste of time at assembly points. But these considerations were nothing to do with the safety. Where common sense or intuition had regarded the smaller convoy as safer, science had shown that the advantage lay with the larger.

(d) But records already obtained did not always provide all the facts and figures required. In this case it was necessary to *alter the layout of operational logs*, so that the statistical experts could get the information they wanted from the regular returns.

(e) Occasionally it became necessary to *conduct experiments*. In such cases the use of proper statistical checks made possible a great economy in the numbers of men and machines used.

A year or two's experience of such work yielded not only a big crop of specialised results but a general 'Theory of Combat,' which laid down the principles for calculating the forces required for winning any engagement. It was the application of this on a large scale that was first carried out by Zuckermann at Pantellaria.

It is easy to see that O.R. has a part to play in the affairs of peace wherever an urgent job needs to be carried out with limited man-power and supplies. It is likely that if an O.R. team had been put on to the problem of fuel supplies for the country in 1946, they would have been able to plan consumption and transport in such a way as to obviate the fuel crisis of February 1947.

Today the Operational Research principle is accepted by the Government, and the Scientific Advisory Committee on Industrial Productivity appointed in December 1947 was constituted with one section to deal with 'Technology and Operational Research.' By March 1948 an inquiry by O.R. methods into the extent and causes of variation in productivity in cotton factories was already yielding valuable results.

It is evident that O.R. methods overlap with the sort of investigation that was carried out by the Harvard team at

THE SCIENCE OF HUMAN SOCIETY

the Hawthorne works. The former, however, have a great advantage. The Chicago researches were carried out by setting up special observation rooms, in which workers unavoidably felt conditions to be rather artificial. But O.R. works by applying statistical analysis to a large number of records of jobs performed *under normal working conditions*. In this way we may expect to obtain information about the effects of different methods of management, and the influence of the atmosphere or spirit of an enterprise on production, which could scarcely be obtained by experimental methods with adults.

5 SCIENTIFIC METHOD IN ECONOMICS

The economic discussions contained in this chapter and the last have shown how inextricably scientific and historical methods (in the senses defined on pp. 11-15) are interwoven in the study of economics. Let us sum up shortly the types of argument and evidence used

(a) *Historical records*. We have here the numerical records, such as income tax returns and figures of world price movements ; and the qualitative records, such as the accounts of the events that make up trade cycles

(b) *Sample survey results*. Here we have a scientific method used for obtaining further historical data beyond those available under (a).

(c) *Logical analysis*. This heading covers three items. First, the *classification* of the data obtained from the historical records—for example, the analysis of the National Income in several different ways. Second, the *analysis of concepts*, as in the definition of transfer payments or investment goods. Third, the *analysis of logical consequences*, of (for instance) the various alternatives involved in the attempt to balance investment and consumption.

(d) *Historical analysis of a single course of events*. We see an illustration of this in our discussion of the connection between the scale of society and the scale of slumps.

(e) *Generalisation from history*, based on multiple examples,

and therefore grading into the 'potential measurement' to which we referred on p. 14. The course of development of a frog's egg has been established by the observation of a number of instances, each in itself unique, but when multiplied many times offering a basis for statistical generalisation. This is the kind of argument we have used in describing the course of a trade cycle. The question that faces us is, how many cases must we take into account before we can regard our generalisations as secure? The answer lies, as we have seen in our statistical studies, in the degree of variation of our individual observations; and this is far greater with the trade cycle than with the frog's egg. The evidence here can never warrant the kind of certainty that is possible in regard to the latter.

(f) *Measurement of time-series.* Finally, we have the fully scientific use of statistical method in the analysis of series of figures of—for example—the quantities and prices of beer sold in this country over a number of years, or of wheat sales in America. This is the logical extension of (e) above when observations become frequent and uniform enough to permit of strict mathematical analysis, and the historical generalisation can be established for the period it refers to. It represents one of the growing points of economics as a science at the present time; but it would take us too far out of our way to discuss it in detail in this book.

A final comment is called for. The sample survey revealing how savings varied with income-size in America in 1935 was establishing a historical or unique fact. It must not be assumed that this pattern of saving is universal or unchangeable; a runaway inflation in a country results (psychologically speaking) from the conviction that money is losing its value and therefore to save it is equivalent to throwing it in the fire. People's habits in regard to saving are a function of the prevailing values and outlook; in so far as the trade cycle arises out of savings habits, it is a function of the values current in West European civilisation during the last two hundred years, including particularly acquisitiveness and thrift. The economic laws or theories

THE SCIENCE OF HUMAN SOCIETY

that are drawn from the facts are not to be regarded as valid outside the civilisation under study. The institution of universal social security, for example, might bring about such a change of attitude to thrift as to alter entirely the traditional economic cycles.

CHAPTER XVII

WAR AND WORLD ORDER

I THE PROBLEM ANALYSED

THE immediate cause of the Second World War was Hitler's megalomania. In other countries and at other times such men have been shut up in prisons or asylums. How is it that a large part of the German nation came to support his crazy ambitions? Are the impulses that lead large groups of men to fight ineradicable from human nature? If they are, must they necessarily lead to war? In what sense is war caused by economic maladjustments?

These are the kinds of questions we have to face in the present chapter. Can science contribute to the answers? Can science, in other words, throw any light on the causes of war? Or offer any prescriptions for its avoidance? I think we can definitely say yes. The classical example of scientific analysis in this subject is that worked out by Durbin and Bowlby in their book *Personal Aggressiveness and War*, from which the first part of the following argument is taken.

It is convenient to divide the subject into five parts :

- (i) Motives leading to fighting between individuals
- (ii) Conditions of self-restraint in a stable society
- (iii) Motives leading to war between nations
- (iv) Conditions of restraint on the international scale
- (v) Practical conclusions

These five parts will be dealt with in turn in the succeeding sections of this chapter.

2 MOTIVES LEADING TO FIGHTING BETWEEN INDIVIDUALS

The psychological causes of fighting can be analysed at two levels : (a) external occasions ; and (b) internal

promptings. The evidence can be obtained from various sources ; but Durbin and Bowlby's material is both concise and representative. It is culled mainly from Susan Isaacs' studies of young children ; from zoologists' observations of animals like baboons ; from anthropologists' records of primitive tribes ; and from reports of speeches and propaganda put out by the Nazis.

(a) *External occasions*

At this level we can say there are three groups of causes :

(i) Disputed possessions. Small children will fight for a toy, thieves for booty. If we are prepared to stretch the sense of ' possessions ' a little, we can say that children will fight each other for the attention and affection of grown-ups.

(ii) The intrusion of a stranger into the group. Monkeys will set on a newcomer and bite it to death. Small children in a school will express hostility to a new child even before he appears. Most primitive tribes are suspicious of an unfamiliar person. The motive seems to be allied to the first type : the newcomer is felt, in the case of children, to be a rival for the toys and affection of which they already cannot have enough. A special example of this is the jealousy aroused when a new baby is born and an older child has to take a back place.

(iii) A sense of failure or frustration. We knock a favourite vase off the mantelpiece and break it ; it is all the more exasperating when it is nobody's fault but our own and we can find nothing to blame but ourselves. We are apt to vent our annoyance on an innocent party. Examples of this sort of thing were given on pp. 94-5. The reasons for this take us straight into the deeper causes of fighting.

(b) *Internal promptings*

We have to go back to the mental process of *projection*, which we discussed in some detail in chapters viii to xii. You may find it advisable to read again now the accounts on pp 91-7 and 134-7.

The general idea is that we project feelings, motives, ideas,

values, any of our mental experiences, into other people, attributing to them what may not be part of the workings of their minds at all. In discussing the effects of projection we found it useful to classify our mental experiences in four groups : our ordinary conscious assumptions ; friendliness and goodwill ; criticalness or condemnation ; unscrupulous selfish motives. From the evidence already put forward four conclusions or principles emerge which bear on our present subject :

(i) Our own friendliness and hostility towards other people depend to a great extent on the motives that we tend to project into them. If A regards B as hostile, A may feel a resentment which provokes B into genuine hostility. If A believes B to be friendly, A may take up a friendly attitude to which B responds with genuine friendliness. The amount and kind of such projection are an index of the stability and maturity of our own personality. The unsatisfactory individual—the over-assertive, the neurotic, the criminal—tends to project into other people an attitude of condemnation or scorn which produces in himself an unconscious sense of guilt or inferiority, followed by resentment against the society round him. The more balanced personality, though he too possesses these impulses, has them less strongly developed.

(ii) The mutual projection of evil motives between individuals becomes more likely if there is a pronounced difference of values and outlook between them. A Quaker and a Nazi were not likely to understand each other's deeply engrained principles ; and purely on account of this difference they would be prone to attribute to each other insincerity, bigotry and hostility.

(iii) In the third place we must note that hostility *between* groups is increased by the tendency to suppress hostility *within* a group. Within a family, for example, life would sometimes be rather grim if all the annoyance that was felt found expression. The price of greater peace within the group is greater hostility towards other groups ; the resentment tends to be displaced from its original object on to

THE SCIENCE OF HUMAN SOCIETY

another that is slightly further off. This fact is amply attested by psycho-analytical evidence ; it partly accounts for the tendency of a group to be hostile to a stranger.

(iv) Our fourth conclusion is that in any serious dispute the judgment of the case cannot be left to the disputants. For in any situation that arouses strong feelings in us we are liable to project impulses of one kind or another on to other parties to the situation—perhaps friendliness and goodwill on to our friends, and criticalness and self-interest on to our opponents—and we are therefore almost certain to see the case in a distorted light.

We come to the next stage in our argument : how in fact are battle, murder and sudden death normally prevented within a free society ? Here we enter the region of doubt and speculation.

3 CONDITIONS OF SELF-RESTRAINT IN A STABLE SOCIETY

(a) *Submission to the law*

First I want to ask what leads us to submit our disputes to the law as a matter of course in a civilised country. The evidence is confused and I can only put forward a few leading ideas. We have to distinguish two cases, the community that feels itself to be an organic whole and the community that consists of odd fragments thrown together. Let us consider the latter case. The observations reported by Susan Isaacs suggest that a desire for impartial justice and external arbitration only begins to grow up when parties to a dispute find themselves (i) evenly matched in strength and (ii) tied by an over-riding common interest. Two small children quarrelling for a tricycle ask for adult intervention when they are equal in power and want an uninterrupted use of the toy. Parties to a labour dispute will accept arbitration in war-time under the sense of a binding common need, where in peace they might wrangle on for years. In this case the disputants see that if they do not hang together in the emergency, they may well hang separately. Without the

conviction of a common need the antagonists may, as in France in 1940, prefer the second course—to hang separately. The lack of support for a revolutionary form of Socialism in this country has in part been due to a general belief among all classes in a common moral law.

A certain minimum code of moral standards must be agreed on ; each party must at any rate stand by its signature, if only because its opponents are strong enough to oblige it to do so.

The community that feels itself to be an organic whole may have grown out of a heterogeneous community gradually welded together by an outside threat ; or it may always have been homogeneous. In either case, however, the sanction of the law is strong and stable, for now the bystanders not directly involved in a dispute remain identified with the community as a whole instead of lining up on either side as participants. So instead of a sense of a common external threat we have the powerful pressure of a united public opinion. It is only in this case that we find a real confidence in the justice of the authority that pronounces judgment, for it is only now that the community is conceived as a unity and bound together by common values. At this stage the individual not only identifies himself with the community as a whole, but the authority within it with his own sober conscience, helping him by its sanctions to control the unruly side of his own nature. The function of government at either stage is, in Temple's words, to secure ' that self-interest prompts what justice demands.' Whereas at the first stage the self-interest is the baser motive of fear, in the second the process of identification has gone much further and the self-interest is more in the nature of a desire for support or assistance.

We see again the fundamental significance of the process of identification—you may find it worth while to refer to pp. 131-3. We may also notice that authority in a community has two functions : to maintain a stable framework of social structure and of values, and to foster identification of the members with the community as a whole.

(b) *Democratic methods and individual self-respect*

The problem here is that of the effect of democratic methods of conducting affairs on the unconscious guilt and the stable self-respect of the individuals who take part.

The very method by which opposed interests gather together round a table to hammer out a joint policy has profound psychological effects. The minds of the men sitting round the table are stimulated by the give and take of discussion, and they become more fertile, more creative, than when on their own—a fact which has been established by ingenious American experiments. The sense of creativeness is a powerful antidote to unconscious guilt and inferiority. Ideas become moderated or filled out, intensified or re-directed. They become group ideas : the final product is the joint effort of the assembly. In the process the members of the group come to look on the final decision as their own personal creation. And ' policies and doctrines based on the willing consent and active participation of the parties most concerned in them are far more effective than any imposed policy ' : they engage the individual will as no external decree can. Thus group action offers an important field for deliberate choice, for the responsible exercise of free will.

Those involved in the decision become in this way identified with authority, and instead of being in the position of underlings ordered to do something—a relationship which is always apt to stimulate projection of the wrong feelings—they get a sense of being their own masters. This result too helps to neutralise any sense of guilt or inferiority.

Another consequence is that the members of the group get to know one another as men rather than as representatives of opposing factions. They begin to appreciate each other's views, to credit each other with sincerity. Not only does this favour the right kind of projection between opponents but it fosters the growth of a group spirit ; and you will remember that membership of a group of like-minded people is one of the most potent means to self-respect. This point suggests another advantage of the machinery of consultation in industry.

In short, the successful hammering out of a joint policy by a number of people is likely to confirm their self-respect and to dissipate their unconscious guilt or inferiority.

The operative word in the last sentence, however, is 'successful.' Most of us will know how futile and exasperating a bad committee meeting can be. We are also well aware of the difference between the bargaining that barely avoids breakdown and the negotiations that result in a synthesis integrating contending views into something better than any of them. What are the conditions of successful group discussion? This leads me straight into my third point; but before I embark on that, I must make it clear that I am not confining the term 'democratic methods' to discussion alone, but using discussion as illustrative and symbolic of democratic method. Such typically democratic techniques as the co-ordination of voluntary agencies in education and the Youth Service, and the refusal of the Tennessee Valley administrators to institute schemes without local co-operation, have the same sort of psychological effects.

(c) *A common ground of civilised values*

Under (a) we assumed that the citizens of a democracy generally practise a good deal of self-restraint. Under (b) we commented on their capacity for sinking their differences in joint action. Have these two characteristics any basis in common? I wish to suggest that both rest ultimately on a widespread respect for other persons.

We have seen that mutual respect for personality is an antidote to the more virulent forms of projection. You cannot feel for very long that the other man is scum, fit only to be wiped off the face of the earth, if your deepest convictions tell you that he has as much right to an opinion as you have. Conversely, an intense conviction that the other man is doing you down behind your back, such as is likely to spread around in a period of severe economic distress, and appears to have developed between the U.S.A. and the U.S.S.R. now, may well destroy the possibility of fruitful negotiation.

THE SCIENCE OF HUMAN SOCIETY

I hold in addition that the one essential condition for the success of democratic methods is *the conscious sharing of a common ground of civilised values*. Of these it seems to me that mutual respect is the most important, for it implies a belief in the worth of human personality in its own right—in other words, it is not only a value in itself, it involves a judgment on human nature and a chain of other major values—honesty, tolerance, loyalty and so on.

It also implies one element of behaviour which particularly concerns us here, namely, a determination to reach agreement rather than fight, a deep preference for negotiation and compromise over the use of force or threats or mere cajolery, an unshakable belief in the supremacy of law over power.

We have, I hope, gained some insight into the way man's fighting propensity is regulated in a free society. Let us now apply our analysis in the international field.

4 MOTIVES LEADING TO WAR BETWEEN NATIONS

We can again distinguish causes at two levels : the external occasion, such as the murder at Sarajevo in 1914 or a dispute—essentially economic—between two hunting tribes claiming a particular stretch of territory ; and the underlying motives, such as the German state of mind in 1939. The occasion is of less interest to us than the motives.

A number of difficult questions immediately confront us : can we interpret relations between nations in the same terms as relations between individuals ? Is it useful to think of a nation as having a character as a man has, and speak of one nation projecting feelings of some kind into another ? If Hitler's megalomania was the result of deep unconscious guilt, does that mean that his supporters—a large proportion of the German nation—also suffered from an exorbitant sense of guilt ? If so, how did they get it ?

Let us take a look at the idea of national character. I think that if used with reasonable caution the idea is valid ;

it obviously is so in the case of a small and distinctive tribe like the Arapesh or the Mundugumor. The qualifications needed in a large complex society become obvious as soon as we look at our own country. As we have remarked before, the Gallup Polls have shown considerable differences of opinion between different classes on important issues. On the other hand, on certain issues the country appears to show a clear-cut judgment: the response to the Hoare-Laval plan for Abyssinia was immediate and decided; there was general support for the decision to send an Expeditionary Force to Greece when Italy invaded her during the war. Any self-contained community, as we have seen, tends to develop an outlook of its own. The larger it is and the older its tradition, the more assurance it acquires of the validity of its own way of life (see pp. 131-3). Within a group, ideas that flout the reality of ordinary life soon disappear: the individual who insists that somebody is trying to do him in is quickly proved either right or wrong. But fantastic ideas about other countries may flourish simply because they are not disproved by the realities of daily experience. Thus the Nazis were always proclaiming to the rest of their country that the Western Powers were trying to 'do them in'—organising encirclement. Thus the country as a whole came to project on the Democracies motives that had no substance outside the German mind.

But this does not account for the whole of the facts. It is easy to be misled by special experience, supported by official propaganda, on the subject of a foreign country: from 1905 to 1942 the British generally regarded the Japanese as 'clever little Japs' with a knightly code of honour. But it is a very different matter to be so misled about a foreign country as to generate the kind of hate that the Nazis exhibited. There must have been a very special psychological soil for the crazy utterances of the Nazi leaders to have had such demoniac effects on the mass of the nation. I have given reason for believing that the substratum beneath violent resentment and aggressiveness is a hidden sense of condemnation or inferiority. What evidence is there for

THE SCIENCE OF HUMAN SOCIETY

any such general condition in Germany between the wars?

The first point to make is the effect of the ordinary code of behaviour passed down from generation to generation. Many observers have pointed out the strength of the militaristic tradition in Germany and the strain of brutality exhibited from time to time. What is important for us to notice is the effect of these values on the characters of the next generation : the insistence on immediate unreflecting obedience, the lack of sympathy with weakness, are (as we saw with the Mundugumor) just the methods of handling children most certain to foster a strong unconscious sense of guilt and resentment.

Then there is the evidence from Hitler's own book *Mein Kampf*, where he describes the sense of humiliation and desire for revenge produced in many of his countrymen by the defeat of 1918. But in the early years it was only the neurotics and psychopaths that joined his party.

The next evidence is the report of the Swiss psychiatrist Jung that Germans who came to him for treatment after the first world war all showed an alarming tendency to deep-rooted and violent resentment.

Finally, it is well known that the inflation of 1923 and the slump of 1931 brought in their train a fearful load of misery and humiliation in Germany ; and, as we saw in discussing the psychological effects of unemployment, these are conditions under which stable self-respect becomes very difficult to maintain. This experience was the breeding ground of despair and hate ; it was this crisis that finally generated the psychological forces that gave Hitler his power. The graph opposite shows how the rise of the Nazi party was correlated with the accentuation of the slump.

By identifying themselves with Hitler the German people were able to cast off the burden of guilt, first on to scapegoats like the Jews, and secondly on to the 'moralistic' Western Powers who had imposed on them the 'monstrous diktat of Versailles.' (Incidentally it is worth noting that the Germans were not the only people to relieve their minds of

WAR AND WORLD ORDER

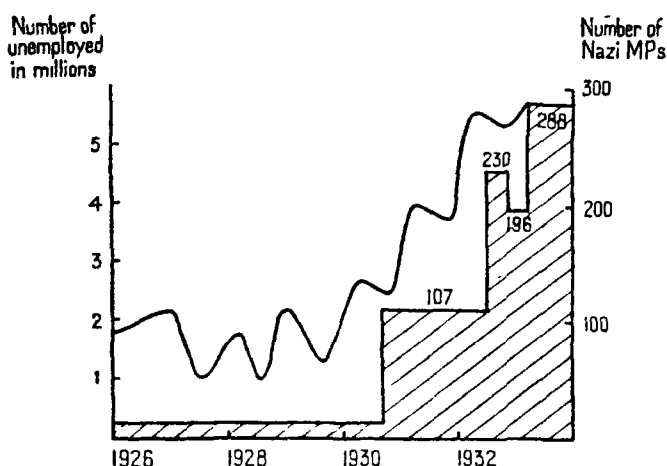


Fig. 29 Diagram showing connection between rise of Nazi party and rise of unemployment (after Sawyer)

guilt by projecting the responsibility for the depression on to other shoulders : the slump in our own country, though part of a world catastrophe, was attributed by Conservatives to the Labour Government of 1929-31, and by others to the wickedness of bankers or capitalists.)

We must take note also of an allurements that many people experience when their country takes the plunge into war : there is a clearing of the air ; a sense of unity and purpose takes possession of the country in face of the external threat ; internal conflicts, economic discontents, tend to be displaced outwards ; everyone is now important (‘ Your courage, Your resolution etc., will bring us victory ’), everyone is now ‘ right ’—more ‘ right,’ anyway, than the millions of the enemy nation. The suicide and insanity rates fall. These are ideal conditions for the neurotic : over-aggressive feelings are no longer a liability but an asset ; the pressure of unconscious guilt is relaxed ; broken self-respect is healed. This is the habit of mind worn more and more wholeheartedly by the Germans in the years before 1939.

THE SCIENCE OF HUMAN SOCIETY

5 CONDITIONS OF RESTRAINT ON THE INTERNATIONAL SCALE

In dealing with the conditions of restraint within a community, in section 3, we based our discussion on three conditions, viz (a) submission to the law, (b) the use of democratic methods, and (c) an agreed basis of civilised values ; it is convenient to follow the same plan here.

(a) *Submission to the law.* What are the conditions under which nations will submit disputes to a common supranational law ?

We saw that the only stable and enduring condition of law-abiding behaviour within a free country was a sense of organic community, a conviction that the country as a whole shared a certain code of civilised values and a certain way of doing things. This unity may be endangered by changes of circumstances ; if it is broken the habit of submitting disputes to the authority of the law is also liable to be broken.

What chance is there that such an outlook will prevail in the international field ? None whatever, at present. The cleavage of values between the Great Powers goes far too deep.

Short of a sense of common values, the only circumstance that will drive warring factions within a nation to surrender the judgment of their own disputes is a conviction of an overwhelming common interest. This principle applies equally in the international sphere. The lack of such a conviction was the downfall of the League of Nations. Perhaps the biggest single question facing the human race today is whether the existence of the atomic bomb will suffice to fill in this breach in the wall of human conviction and will to peace.

Suppose it does. Suppose we succeed in keeping an uneasy peace for a time—it is bound to be uneasy simply because the gulf between the Eastern and Western attitudes to life offers the best possible opening for misunderstandings, for the projection of wrong motives. What conditions must

be fulfilled if UNO is to establish its authority over all disputes ?

(i) It must show itself able to dispose an overwhelming force in support of its decisions : when public opinion within a community becomes sufficiently united, mere police action is required ; but not before.

(ii) It must show itself able to enforce obedience to a minimum code of international behaviour—the honouring of pledges and so on.

(iii) It must ensure that happy economic relationships are established. Economic troubles are as significant as political disorders, because they hit the common man's standard of living and foment ill-feeling directly.

(iv) It must lay down a firm reputation for justice—rather rough possibly at first, but recognisable ; and applied not only to the settlement of disputes, but to the revision of unjust or outdated treaties and to economic frictions. Nothing is so important for this achievement as the maintenance of three or more stable blocs of nations whose power roughly balances : a respect for justice first springs up in a community, as we have already seen, as a result of conflict among equals.

What are the odds that UNO can acquire such authority ? It is obvious that if the Eastern bloc are really convinced that they have no ultimate interest in common with the Western, that the economic differences will eventually necessitate a showdown, then UNO can never acquire any real power. The course of Russian policy since 1945 makes this interpretation appear only too likely.

(b) and (c) *Democratic methods and agreement on civilised values.* What can we say about our other two questions ? What of democratic methods in handling international affairs ? Personal meetings of foreign ministers, arguments round a table, certainly have a great value. But as we saw before, their full influence can only be felt when certain other conditions are fulfilled—above all, the sense of sharing a minimum code of basic values. Of these I suggested the major ones were mutual respect and a genuine desire for negotiation. It is very unfortunate that the whole cast of the Russian

THE SCIENCE OF HUMAN SOCIETY

character seems to be to run to extremes, to regard compromise as a betrayal of principle. It is even more unfortunate that, if we are to credit Kravchenko's evidence, the code of values of the Soviet rulers has little in common with Western values, and that suspicion and mistrust are now so deeply engrained in the Russian outlook, presumably as a result of their secret-police system, that their emissaries are never given authority for creative negotiation by the round-table method.

6 PRACTICAL CONCLUSIONS

Can we arrive at any conclusions on these fateful problems?

(a) *The general situation*

It seems to me that *in view of the dominating influence of projection on human relationships, and the undesirable twist that is given to it by discrepancies of values and outlooks*, we should, in any case, have to expect serious difficulties among the Great Powers in reaching agreement on major problems. For years to come we could not expect to get beyond the first stage in the restraint of international aggression. During that stage the spirit of give and take would be certain to express itself in prolonged and bitter bargaining. Justice would in all likelihood be crude simply because it would express the balance of strength between the powers. The mere fact that negotiations still continue is an achievement: there has at least been no secession of a major power from UNO yet. But can we really feel that the position offers any hope of improvement? Everything depends on the attitude of the Soviet hierarchy, and I find it hard to believe (referring again to Kravchenko) that this can change radically—except in so far as they see themselves confronted with stable and contented countries strong enough to maintain a state of peace.

(b) *Germany and Japan*

From what we have seen before, it must be perfectly clear

WAR AND WORLD ORDER

that Germany is going to remain a festering sore in Europe until the people of the country can gain some enduring self-respect. As they are a highly industrialised country accustomed to a fairly high standard of living, it seems most unlikely that they will achieve this object until they are making a substantial contribution of manufactured goods to the non-industrial parts of Europe which so badly need them, and are able to pay their way at a reasonable living standard. Neither Russia nor the Western Powers appear to have the slightest intention of loosening their grip on Germany's potential war industries ; and with that proviso it would seem that the quicker we can rehabilitate the country the better. By the time it is done retribution will have been amply exacted. It is useless to think about eradicating the streak of brutality or building up a democratic outlook except in terms of the creation of a stable and contented people. The question is, is that possible without the re-ordering of our entire civilisation ?

Japan also is likely to prove an intractable case. Their inherited code is hammered into their minds more ruthlessly than we can well imagine. Their stoicism and their punctilious observance of etiquette even in the horrors of Hiroshima illustrate this. The whole cast of their mind is hostile to fresh ideas : the relative failure of Christian missionaries in the past is an index of their unreceptiveness. The way they bring up their children explains why they are so highly resistant to outside influences. In the present state of world development I can see no satisfactory solution to the Japanese problem.

his influence to uphold law and order and a stable financial system. Hence the idea of 'a property-owning democracy'—the slogan coined by the Conservative Party. I think we may infer that the same idea lies behind the fact that at the height of Athenian democracy the vote was based on property, and that Cromwell also maintained the same principle against the Levellers in the seventeenth century. This provokes the question whether democracy, which is based on the responsible outlook of the individual, is impossible in a country where ownership is limited to a few. It is worth reminding ourselves that Christian doctrine has long taught the social advantages of widespread ownership of property ; and that in the Western democracies the possession of capital is largely concentrated in the hands of a small fraction of the population (see p. 202). The question is as important as the evidence for settling it is scanty ; we shall return to it on pp. 277-8.

The expectation of a good profit is a strong incentive to effort : initiative, enterprise, ingenuity, efficiency, are encouraged. Hard work and thrift enable the owner to sink more capital in his business, and may provide a handsome return to a man who has no business of his own but can invest his money in somebody else's.

These qualities of mind are solid virtues in any society. But there are two further points to be noticed about the system.

(c) Bad effects of the profit system

Like any other powerful stimulus, such as war or hunger, it calls out bad qualities as well as good. Because it makes for individualism it tends to push regard for self to the first place, leaving the common welfare to follow as a by-product of the owner's welfare, and that of the employees a poor runner-up. It tends to heighten competition, and so to divide men rather than to unite them. The idea of the system is that every man should do the best he can for himself. And that principle is followed by all parties to it—the employer who drives a hard bargain for his raw materials or tries to cut the piece-

SOCIAL STRUCTURE AND HUMAN CHARACTER

work rates, and the trade union group that calls an illegal strike or keeps down the bricklayers' pace of work. (See page 192.)

The cash connection tends to supplant other relationships between man and man. Karl Marx's scathing comment is well known : ' The bourgeoisie [i.e. the trading and industrial middle classes], wherever it got the upper hand, put an end to all feudal, patriarchal, idyllic relations, pitilessly tore asunder the motley feudal ties that bound man to his natural superiors and left remaining no other bond between man and man but naked self-interest and callous cash payment.' He exaggerates his case, but there is considerable truth in it. History shows that we have become much more money-conscious in the last two or three hundred years than we were before.

(d) Conditions governing the effects of the profit system on a society

The other point I want to make about the profit system is that the balance of good and evil effects depends on historical circumstances. Amongst one people, at one stage in their history, its good influence may be almost unalloyed. In another country, at a different stage of development, it may be overwhelmingly evil.

Two factors are at work : the traditional code and outlook of the people amongst whom the profit system is planted ; and their stage of economic development. We saw how characteristically the Arapesh modified the system of barter usual among primitive tribes : they merely exchanged gifts. They never haggled and they never kept accounts. The normal method of trading was radically altered by their unusual attitude to life. We might draw a corresponding contrast between the type of business that was built up by the Frys and Cadburys and Rowntrees in eighteenth-century England within the influence of a strong Quaker tradition, and the kind of firm that was to be found in America between the wars, which, to counteract trade union action among its employees, was prepared to maintain its own forces of professional strike-breakers

and to arm them with rifles and machine-guns.) These gangs did not stop short of beating up and shooting union organisers and blowing up their offices or homes.¹

It seems clear that we in this country have much to be thankful for. We have had a long history of military security. We have never had to maintain a large army to defend ourselves. For a long time we were the wealthiest country in the world. In this atmosphere of security and prosperity we had besides an almost unique tradition of mutual friendliness and solicitude for the weak reaching far back into the past ; see, for example, Trevelyan's reference to the Englishman's ' monopoly of good nature ' in the time of Charles I, and to the establishment of Poor Relief in the sixteenth century. These influences served to humanise the private-profit system, and bring out its good psychological effects, in a way that was not usual elsewhere.

But a country's outlook and tradition are not the only factors. When we think of an ideal business firm we are apt to visualise an old family firm in which the men all stay a lifetime and the manager knows them all by their first names. But, as we have emphasised in earlier chapters, this is no longer a typical picture—it is the exception rather than the rule. The owners of the capital, i.e. the shareholders, of a firm often have nothing to do with the running of it. The whole tendency of the age is, as we have seen on pp. 190 and 221 and 225, towards amalgamation. Business groups form bigger and bigger rings. Four out of every five of the factory workers in the country belong to firms whose employees number more than 100 ; and 40 per cent to firms of more than 1000. These are the figures for 1948 ; and nationalisation is now entrenched. In other words the majority of employees belong to large firms, where personal relationships *tend* to become more formal, the crowd outlook *tends* to take charge, and the cash relationship *tends* to oust the human relationships. As we saw before, manage-

¹ Such practices are scarcely credible to British ears ; but there is no gainsaying the evidence of the La Follette Committee of the United States Senate, which published its findings in a series of bulky reports from 1936 to 1944.

SOCIAL STRUCTURE AND HUMAN CHARACTER

ment may spend a lot of money on welfare without removing from the worker's mind the impression that he is only noticed when he isn't there. The large scale of organisation limits the individual's scope for responsibility and initiative : any large organisation is liable to become over-centralised and unwieldy, to multiply regulations and red tape, to lose elasticity and adaptability. Virtues only grow by practice ; if we do not have to exercise initiative or responsible judgment during our eight hours of work, we have halved the time available for their cultivation.

The decay of personal relationships between the executive and the worker, coupled with the desire of an energetic management to try out new methods and processes, has another serious consequence. Workers find that the informal groups that naturally spring up amongst them are constantly being broken up and re-shuffled by changes imposed by the management without prior consultation. Now we know that within our civilisation stable self-respect can only be maintained in stable groups of like-minded people of secure status ; and the continual disruption of the natural working groups tends to reduce the individual members to the condition of an irresponsible rabble. (Compare p. 191.)

Amongst management, it may be observed, two incentives have come into greater play — the desire for power and the professional spirit. Management is fast becoming a profession involving training and experience as specialised as a doctor's. And it is power rather than money that offers the biggest prizes in the top reaches or lures on the already rich business man.

(e) Causes of the trend towards mammoth organisations

One reason for the growth of scale is the technological development of the age : telephones and typewriters and dictaphones, electrical controls and conveyor belts, enable men to handle bigger jobs, to co-ordinate more complex organisations. Larger towns can be supplied with food and water and drainage and transport.

But the most important factor is one that we have

already indicated in our discussion of economics—see pp. 221 and 225. This is the fact that the period of rapidly expanding markets is over.

The modern era began with a huge expansion of European man over the world in the 1500s and 1600s. This eruption over the planet was, as Mumford says, exhilarating: it went to his head. It gave him an extravagant confidence in his own invention, his own theological beliefs, his own aptitude for ruling over other peoples.

It was accompanied by a great growth of science and technology which enabled the land to support far larger populations than before. The populations of the Western countries all multiplied rapidly in this era; England, for example, rose from 5 millions in 1700 to nearly 40 millions in 1900. Industrial markets expanded in consequence; and when demand is growing fast even the inefficient firm prospers.

In our time we have seen the period of expansion come to a close. There are no more countries with a congenial climate waiting to be taken over by white men; the purchasing power of the coloured peoples is not large enough, or increasing fast enough, to keep the markets expanding. 'Do not deduce from this condition [Mumford insists] that the possibilities of new population movements are over; on the contrary, there are areas that are now sparsely populated, like the Tennessee Valley . . . that will benefit by an added population. . . . Arid regions, from California to Australia, waiting to be harnessed to the sun, will become the Egypts of a new cycle of civilisation. But this new population movement, this new re-settlement, cannot proceed from the same motives that governed the past; co-operation must replace conquest, and systematic cultivation must take the place of heedless and often destructive utilisation.'

'The same motives [he says] that governed the past.' What were those motives? Predominantly in the Western world the motive of individual ambition, individual gain, the ideal of the man who makes his own way. In Britain,

SOCIAL STRUCTURE AND HUMAN CHARACTER

as we have observed, the ideal has been constantly softened by the intense feeling for human fellowship and sense of moral law : we have no use for the trade union official who forgets the working-class friends of his youth ; we approve of the firm that looks after its retired employees. The evil side of the industrial system has been damned by a long line of prophets, from Blake and Dickens to Shaftesbury and Ruskin. The business magnate in this country has never resisted taxation and the limitation of his power by Parliament as his opposite number in America has. Nevertheless, the choking up of world markets produced the same internal catastrophes in every country in the world—chronic unemployment, loss of hope and enterprise, a decline in the general will to work and sacrifice, a falling birth-rate, a blind desire for security on the part of investors of capital as well as of the ordinary employee, followed in the worst-hit countries (such as Germany) by hatred and despair.

What must we do to be saved ? What must we do, in other words, to create a new sense of purpose, a new vision of human life, a fresh generation of balanced and satisfied men and women ? That is the question. Before we attempt to answer it we must look at the human repercussions of one more prevailing feature of modern civilisation—the predominance of town life.

2 THE INFLUENCE OF CITY LIFE

Before you embark on this section, you should try answering the following questions :

- 1 Where would you like best to live ?

city (200,000 inhabitants or more)
county town (50,000 inhabitants, say)
small town (say 3,000 inhabitants)
village (say 500 inhabitants)
just outside a large town

Write down the main reasons for your preference.

- 2 What would you like best to live in ?

flat	detached house	terrace house	bungalow
(722)			19

THE SCIENCE OF HUMAN SOCIETY

- 3 How much garden would you like ?
1 acre $\frac{1}{4}$ acre size of half a tennis court none at all
- 4 How many evenings in the week do you expect to go to the cinema or other passive amusement ?
- 5 How many evenings do you expect to meet other people socially ?
having friends in going out to friends
going to a club or society going to the pub
- 6 How many evenings do you expect to spend doing public work ?
sitting on committees helping to run things
- 7 Do you feel you know as many people as you would like ?
- 8 If you have lived in different places at different times in your life how long would you say you had taken to get to know people well enough to feel you belonged to the community ?
a few months a year three years more
- 9 If a social club opened in your neighbourhood that all your family could join, and offered all sorts of activities, do you think you would join ? Who would you want to run it ?
Local Authority business firm social service organisation
- 10 What would you consider a suitable distance to live away from the following ?
work shops school social club open country

(a) *The decay of social life.* In the Middle Ages, as we have seen before, a town of 10,000 inhabitants was a great city : now, nearly half our population lives in towns of more than 100,000 inhabitants. (See Fig. 32, p. 321.) The ill-effects of living in large masses are dangerous because they are insidious. It is a fact that in American towns of more than 50,000 inhabitants the population fails to reproduce itself : an urban existence seems to suck the life out of that ancient institution, the family.

At bottom the trouble seems to be that when small communities merge together into large ones they tend to lose their coherence and vigour. New types of groups certainly spring up ; but they tend to be based on specialist interests : football clubs, musical societies, Rotary clubs. This means that the less active and socially conscious members of the community are apt to get left high and dry ; the

SOCIAL STRUCTURE AND HUMAN CHARACTER

community life which formerly rested on the fact that a number of families lived close to one another, and which therefore included everyone, dries up because the brighter spirits of the locality take themselves off to their specialist groups. We find support for this view in a report from America : in a particular small town of 1,500 inhabitants ' the average adult had a speaking acquaintance with about one-fourth of the people in town, and knew by sight, name, or reputation approximately nine-tenths of all the grown-ups.'

Thus we find the large town constantly attracting the most energetic members of surrounding smaller places for the sake of its broader outlook and stimulating contacts, its more abundant opportunities and the amenities that it can offer in the way of shops, schools, amusement, clubs and so on. But the less vigorous children of succeeding generations drop out of community life and go to the wall.

Unless, therefore, the traditional community life of the locality is unusually vigorous we find a gradual disintegration into isolated fragments, apathetic and irresponsible.

Let me quote an account of a typical family that joined the Peckham Health Centre in London :

' Mr and Mrs X had been married seven years and had two children aged four and two. The wife was fat . . . dressed in slovenly clothes, was suspicious, diffident and negative. The husband was overweight, irritable with his wife in private, in public alternating between over-confidence and shyness. . . . Before marriage the husband had been a keen boxer, used to go to " the Club " three nights a week, had several men friends and was a swimmer—all of which had been foregone since marriage. The wife had been a shop-assistant and had never helped in the dignities of the house before her marriage. Now incapable of achievement—still less of adventure—in housekeeping, cooking or in any social direction, she had no sense of home-making and no friends. She had been ill during her first pregnancy, injured at the confinement, and had " never been right " since. She was incapable of managing the children, the elder one, aged four, being already beyond her.

‘What had been their life together since marriage? The husband, a van-driver in steady work, got up at 6 a.m., took his wife tea and made his own breakfast before going to work. The wife got up at 9 or 9.30 and gave the children their breakfast about 10 o’clock. She cooked a desultory dinner of one course; walked up and down the shopping street three or four afternoons a week with the baby strapped into the pram, the elder child dragging beside her; went to the park once a week, speaking to no-one and coming home early because the elder child was fretful; knew no-one except for a passing acquaintance with the grocer’s wife round the corner, and her in-laws, with whom she was on the defensive and did not find herself in sympathy. The husband came home to a hotted-up meal, stood for half an hour or more beside the cot of the elder child—who refused to go to bed or to sleep if he were not there. So at 9.30, or later, he went off to the billiard hall for a little recreation or to the pub till closing time, leaving his wife to see that the children came to no harm. . . .

‘So all this husband had done since marriage was to work. And for what? Both he and his wife were disillusioned; life to them had become stagnant. There are no sensitive tentacles nor lively growing points from such a home, feeling and thrusting their way bit by bit into the nearby environment; tasting, testing new experience and affording a continuous flow of nutriment for embodiment in that home.

‘[This picture does not] stand out vividly by reason of [its] rarity. Varying but slightly in detail, this story of early married life is repeated with *monotonous regularity*. It is however the final chapters only that are generally known, and they are to be found written down in full in the notes of doctors, psycho-pathologists, almoners, social workers, child guidance specialists, magistrates, probation officers, solicitors—all of whom are continually encountering every form of chronic and acute disease and disorder in the home; disharmony, neurasthenia, inebriety, ‘suburban neurosis,’ causes for divorce, parental neglect or incompetence, the

SOCIAL STRUCTURE AND HUMAN CHARACTER

difficult child, the young offender ; suspicion, retreat and anti-social behaviour of all sorts. . . .

‘Here is the story of Mr and Mrs X, the family cited above, once they became members of the Centre. The father joined the boxing club, boxed and within four months was found instructing a group of boys. At the first family consultation the mother was referred to a gynaecologist for her disorder to be adjusted. Thereafter she went to the “Keep Fit” class, learnt to swim, meeting various people and becoming friendly in the course of her struggles in the water. Both husband and wife lost weight, moved about more briskly, looked healthier ; eventually both played badminton together with their friends, and built up a social circle of their own, coming out perhaps two evenings a week. . . .

‘It must be emphasised . . . that these changes towards more healthy action which occurred as a result of membership of the Centre were *unassociated with any change in the wage level or other economic factor operating upon the family.*’

I do not think the picture is over-drawn. For one thing, people are more nomadic than is often supposed. Half the families that lapsed from membership on the Peckham Health Centre did so because they got jobs in other places, or moved for other reasons. In America one person in three no longer lives in the State where he was born. Again, it is a real difficulty for a young married couple coming into a new district to get to know people. The rituals of paying and returning calls have dropped out of use ; and open social centres are few and far between. Hence the ‘suburban neurosis’ which is found among the socially starved young wives and mothers whose husbands go out all day, leaving them with little company, little to do and little to live for. Similarly, men with an intensive academic training often appear to drop out of the common life.

In short, the cement that holds people together in stable groups is crumbling. Thus the growth of scale in modern civilisation produces parallel effects in industrial organisation and in city life : in both cases the little knots of people among

whom we live or work seem to lose their stability and coherence and vigour, and we ourselves to lose both our sense of being rooted in an enduring community and our faith in life.

The position is not good in Britain ; but it appears to be worse in other countries. The contrast, in fact, is sufficiently marked for an acute German observer to make the following comment : ' Among all the capitals of Europe London least represents the typical large town. It has remained to this day the agglomerate of a number of communities some of which have almost kept the character of a village. If one looks below the grey uniformity of surface of the northern industrial town the same structure is revealed. The celebrated individualism of the Englishman is at bottom nothing but that manner of life which naturally develops in a small town.' By contrast with Germany the English city dweller still prefers to have a one-family house with a garden to living in a flat, still maintains in many places a vigorous local life. But the cancer of social disintegration is at work here, and we cannot afford to sit back and hope for the best.

(b) *The crisis of values.* Another side to the picture of urban life must be taken into account : the sheer multiplicity of influences that assault and invade the ordinary person. The fact is that while our scheme of interpretation of life has fallen to pieces, the horizon of our experience has enormously enlarged : we are inundated with snippets of life from the whole surface of the globe ; the spate is endless. The first effect of the impact is to fertilise our imagination, to stimulate us to think out a philosophy for ourselves, to broaden our tolerance. But any stimulus repeated often enough will eventually jade our appetite for it ; and our moral and intellectual digestion is overwhelmed by the mass of material we have to assimilate. We seem to be no more capable of disentangling our principles, of discovering a valid perspective, than the African who has lost belief in his tribal tradition. So we find it much easier to know what we detest than what we love with our whole hearts, much easier to find something

SOCIAL STRUCTURE AND HUMAN CHARACTER

to die for than something to live for. As the Mass-Observation investigators report, we often find ourselves 'lost in this wilderness of free opinion.' Certainly the cleavages within Western civilisation go deeper, on every point of belief and value, than has been the case for centuries ; as we can see in the contemporary contrast of the liberal and the communist.

I suggest that one of the causes of the apathy and selfishness for which the modern age is often condemned is just this : that people no longer have any deep convictions, any certainty, as to what the major values of life are. They have lost most of their belief in Christianity and have no clear or coherent scheme of life to replace it.

This crisis of values hits us in other ways. Most of us perhaps retain some belief in the traditional principles of neighbourliness ; but we can no longer see clearly how to apply them. A starving Chinese in a London street would soon get help ; but when it comes to assisting, and even legislating for, millions of men and women in the four corners of the earth—Indians, Jamaicans, East Africans, West Africans, the tribes of Honduras or the natives of the Solomon Islands—we can no longer see how to apply the principles of fair play and mutual aid on such a scale. Even when we bring the problems nearer home, we are apt to find ourselves at a loss in the face of some of the questions of social morality that face us : think of the pros and cons of equal pay for men and women. The principles that govern our private conduct seem to be thrown out of gear when we try to apply them on the large scale demanded by modern society.

Here we can see a cause of one of our most serious failings : the people we know are often, in their personal relationships, as cheerful and kind-hearted as you could well wish. Yet in their collective aspect as responsible citizens taking an active interest in public affairs, and an energetic part in helping to run things locally—well, if we are not already aware how little ordinary people shine at this sort of thing, we can look up the evidence in Mass-Observation's report, 'Puzzled People.'

THE SCIENCE OF HUMAN SOCIETY

3 THE PRICE OF LIBERTY

The implications of the above facts are serious.

The point is this. Every community must, whether it likes it or not, have some form of social control, some form of check on the behaviour of its members.

The first job of public authority must be to guarantee the citizens security against murder, robbery and starvation. Hence the police, the municipal authorities and the other agencies of government. But these have no power unless they are backed by overwhelming force ; and if that force is not supplied by the common opinion and collective action of the whole body of citizens in their common interest, and with a common belief in the supremacy of law over power, it must be provided by military might.¹ A government that is not supported (I mean for the purpose of maintaining law and order) by public opinion has no alternative but to use coercive methods or abdicate. If it abdicates it will probably be replaced by a clique or pressure group that is prepared to use force ruthlessly.

There is a difference between the government's responsibility for public order and its responsibility for the healthy functioning of the community in its economic and other activities. But the same principle applies : when the voluntary worker steps out, the paid official steps in. And if the central government acquires such power as to become a dictatorship, the ordinary man will have extreme difficulty, under modern conditions, in dislodging it.

In a very small community—a village or small town, or even, as in eleventh-century Iceland or the Athens of the fifth century B.C., a whole nation if it is small enough—it is quite possible for all the adults to contribute their view and voice in spontaneous collective action on every issue that faces the community.

But under modern conditions this has become impossible. Yet the inescapable psychological fact remains : democracy

¹ Compare the argument here with that of pp. 250-1.

SOCIAL STRUCTURE AND HUMAN CHARACTER

can only work effectively on a national scale if it continues to function vigorously on a local scale.

We recognise that our national leaders must acquire the habit of judging their problems from the standpoint of the country as a whole rather than of one particular class ; they have to learn to sink individual differences and sectional interests in order to serve the common good. What we often fail to realize is that their attitude and practical acumen depend, first, on their own experience of negotiation and compromise on a smaller scale, before coming into power, and second, on the prevalence of the right spirit and judgment among the people at large. To take a concrete example : the big voluntary organisations like the trade unions and the churches only agreed to compromise on the delicate and controversial question of the Church schools when the 1944 Education Act was being drawn up, because the rank and file had the will to support a compromise and the practical judgment to recognise a fair one.

In short, unless the mass of the people continue to exert themselves in spontaneous joint action on the affairs of the village pump, they will lose, or never acquire, the practical judgment and capacity for collective decision which enables them to control regional or national affairs in the common interest.

Nineteenth century thinkers often imagined that the secret of popular control lay in the vote, the anonymous ballot of the multitude of separate individuals. The referendum or plebiscite was their ideal machinery. They could not understand why parliamentary democracies on the English model collapsed like bubbles on the continent of Europe, and only the British had somehow learned the magic formula that made the system work. The failure of their theories was due to what we might call the weakness of their social psychology : they did not realise that the strength of the British lay not in the machinery but in the vigour of their spontaneous collective life, of their voluntary groups and organisations. The democratic machinery was only a means of translating

THE SCIENCE OF HUMAN SOCIETY

on to the national plane the action that was already vital on a smaller scale.

Where, then, does property as a qualification for democratic responsibility come into the picture? That is a question that I must leave to you to discuss.

4 THE CRISIS OF CIVILISATION

It is perfectly clear that the foregoing analysis is a long way from being fully 'scientific,' in the sense defined in chapter 1. In tracing the implications of the principles formulated in chapter xii, we have found ourselves making an excursion into the study of sociology, the 'science' of the structure and development of human societies. But here even more than in dealing with economics we have had to rely on evidence that is mainly historical in character, and rarely, even when fully established in a number of cases, available in sufficient quantity to make mathematical analysis possible—Toynbee's list of human civilisations only contains twenty-six.

Nevertheless certain features of the modern world situation—the intensity of the latest slump in the Western trade cycle, the rapid expansion of backward populations in Asia, the fall of the birth-rate in the West, the anarchy of codes and values within Western civilisation, the lining-up of the peoples of the world on two sides of a deep gulf, the advent of the atomic bomb—are such serious portents for the future of mankind that the systematic study of the development of human societies or civilisations has become an urgent need. And though in the nature of the case sociology can never be a 'science' in the full sense used here, yet it is important that we should see where our more nearly scientific principles lead us on these great issues, and that we should appreciate the nature of the frontier country of sociology.

(a) '*Civilisation*'—its meaning. Two great questions arise: what is the essence of 'civilisation'? and what is the essence

SOCIAL STRUCTURE AND HUMAN CHARACTER

of the problem now facing Western civilisation? I can only give the briefest of hints here on the two issues.

First we have to decide whether civilisation is to be defined in terms of material wealth and technical development, such as would mark out our own civilisation as a peak of human achievement; or in terms of moral qualities: 'there is no progress but progress in charity.' If the latter, where do the Arapesh stand, or the Jews of A.D. 30? Or is it to be defined in terms of the scale of society? Or in terms of such an abstraction as Toynbee's 'self-determination'? You will need to reach some conclusion on this point before you go on.

Toynbee is one of the foremost exponents of the study of social evolution; and in throwing out one or two suggestions on the second issue mentioned above I shall be making use of his frame of reference.

In his view the growth of a civilisation depends on the successful response of the society concerned to a series of challenges, starting, if we go back far enough, in the challenge of a harsh physical environment, such as a severe climate; passing into the challenge of another human society, such as that of Persia to Athens in the fifth century B.C., or of the Arabs to the Spaniards in the fifteenth century; and being eventually displaced from the field of the external environment to the internal. The problem to be faced now becomes one of internal social or spiritual conflict, such as may arise from over-population, or from deterioration of the masculine virtues.

(b) *The challenge to Western civilisation* Western civilisation is now confronted with several momentous challenges, which can tentatively be summed up as follows:

First group:

(i) *The end of the period of commercial expansion.* Here as we have seen is the underlying cause of the congestion—you might call it constipation—of modern industrial society, with its associated problem of central planning versus democratic freedom.

THE SCIENCE OF HUMAN SOCIETY

(ii) *The accentuation of internal social division*, with increasing bitterness between the classes, culminating in the lining up of the Communists against the rest—and this despite the fact that there is less difference in material conditions than in the last century.

(iii) *The growth of external social division*, with increasing bitterness between the white and dark races.

Second group :

(iv) The technological development that has produced *modern industrialism*, and that has also brought forth

(v) *the atomic bomb* and bacterial warfare.

Third group :

(vi) Technological development has also brought about the *growth in scale* of modern society, which as we saw is one of the main causes of the decay of conviction about values ; and
(vii) *the acceleration of the pace of social change*, which has thrown out of gear the traditional processes of social adjustment.

(viii) *The decay of a well-defined code of civilised values.*

(ix) Technological development owes its origin to *science*, which has itself modified human outlook radically.

(x) The growth of one particular nexus of values and ideas, that of *democracy*.

These are the changes in social structure, in material conditions and in the climate of values, which appear to be responsible for the present world convulsions.

5 THE FUTURE OF CIVILISATION

I have attempted to show what light our methods and principles can throw on the condition of society and its relation to the happiness of ordinary people. Let me now attempt to sum up the implications of the last five chapters in the form of answers to four questions on the future of our civilisation :

SOCIAL STRUCTURE AND HUMAN CHARACTER

- (a) In what direction should Western civilisation now try to move ?
- (b) What is the new ideal of personality to be ?
- (c) What sort of incentives should dominate work ?
- (d) What sort of changes must we aim at in town life ?

(a) *A new direction for Western civilisation*

Very briefly we might sum this up in the following propositions : (i) We must thoroughly explore our own resources and set about re-colonising our land here in our own countries, applying scientific and technical knowledge to the task of making the best use of our derelict industrial areas and neglected farm-lands. This inevitably means much central planning.

(ii) We must apply much more searching criteria in judging new political, social and economic policies. At a first level we must constantly ask ourselves : Will this policy make better men and women ? When the Roman Empire was collapsing, the men who spent money on new roads and aqueducts were less wise than those who endowed monasteries where the great human values could be nourished. So now, when it is a matter of doubt—shall we spend money on equipping schools more lavishly or on training the teachers more fully ?—the human test should be applied.

But this in itself will not be enough. We shall have to go much more deeply into the question of what human nature is, which values come first in our civilisation, and above all how our values should be applied under the new conditions.

This process of *re-interpretation* (to use Sir Fred Clarke's term), though of fundamental significance, is as yet little appreciated. As material and social environment changes, a healthy community's values adjust themselves to the fresh conditions. But this is a slow process : we have seen how great is the momentum, the inertia, of human tradition. It is what I have once or twice referred to as the normal process of value-adjustment. In the new age we shall have to learn to adapt ourselves more quickly, and this can only

THE SCIENCE OF HUMAN SOCIETY

be done if the process of re-interpretation becomes conscious and recognised for what it is. Let us take an example. How are we to draw the line between private neighbourliness, in the style of the Good Samaritan, and the human responsibilities we appear to owe to starving children in the far parts of the earth? In the past we have given pennies to beggars and subscribed to voluntary hospitals; now that beggars and voluntary hospitals are disappearing our duties will perhaps lie in a more active interest in the local body that is responsible for the hospital, or again a keener concern for the welfare of colonial races. Or, again, with the increasing assistance of the State for our children, should our parental affections and ambitions look round for fresh outlets? There are endless such questions to be argued over and thrashed out in the light of the best moral judgment that we can bring to bear on them.

(b) A new ideal of personality

I think four leading characteristics can be specified of our ideal man or woman

(i) He must have an altogether deeper and more whole-hearted respect for moral law than is at present the rule—I mean for such a system of universal values as that mentioned on p. 158. This would involve not only an allegiance to the civilised values of honesty, loyalty, respect for other people and so on, but a realisation that duties come before rights, that whatever anyone else does you yourself are under an obligation to your community to make a solid contribution of hard work and voluntary service for the common good. A lot of people seem to think nowadays that if they work hard, or make other sacrifices, some sinister boss or party in the background will draw the benefit: they refuse to acknowledge their own share in the common responsibility for the ills, and the regeneration, of society. The recognition that you yourself are bound by a universal moral law entails a clear and willing recognition of your own responsibility, and if necessary, guilt. The question is, whether you can be ready to accept guilt or a sense that you have sinned,

SOCIAL STRUCTURE AND HUMAN CHARACTER

without a *religious* sanction for the moral law ; but this we cannot settle here.

(ii) He must have a much more conscious and reasoned attitude to values. This is in fact already rather obviously the case among the sceptics and rationalists (see later, p 295). But on the whole I think it is true to say that those who are most deeply civilised in behaviour and most perceptive in judgment, are not most articulate or sure of the reasons for their values and actions. When social change becomes as vast in scale and rapid in tempo as it now is, it becomes essential for people with a fine sense of values to realise also the rational basis of their judgment, so that they may be better able to achieve the 're-interpretation' that we spoke of in the last section.

(iii) Our ideal man must have a much more fully developed social sense than is now usual, even in Britain. This means he must be able to get on easily with all sorts of people, and be ready to take an active part in local group functions, both at work and at leisure, so that he may develop a fuller awareness of his community and a determination to see that it is run in the interests of the basic human values.

(iv) He must have a many-sided personality—he may be a financier who grows champion leeks ; a fitter's mate who sits on his factory's Joint Production Committee ; a man who keeps a sweet shop and plays Beethoven quartets in the evening ; a highbrow critic who enjoys a game of darts at the pub and can get on with the fitter's mate and the financier.

In a complex modern civilisation jobs are bound to be specialised and the various sections of the community to be highly differentiated ; and if the cohesion or integration of our society is to be regained, the moral unity of (i) and the wide social contacts of (ii) must in my view be supplemented by a new emphasis on versatility. This will also help us to become more quickly adaptable to changing social conditions and to overcome the tendency to stagnation which may ensue in some departments of life when social and economic security become more general.

THE SCIENCE OF HUMAN SOCIETY

(c) *New incentives to work*

We have seen that Capitalist monopoly and unemployment are being followed everywhere by State monopoly and full employment : the policy of nationalisation of major industries is part of a world trend towards Government control and planning of economic effort. Will people work hard without the attraction of profit or fear of the sack ? What conditions and incentives must operate to get the world's work done ?

It looks as if Capital will have to be willing to sacrifice high profits to stability and the sense of serving social need. This is not to say that all profits should be cut out ; on a small scale, where the owner of the capital is the man who runs the business and carries the responsibility, the advantages of this system appear to outweigh the disadvantages. But it can no longer be relied on as the mainspring of the productive process as a whole. Labour equally will have to be prepared to work hard without the threat of poverty or unemployment, to measure wage demands by productive results. This will require a spirit of responsibility and self-restraint on the part of the trade unions.

What about incentives ? Three may be mentioned here :
(i) A great extension of the joint consultation principle in industry and other places of work. In chapter xvii I argued the case for this change from quite a different angle : there we were concerned with the question of making dreary and unsatisfying work yield some nourishment to the human spirit ; now our concern is with finding drives that are sufficiently powerful to produce the goods and services the world needs. It has repeatedly been shown in Britain and the U.S.A. that high productivity in a firm is associated with a spirit of co-operation and consideration. The Tennessee Valley project, one of the great experiments of democratic civilisation, has demonstrated how not only production but vitality and enterprise go up by leaps and bounds when you succeed in enlisting real ' citizen participation.'

(ii) One of the most notable features of war is the way people get down to a job when they have a clear and urgent goal before them. Beveridge has suggested that we ought to set

up a comparable goal in peace—that we ought to launch a crusade against the evils of Want, Disease, Ignorance and Squalor. In backward countries the standard of living and of literacy can be raised together as part of a single drive towards better social conditions. (See pp. 174-5.) These schemes are important: they fit in with what we noted in chapter xvi, that many people are stirred by the realisation that they are embarked on a great project, that what they do really counts. But as we saw on pp. 188 and 189, the percentage of the population that will respond to this kind of appeal is likely to be small.

(iii) Perhaps the crucial factor, however, is the right leadership at all levels. Without the right leader a crusade may be a fiasco; which is worse than no crusade at all. Leadership in a democracy is a subtle art. Before you read on you should try writing down the qualities that you would like to see in your employer; and the ones that you try to exercise when you are in a position of leadership. In the first place you need at the very top a man of sufficient personal stature to stir the imagination—a Churchill or a Roosevelt; all the way down the line you want a man who knows his own mind and will do the chief job of a leader, which is to lead. In the second you need a man who is alive to the feelings and aspirations of the common citizen and has a natural bond with him, and knows intuitively just how fast he can take him along the road he should go. Mass-Observation's reports on the common reactions to Government posters and information show the gulf between Whitehall and the man in the street. In the third place you need somebody who has a flair for chairmanship, a man who is responsive to other people's ideas, and has the capacity for integrating a crowd of conflicting personalities into a harmonious team.

These are qualities not often combined in one man, and they are needed in factories and offices just as much as they are in the Government.

CHAPTER XIX

SCIENCE AND CIVILISATION

I THE FIELD AND BOUNDARIES OF SCIENCE

It is time to draw together the threads of my argument. In this book I have been trying to do two things : to trace the meaning of science for human society (*a*) as a method of *investigating* the nature of human beings and their society, and (*b*) as a method of *meeting human needs* by offering prescriptions for overcoming human ills. Let us see what sort of conclusions we can formulate as to the scope and limitations of scientific method.

(*a*) Science as a method of investigation

(i) We have seen that, by adapting scientific method in a suitable manner, it is possible to reach many valuable conclusions on human nature and human society.

A useful distinction is that between the clinical approach and the laboratory approach. The former deals, as we saw in chapter I, with individual case-histories in real life ; such as those quoted from the psycho-analyst's casebook, or the studies of the Arapesh and Mundugumor, or the examples of projection quoted in chapter VIII, or a number of the instances quoted in our discussion of satisfaction in work. In many cases such observations are sufficient to *establish* some fact about human nature—that some process does actually occur. It then serves as a pointer to more extended, or to more intensive, investigation : more intensive, under controlled or experimental conditions ; more extended, in the manner of operational research, where the amassing of a large number of observations permits the use of statistical analysis. In any case the application of mathematics must always be on a statistical basis ; and this means that the results of measurement can never be couched in more

precise form than 'the odds are x to 1 that the result will lie within y per cent of z .'

(ii) On the other hand, we have also seen that on a good many subjects scientific method cannot even within statistical limits *establish* conclusions for us. In some cases this is because the method has not been sufficiently developed to yield clear-cut results; Operational Research methods, for example, have only recently been elaborated. We can certainly look forward to great advances in our knowledge of the social and psychological conditions of high industrial productivity.

But I think I have also sufficiently shown that on certain kinds of problem science is incapable of giving us established conclusions; and this not because of the inadequate development of method but by virtue of the nature of the problem itself. Science can help us to measure the effects of intelligence: it cannot tell us what intelligence is. It can measure the conditions of high productivity: it cannot measure the depth of your personal satisfaction in your job. It cannot tell us what the ultimate values are; nor can it tell us what leads civilisations to grow and die. These are matters on which we can get evidence to *support*, but not to *establish*, our theories.

There are two different reasons for this failure. In the first place there is the shortage of historical material, which makes it impossible ever to apply statistical analysis to (say) the causes of the decline of civilisations. In the second there is the kind of difficulty we discussed in chapter XII, particularly p. 151. Science always asks the question: How are these events connected with other events? What sequences are there? It cannot therefore show any ultimate reason why, for example, the Arapesh way of life should be regarded as 'better' or 'worse' than the Mundugumor, or why human nature should be 'fulfilled' at all.

(b) *Science as a method of meeting human needs*

It is well known that science can help to increase production of food and manufactured goods by technological improve-

THE SCIENCE OF HUMAN SOCIETY

ments. We have good reason for believing that it can also help in ways that are as yet scarcely appreciated : 'as, for example, in military tactics, in the sphere of industrial productivity, on the subject of democratic and authoritarian methods of government.

2 SCIENCE AS A HUMAN ACTIVITY

This book would not be complete without some reference to the human implications of the fact that science is one of the many activities to which men give their lives, and one that has during its short history gained prestige as a vocation or profession at an increasing rate. Several aspects of its influence call for attention.

(a) Science as one among several methods of ascertaining truth

Truth can conveniently be divided into three sections : truth of fact, truth of value, and truth of logic.

We have already distinguished historical from scientific truth. Both belong to the category of truth of fact. We should, in addition, not forget that a man may perceive the truth, say, of the workings of another person's mind, without being able to express, let alone substantiate, his interpretation. In other words, truth of fact ranges from established scientific and established historical fact to facts that are truly perceived but unsupported by any publicly available evidence at all.

Truth of value may refer to moral or to aesthetic value. I think it will be generally agreed that one person may appreciate the application of moral principles more justly than another. One man will approve while another condemns the German action of bombarding a Spanish coastal town in reply to an attack on her own warships during the Spanish Civil War. The judgment may be based on habit, or it may be based on a keener insight into human nature and its moral needs : in the latter case I would say the understanding of *moral principle* is properly called 'true.'

I think it will probably meet with general agreement if

I suggest that the parable of the Good Samaritan expresses some 'truth' about human nature.

It may not be so readily conceded that music may express some 'truth.' Words are symbols for things, for relations and for human responses ; and it does not seem unreasonable that musical notes should also be symbols for responses to the outside world. Beethoven's Fifth Symphony might then be interpreted as the ebb and flow of argument, in musical symbols, as a man faces the challenge of fate—'So fate knocks at the door' wrote Beethoven at the top of the score. Is it legitimate to use the word 'truth' of such a symbolic presentation ?

Truth of logic is illustrated by the statement that two and two make four, or that if all bogytes are tackriches, and all tackriches are banting, then all bogytes must be banting (see example on p. 80). The truth of the conclusion depends on the truth of the assumptions ; but given certain assumptions, such as those of Euclid's geometry, then a vast structure of conclusions may be erected on them which are true *when the assumptions are true*.

(b) *Direct effects of science on human thought*

Four main influences can be traced (Before you read the remaining sections of this chapter you should note any effects of science that you can think of yourself, on the thought and values of ordinary people)

(i) It is obvious that science has built up a picture of the material universe which is fundamentally different from that current in pre-scientific times. The physical world is seen to have a range of size which far exceeds the reach of our imagination. It is impossible for us to grasp in any vivid way the statement that a flash of light would take 1,400 million years to travel across the universe of stars, or that an electron weighs $2\frac{1}{2}$ thousand-million-billionths of an ounce.

The living world, too, is pictured in quite different terms. The idea of evolution has revolutionised ordinary conceptions of human history : we no longer look backwards to a golden age in the past or tremble to think that Judgment

THE SCIENCE OF HUMAN SOCIETY

Day may arrive in a year or two's time. The human body is now usually regarded as a physical machine whose health is a function of food and exercise rather than as a mysterious entity susceptible to magic potions or witches' spells.

It may be objected that the man in the street, even the educated man in the street, is quite ignorant of the specialised conclusions of highly abstract branches of science. On details, this is true enough : the educated man is certainly not conversant with the diameter of the galactic system. But the important thing about this characteristic world-view is not so much the detailed conclusions as the assumptions that it is built on : that there is a universal order in nature, an order based on a mechanical sequence of cause and effect. The immense spread of this assumption in the Western world is the second effect of science on human thought. Let us look a little more closely at this axiom or dogma of science.

(ii) What I am saying is that there has been a great spread of the assumption that the natural world works by a law of its own kind, a mechanical law. Comets and eclipses are no longer regarded as portents ; we take for granted that they occur as a result of regular causal laws operating quite automatically. This new attitude is accompanied by a general increase in scepticism. Scepticism is a broad word ; here I mean a tendency to discount the supernatural. We do not easily recognise any stable reality outside or above the processes that we can see working themselves out in time. There is no place for any transcendent reality, let alone a personal loving God, in a universe which can be fully explained in terms of mechanical cause and effect.

So our picture of the universe is fuller and richer in a material sense, thinner and shallower in a human, moral sense : heaven has been replaced by an ocean of empty space interrupted at vast intervals by masses of incandescent gas ; hell has given way to a core of heavy substance inside the earth's wrinkled crust. The effect on the human imagination is immense. Not only do the heights and abysses of human experience level out into a series of hummocks and

dips but pain and suffering lose moral significance. From having once been regarded as a magical consequence of sin, or as a discipline imposed by a loving God, they have come to be felt as sheer frustration.

So much for the second influence that I ascribe to science—the spread of the belief in a mechanical order of nature. The third is closely connected with this : it is the effect that science has had on the criteria by which we judge evidence.

(iii) In chapter 1, I pointed out that the outstanding characteristic of science to the lay mind is its *certainly*. It is this that has given it its prestige, and it is this that has had such a profound effect on conceptions of evidence and proof among reflective people. We expect a much higher standard of evidence for anything we believe than was formerly the case : we no longer, for example, believe the travellers' tales of unicorns which were still credited by our opposite numbers in the eighteenth century. Similarly we demand much more precise and conclusive evidence for important events of the past : we are no longer prepared to commit our lives to the exacting and uncongenial discipline of Christianity on the strength of the available historical evidence. This is not universally true, of course, but it is the general tendency among thinking people. It is closely related to the scepticism that I have already mentioned. But whereas scepticism has been a feature of the later stages of pre-scientific civilisations, arising out of frustration and apathy, the demand for conclusive evidence is something new. It is in my view derived from the certainty achieved by science, especially the physical branches, and it gives a much more solid ground for scepticism.

To my mind the scientist's scepticism is often misplaced : he judges human problems by criteria derived from the physical sciences, and sits on the fence because he will not commit himself without demanding a degree of certainty which is impossible of attainment. Periodically, however, there are revulsions against excessive scepticism. The existentialist movement, for example, insists that decisions

and judgments in everyday life have almost always to be based on inadequate evidence, and that to apply the standards of evidence customary in physical science to our ordinary actions would be to leave us paralysed.

On the other hand there is a school of thought among the scientists which would regard itself as allied to the existentialists. Thinkers of this school would take the line that no practical scientist systematically follows the process neatly described by the logicians as observation—inference—hypothesis—verification. Rather he gets a hunch about the solution of a problem and tries it out ; and then another, and another, until he finds one that works. The hunches rarely have any strong support when they are first tried out. Darwin's family used to laugh at the absurd experiments he devised to check the theories that flowed from his fertile imagination. The scientist's willingness to try out his hunches is accordingly to be compared to the ordinary man's willingness to make the endless decisions of everyday life on inconclusive evidence. The argument usually insists that the scientist's final conclusion has no ultimate certainty : even a Newton is eventually superseded by an Einstein.

But there are two serious flaws in this argument. In the first place, as I have emphasised before, the ordinary man's chief impression of science is not its ultimate uncertainty but its immediate practical certainty : he takes it for granted that the electric light will go on when he flicks the switch, or that if it doesn't there is a perfectly definite and traceable cause of the breakdown. The second fault in the argument is its failure to recognise the gulf between a decision on a small matter of action—which bus to catch into town, for example—and a decision to commit your life to the service of an all-embracing creed, such as that of Communism or a Christian Church. The scientist may be ready enough to try out his hunches without being willing to make a decision on any of the major issues of life. Or, to be more precise, if he does commit himself to a creed this often seems to narrow itself down to an obsession with material betterment. He appears

SCIENCE AND CIVILISATION

to regard the sole purpose of life as the improvement of material conditions.

Such a view is the natural accompaniment of the loss of belief in a reality transcending our material existence. When suffering is felt as sheer frustration it is liable to give rise to a wild casting round for satisfaction, and technology, having given success over material things, is seized on, as a 'lucky' fishing rod or cricket bat is clung to by a failing sportsman, as the only salvation. Finally it elbows out every other belief.

We must learn to see the 'certainty' of science in its proper perspective. In the physical sciences, it is true, most results have a very high degree of assurance. But outside the physical sciences the certainty of the conclusions grades away through the reasonably high probabilities of much biological work to the moderate sureness of many psychological results, and thence to the highly debatable generalisations of a Toynbee on the processes of growth of civilisations. Where the data cannot be measured—as in ethics, the study of good and evil, or where the conclusions have to be based on historical rather than scientific evidence, in the strict sense I have already defined—there we can have no certainty. The great questions of life are all concerned with matters where no certainty can be reached ; and I can hardly over-emphasise how important it is not to apply the principles of water-tight proof we learn in the physical sciences to these issues. For if we do we will either misjudge the issue or mistakenly suspend our judgment.

(iv) A fourth effect of science in the realm of thought has been to lead men gradually to assume that the fundamental reality is matter rather than conscious personality. This is another result of the amazing success of the physical sciences ; but it has tended to produce two alternative results. Men with stable and well-developed personalities have tended to regard science as an intellectual pastime or a servant of industry ; those who have found difficulty in their personal relationships have tended to interpret all experience in terms of the principles of the physical sciences and

THE SCIENCE OF HUMAN SOCIETY

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THE SCIENCE OF HUMAN SOCIETY

to lose sight of the fundamental reality of conscious personality.

Here we see four ways in which science has influenced our conscious thought : how has this influence passed to those half-articulate assumptions that we live by ?

The new picture of the stellar universe has in itself perhaps not had a very large effect. The picture of the evolutionary process has on the other hand profoundly modified our attitude to change. The idea of evolution may itself have grown out of the experience of technical progress, but it has certainly reinforced the assumption now widely current among people with a scientific training that change is good, resistance to change bad.

The spread of the belief in a deterministic or mechanical universe has had an incalculable influence on religious belief : the great majority of educated people of today regard miracles, in the sense of God's interference with natural processes, as superstition. This inevitably means that the belief in Christianity as a supernatural religion weakens ; Christianity comes to be regarded as an idealistic system of ethics with no compelling historical or rational sanction. We no longer feel any *obligation* to do good and eschew evil ; in fact we are recommended to read up the Great Religions of the World and pick out for ourselves the ethical principles we think will suit us best. The idea of an objective moral law to which man should conform evaporates, and with it the conception of any purpose or discipline in life beyond what is imposed by our immediate circumstances.

But to my mind by far the most significant and dangerous effect of the loss of belief in a supernatural reality is the altered attitude to pain and suffering. When these are no longer regarded as part of the pattern of life imposed by spiritual agencies, whether a polytheistic tribe of gods or a single supreme Deity, they quickly come to be ascribed to the influence of bad men. And since human life, at any rate up to the present time, is full of contradictions and frustrations, these are certain, if they are not ascribed to the inscrutable purposes of heavenly figures, to generate hatred

between men. In our own country we still preserve a tradition of mutual confidence and kindliness ; but it is impossible to doubt that this has weakened in the last few decades, and it is plain as a pikestaff where distrust and hatred in the world at large are leading us. It seems to me to be clear that the theoretical assumptions about the nature of the universe brought in by science have weakened the spontaneous cohesion and co-operation of Western society.

(c) *Direct effects of science on moral outlook*

I suggest three main influences : first, a scepticism about traditional values ; second, an encouragement of self-reliance ; and third, the fostering of a regard for truth for its own sake. Let us take these in turn.

I have already referred to the scepticism that discounts what cannot be seen or touched, and debunks traditional views of man and the universe. It is accompanied by a scepticism about traditional values. The scientist tends to regard values as 'unproved,' as indeed they are : you cannot 'prove' that justice is the highest virtue in the way that you can 'prove' the formula for the time of swing of a pendulum. The scientist's attitude to values is, like his attitude to his hypotheses or hunches, pragmatic : he tries them out, and if they seem to 'work' he carries on with them. But a pragmatic test of morality is a dangerous thing to lean on ; for its result depends on the moral quality of the society you live in. It may help to loosen the grip of obsolete habits in an over-rigid tradition ; otherwise it merely knocks away the supports of all absolute values. The lack of recognition of an over-riding moral law tends to displace idealistic effort from the pursuit of goodness to the pursuit of knowledge or technical skill. This results in a narrowing of moral insight : we begin to take for granted that our own moral principles are the right ones, our own moral condition sound. We begin to assume that morality is a skill that can be learned as straightforwardly and completely as a technical skill.

To be fair, however, we must again remind ourselves that science is not to be held wholly responsible for an attitude

THE SCIENCE OF HUMAN SOCIETY

of mind which has appeared in the declining stages of every civilisation ; the special effect of science has been to set up a plausible intellectual principle as a sanction for this moral scepticism.

A second direct effect of science has been to foster self-reliance. Partly this has been due to the exclusion of the supernatural element from our daily calculations : we no longer have the confidence in God's existence, let alone his interest in our doings, so we have only ourselves to rely on. In part the vast extension of our power over nature which has been given us by science has encouraged our confidence in ourselves. We have oranges all the year round and light all night if we want it. We can decide for ourselves whether we will have children or not when we marry. Behind this particular form of the moral influence of science has been the development of economic organisation in Western Europe in favour of private enterprise.

Self-reliance is, in its place, a great virtue. It encourages a sense of personal responsibility for one's destiny which is at the foundation of all higher morality. But if it is carried too far it passes over into what the Greeks called 'hubris,' the pride that goes before a fall. In former times we were under the inescapable discipline of nature, of the round of seasons, of the natural fertility of the soil and of living beings. At every turn our ancestors were faced with mysterious forces they could not control. Now we are emancipated (Heaven help us) from these checks ; we have far more power over the material details of our lives ; and, as we are often reminded, all power corrupts.

The two effects of science that I have just mentioned are considered good by some, bad by others. The third influence can hardly be regarded as anything but good by anybody brought up in the Western tradition : this is its encouragement of a regard for truth for its own sake. There are many well-known instances of the scientist's fight for truth at any cost. I need only mention the X-ray research workers who have willingly risked the loss of limbs, and even lives, in the pursuit of truth. The service of science has

SCIENCE AND CIVILISATION

undoubtedly fostered such virtues as integrity of judgment and candour.

In addition, good research teams have shown themselves capable of a very high order of willing co-operation, and other qualities, such as mutual forbearance, which we might regard as characteristic of a free civilised society.

In this respect the scientific research centre may, if it is situated in a community of alien and uncivilised outlook, exert the kind of moral influence that a monastery produced in the Dark Ages, acting as a point of ferment in a dead mass. But the position of the research centre would be more precarious, for it is dependent on technically efficient workers. The implication is, that if the scientist wishes to continue to work under congenial conditions he must contribute his own effort towards ensuring that the society he lives in maintains values that favour the disinterested pursuit of truth.

(d) Indirect effects of science on human outlook

By far the greatest effects of science on men's outlook have been effected through the technological revolution of human life brought about by its agency.

This has been one of the recurring subjects of this book, and all I will do here is to list the main types of influence :

- (i) The growth of scale of all communities other than the family.
- (ii) The acceleration of social change, with the consequent throwing out of gear of normal processes of adjustment of outlook.

From the above we can see flowing such consequences as a growth of irresponsibility and a decline of spontaneous co-operation in industrial countries, an increasing difficulty in applying moral principles to social questions, and an increasing difficulty in adapting moral habits to social change.

These features of modern civilisation are either new in human history or intensified by new forces. They constitute the challenge to the twentieth century which may wreck our

THE SCIENCE OF HUMAN SOCIETY

civilisation or stir it to greater achievements than any of the past. The new force that came into the world with the birth of Christ was nourished by the decay of the civilisation of Greece and Rome. Its own two lustiest children have been the idea of democracy and the idea of science, its grandchild industrialism, its great grandchildren the family of social evils we have talked about. In this book we have seen that science, properly handled, can help us greatly in the understanding and overcoming of the challenge that faces us. But we have also seen that the operative word in the above sentence is 'properly': it is no good to ask science to do too much, or to ask in the wrong way. Science can of its very nature yield no conclusions on the ultimate nature of human civilisation or of good and evil; for guidance on these subjects we must turn elsewhere.

PART THREE
STUDYING A COMMUNITY IN ACTION

Suggestions for a Practical Course

(A) HOW THE MATERIAL NECESSARIES OF LIFE ARE PRODUCED

I HAVE already insisted on the importance of balanced first-hand study of the life of our local community. Its activities can be divided into two branches : first, producing the material necessities of life, such as food and shelter ; and, second, conducting the public affairs and common life of the district. In these last two chapters my aim is merely to make suggestions for planning a series of local studies and to point out some of the more important things we ought to look out for on our visits. The rest of the present chapter will be occupied with the first category mentioned above.

I FARMING

Farming is the basic industry, for food is the first of the material necessities of life.

To get to know something of the farmer's outlook and problems without living and working on a farm is probably easier than to get a similar understanding of any other industry. Probably the majority of people in Britain have gardens. Many schools have a Young Farmers' Club ; some have their own miniature farm. A very large number of people have lent a hand with the harvest at some time or other. All this experience helps.

It is still, however, advisable that you should ask one or two sympathetically disposed farmers in your neighbourhood to conduct you round their farms, at different times of the year. In my own district, near Worthing in Sussex, you find several different kinds of farming going on side by side : one man takes advantage of the high sunshine average and the fast train service to London to practise intensive market-gardening, growing tomatoes and mushrooms on a large scale ; another specialises in pedigree Guernsey cows and high-grade TT milk ; a third devotes his attention mainly to wheat and barley.

STUDYING A COMMUNITY IN ACTION

It is essential, when you go round a farm, to arm yourself with a notebook and a battery of questions. You will want to know something of the following :

(i) What size is the farm ? What is the soil ? What acreages are devoted during a normal year to crops and to pasture ?
(ii) What crops are grown ? What acreage of each ? What rotation does the farmer practise ? What time of the year does he sow and harvest these crops ? How does he maintain the fertility of the soil ?

(iii) What stock does he keep—dairy cows, bullocks, pigs, sheep ? Does he breed them himself or buy and fatten them for re-selling ? What is the inter-relationship of stock and land and crops ?

(iv) How many employees does he keep ? Where do they live ? Does he do any other work himself which takes him away from the farm ? Or is the farmer himself a bailiff for an owner who lives elsewhere ?

(v) What sort of changes has he made in his farm system in the last ten or fifteen years—in amount of corn, potatoes, sheep and tractors, in his market-town, his number of employees, and so on ?

These are questions which the farmer, if he is sufficiently interested in the inquiring layman to take you round his farm, will probably be pleased to answer in full. Let me show you the kind of answers (though much shortened) that I was given on an expedition to a farm in Sussex.

The farmer owns about 900 acres of land on the slopes of the Downs overlooking the River Adur. Of this he ploughs about 700 and keeps 200 for pasture ; the underlying rock is mainly chalk and on the upper slopes of the farmland the soil is usually regarded as too thin and poor to be worth ploughing. He reckons to grow about 100 acres of wheat and 70 of barley (for selling), 80 of oats, 30 of mixed corn called ' dredge,' 100 of hay, and 10 of mangolds and kale (for cattle feed), 30 of potatoes (for selling), and 85 acres of rape, vetches, etc. (for sheep fodder). The rotation is : oats or barley ; hay ; wheat ; roots and rape. The greater part of the corn he sows in October if he can, but some of the

HOW THE NECESSARIES OF LIFE ARE PRODUCED

oats will go in in the spring, as it will ripen later and spread the harvest over a conveniently longer period. The roots and rape and kale will go in from March to July. The hay he cuts in June, the corn between the middle of July and the end of August according to the season, and potatoes between the middle of August and the end of October.

A further 200 acres are ploughed up for 'leys' (pronounced 'lays'). A farmer will nowadays very probably have three kinds of grass on his farm : permanent pasture, which will consist of water-meadows near a stream and rough hillsides too steep to cultivate ; fields that have just borne a crop of oats or barley or wheat and are sown with some species of rye grass or clover or sainfoin to be cut for hay ; and leys, which are fields that have very likely been permanent pastures formerly and have been ploughed up, sown with special grass and used for hay and pasture for three to five years.

The cattle on this farm consist of a dairy herd of 60 cows, mainly black and white Friesians, and 70 young Friesian heifers and calves to go into the dairy herd, with two bulls from which the farmer is breeding up his own TT herd ; and about 50 bullocks which he grazes on the Downland pastures up to two years of age and afterwards fattens up on the water-meadows down by the river for the market. In the summer he grazes his cows mainly on the water meadows ; and in the winter he supplements the poor grass with hay, kale, dredge corn, and oats.

He also keeps about 450 sheep, which he breeds himself. He grazes them on the fields of rape, vetches, rye grass, etc., so that he gets this acreage manured by the sheep each year. As he also gets about 60 acres manured from the farmyard, he reckons to get the whole of the ploughed land done once in about four years. He also uses a good deal of chemical fertiliser.

He usually employs about fourteen regular men at the standard wage. A few who look after the stock earn higher pay. Some of them live in cottages on his farm, some in neighbouring villages and one or two farther off. The

STUDYING A COMMUNITY IN ACTION

farmer himself is a member of the West Sussex County Council and the West Sussex War Agricultural Committee, and takes an active interest in the local Young Farmers' Club.

Since 1939 the chief changes he has made on his farm have been (i) the virtual extinction of his flock of 1,500 sheep during the war as a result of Government policy (he is building it up again now) ; (ii) an increase in the amount of land he ploughs, from 200 acres in 1939 to nearly 700 in 1947 (the 200 acres he used for corn for selling, since although he specialised in breeding bullocks and sheep, yet he used mainly imported foodstuffs for their winter diet) ; (iii) an increase in his number of employees from twelve to fourteen, accompanied by an increase in mechanisation, necessary to meet the much larger labour requirements of 700 acres of tilled land.

2 MANUFACTURING INDUSTRY

There is a far wider variety of factories than of farms in an industrialised country. There is, however, a general pattern to which they all conform : they have to procure raw materials, to employ managers and skilled and unskilled workers to make their products, and to sell their goods at a rate that will pay.¹

Let me quote to you the kind of answers I received to questions on the above points on a visit to a neighbouring cement works.

Portland cement is made from two raw materials, chalk and clay. The former is obtained from a large quarry across the road from the main buildings of the factory, the latter from a clay-pit a few miles away. The existence of the two within a short distance of each other, and adjoining a railway, is the reason for the location of the cement works at this spot.

The central process in the manufacture is the roasting of the raw materials in a kiln, during which they undergo chemical transformation into cement. If a uniform product

¹ In so far as farming is an industry, the same applies there too.

HOW THE NECESSARIES OF LIFE ARE PRODUCED

is to be obtained the raw materials have to be purified and intimately mixed in fine particles before roasting. The first stages of manufacture are therefore concerned with the crushing, sieving and mixing of the chalk and clay, which are carried by a current of water through a series of mills and filters. The final 'slurry' has the consistency of cream, and is fed in at the upper end of a huge rotating kiln. This is a steel cylinder about 160 feet long and 8-9 feet in diameter, whose axis slopes down at a small angle. At the lower end powdered coal is blown in with air and fired, producing a temperature of 1,500-1,600 degrees Centigrade. The kiln-house, as you can imagine, is never cold in the severest winter. The quantity of coal used is large, large enough perhaps to make coal count as a third raw material.

The cement falls out near the lower end of the kiln as a small hard grey clinker, which is air-cooled in a second rotating drum about 60 feet long. The lumps of clinker are mixed with a little gypsum and again crushed, and the powder mechanically packed for sale.

The chemical constitution of the cement is of prime importance, and samples of the slurry and the cement are taken at regular intervals for testing in the chemical laboratory. The manufacturing process thus requires (a) the relatively unskilled labour of the men who quarry the chalk and clay or load the cement ; (b) the skilled electricians and fitters who maintain the electric motors (run off the Grid) and the machinery, and the men who control such processes as the firing of the furnace and the consistency of the slurry ; (c) the technical staff who check the chemical composition of the cement ; and (d) the executive management who run the factory for the large firm of which it forms a branch. Altogether the employees at this works number about 110. A shift system is worked because continual shutting down of the kiln would waste a very large amount of heat.

The works runs a recreational club for employees, and the great majority belong. Facilities for football, bowls and other games are provided, as well as, for example, reading matter on Current Affairs.

STUDYING A COMMUNITY IN ACTION

This factory is a branch of a large company, and it is instructive to see what happens to the profits of such a firm. Below appears the Consolidated Profit and Loss Account for 1945 of the main firm together with those of its subsidiaries. The figures are approximate.

Combined Gross Profit	£ 2,167,000
Income from Investments etc.	407,000
	2,574,000
Deductions :	
Directors' Fees	£ 12,000
Provision for Taxation	892,000
Debenture Stocks, Interest and Sinking Funds	268,000
Provision for Depreciation	871,000
Transfer to General Reserve	37,000
Profits of Subsidiary Companies	200,000
	2,280,000

Table 20 Consolidated profit and loss account of a large company

The Net Profit taken up by the firm for the year was therefore about £294,000, and this was distributed as follows :

Interest on 5½% Preference Stock	£ 71,000
Interest on Ordinary Stock (at 10%)	220,000
Carried forward to 1946	3,000
	294,000

Table 21 Distribution of net profit

One or two of the above terms require explanation :

- (i) *Income from Investments.* The firm has invested some of its capital in other firms, from which it has drawn this amount of income.
- (ii) *Directors' Fees.* Directors are nominally elected by the shareholders of a Company, and are paid by them out of profits. In fact the Directors of a firm are usually the men who establish the firm. The shareholders will rarely at the

HOW THE NECESSARIES OF LIFE ARE PRODUCED

start know enough about the Directors to hold any strong opinion on their competence for their job.

(iii) *Debentures*. These are a section of the shares whose interest forms one of the first charges on the Company's profits. Because of this they are a secure form of investment, and therefore carry a fixed, rather low, rate of interest. The sinking fund is the reserve of capital being built up to pay off the Debenture holders if necessary.

(iv) *Depreciation*. The capital equipment of the firm is subject to wear and tear ; at the end of a year it will not be worth as much as at the beginning. In the course of time it will have to be replaced. The provision for depreciation is the money put by on this account.

(v) *General Reserve*. This is the income that the firm puts by against a rainy day and for future expansion. With the provision for depreciation it forms what we referred to in chapters xv and xvi as the firm's 'undistributed profits.'

(vi) *Preference Shareholders*. These have priority over Ordinary shareholders in drawing interest from the Company's profits and getting their capital back if the firm goes bankrupt. Because of their smaller risk they get a fixed rate of interest, which is lower than that which the Ordinary shareholder will expect to get when business is good, but higher than that received by the Debenture holder. The Ordinary shareholder stands both to gain and to lose more than either.

. It will be noticed that about one tenth of the gross profit is paid out to the Ordinary shareholders, about a third goes in taxation (further tax is paid by the shareholders on receipt of their dividends), and a third is put back into the business for depreciation.

You may have been surprised to see in the above account no reference to the total income of the firm, the cost of raw materials and power, or the sums paid out in wages and salaries. These are usually regarded as confidential information ; but the following figures, published in a letter in *The Times* in March 1948, give us one or two examples of the distribution of the sums involved.

STUDYING A COMMUNITY IN ACTION

Company	Total Income	Expenditure on			Dividends		
		Wages, salaries, holidays with pay, pension funds, etc	Raw materials, fuel and power, rent, etc	Gross profit	Total	As % of gross profit	As % of total income
United Steel Companies	£ m 38 96	£ m 12	£ m 20 77	£ m 6 2	£ m 0 55	9 %	1 4 %
Metal Box Company	16 4	4	11 15	1 2	0 21	17 %	1 3 %
Joseph Lucas Ltd.	Not stated, out of each £100	£42	£48	£10	£1	10 %	1 %

Table 22. Distribution of total income of three firms

A cement works, I should mention, is not typical of manufacturing industry, but it illustrates very clearly many of the features that you should be looking for when you visit factories in your own area.

If, however, you have read chapters xiv and xviii before coming to this section, you must have been struck with one omission here: I have scarcely mentioned what I claimed there to be the most important thing of all, namely, the human relationships. On this point I suggest that it is worth asking a sympathetically disposed management if they will allow you to attend a meeting of a Joint Production Committee or other Works Council.

3 PUBLIC SERVICES

It is essential for us not only to produce the food and manufactured goods that we need to sustain our bodies, but to supply ourselves with water and power, and to organise

HOW THE NECESSARIES OF LIFE ARE PRODUCED

sewage and transport and communications. How are these things done?

(a) *Water* is nowadays provided in most parts of the country by the local government authority, being distributed through pipes from central pumping-stations. The supply itself may come from a variety of sources : from lakes in hill country, from rivers, from deep wells. Large towns use an immense quantity of water and a number of cities in the North and Midlands have found it most economical to create lakes, or buy the water rights of existing lakes, and pipe the water over long distances. In the Sussex area from which I have been quoting, the water is obtained by pumping from wells sunk to just below sea level in the chalk of the South Downs. At the bottom of the well, shafts are driven out horizontally into the chalk to tap the stores of water lying in deep fissures that have developed in the rock. The water level varies a good deal : at the end of a wet winter it may be 80 feet above sea level, whereas after a dry summer it may fall below sea level, leaving little in hand.

Before distribution the public water supply needs to be tested, and possibly filtered and disinfected. When river water is used it is generally passed through beds of gravel and sand to filter it. To be disinfected it may, as in my area have ozone passed through it ; or some other means may be employed. If such precautions are not taken there is a serious risk of epidemics of such diseases as typhoid.

What is the source of water in your own area ? What treatment does it receive before distribution ? How much is consumed in a year per head of the local population ? How is it paid for ? How does the supply depend on the local rainfall ?

(b) *Power*, the power we have on tap in houses and factories, is mainly derived from coal.

Electricity is mostly obtained by burning coal in steam boilers which drive turbines geared to dynamos. The greater part of it is generated by relatively small power stations, which, before their nationalisation in 1947, were either privately or municipally owned. Their output is

STUDYING A COMMUNITY IN ACTION

co-ordinated by the Central Electricity Board and distributed through the 'Grid.' The Grid is a network of transmission cables which enables neighbouring areas to draw on each other's power in case of over-loading or breakdown, and facilitates the distribution of electrical power over the countryside.

You will find your local power station a fascinating place to visit. You will want to find out how much power is produced, what it is produced from, what area it is distributed over, how costing is reckoned, and the other details of management of the public supply.

(c) Gas again is mostly produced and consumed in smallish areas. The methods of roasting the coal, of storing the gas and regulating its pressure, of controlling the quality of its co-product (rather than by-product) coke, and of distributing it round your town, are all well worth study. The astonishing range of materials obtained from the liquids distilled off in the roasting process has no direct bearing on the question of power supply, but is of great importance to the economy of the country.

Sewage, transport and communications equally need to be surveyed.

4 FINANCE

We all know well enough that if there were no money we would have to barter the goods we wanted for others that we had. But we also need to know where the money we use comes from, where it goes to, and how it does its job.

There are two main ideas to grasp about money :

(a) its circulation, and
(b) the connection between prices, quantity of money and quantity of goods.

(a) Let us take an imaginary example. Mr Jones works in a factory for £6 a week. Every Friday he draws his wages and gives his wife so much for housekeeping. She takes the money down to the shops and spends it on food, clothes for the children and so on. The pound notes and silver that

HOW THE NECESSARIES OF LIFE ARE PRODUCED

Mr Jones draws from the factory only stay in his family for a few days. The same thing is happening with Mr Smith, Mr Brown and the other workers in the factory: each draws his wages and between himself and his family spends it on the goods they need. The shops therefore collect a lot

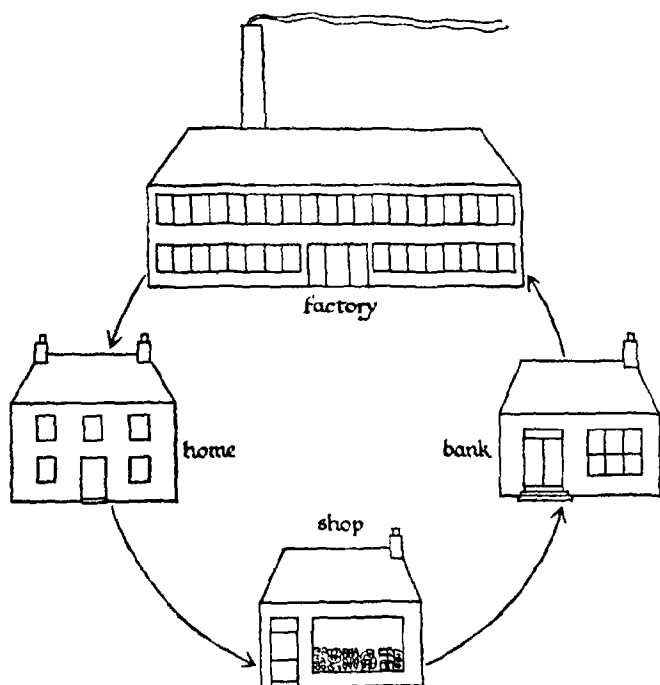


Fig 30 The circulation of money

of cash, and each day or each week the shopkeepers take the money along to the bank, where it is put down to their accounts. From the bank the factory manager draws a large sum once a week to pay out in wages.

Here we have a neat scheme which represents the main facts. These have been expressed in a vivid metaphor: money is round so that it can circulate and flat so that it can be piled up. In everyday life there are all sorts of complications to the diagram. The wages paid out in a particular

STUDYING A COMMUNITY IN ACTION

town do not necessarily get spent in that town : Mr Jones may take his family to the seaside for a holiday and spend his money there. In some places too there is a very large difference between the amount of money being paid out by the banks and the amount received by them. In the manufacturing quarter of a city, for example, there may be few shops, and most of the money handled by the bank is being paid out in wages. In a seaside holiday resort, on the other hand, the banks will be taking in during the season much more money than they are paying out. The balancing is done by their head offices or by the Bank of England.

(b) What is the effect of a change in the total amount of money circulating ? For example, if the country goes to war and Mr Jones's retired father and Mrs Jones's widowed sister now take jobs, the amount of cash paid out in wages is going to increase. This means more demand on the shops for goods. But the factories are now making tanks and aeroplanes and cannot supply the extra goods. The result is that prices rise ; unless they are fixed by the Government and the goods rationed. In this case the prices of unrationed goods—such as furniture at auction sales—shoot up disproportionately. The effect of injecting more money into the system is therefore to promote trade and to increase demand and so, if the supply of goods does not rise correspondingly, to make prices go up.

The volume of money may be increased in various ways. In the old days, when money was based on gold, the precious metal brought home by lucky prospectors had the effect of enlarging the supply of money. Again, if a shopkeeper thinks business prospects are good and decides to build on to his shop, he goes to the bank for a loan. As security for the loan he deposits stocks he possesses or the title-deeds of his house. The bank then allows him to draw cash up to this amount. The effect is once more to increase the volume of money in circulation. If the shopkeeper's decision to enlarge his business is part of a general rise in trade and employment, then more cash will be needed by the country as a whole. In this case the branch banks draw on their head offices,

HOW THE NECESSARIES OF LIFE ARE PRODUCED

and these in turn make demands on the Bank of England, which issues more notes. The total cash issued by the Bank of England is controlled by Parliament.

Conversely the money in circulation may decrease. Suppose the man in the street for some reason decides to save a larger fraction of his income, yet cannot find anywhere attractive to invest it, then—if his decision is repeated by many other people—the return stream of cash to the shops will get smaller, demand for goods will fall, shopkeepers will reduce orders, and manufacturers will cut production and throw men out of work. Each section of the money-stream of Fig. 30 will shrink, starting at the outflow from the home and ending with the inflow to the home. Something like this occurred, as we saw in chapter xv, during 1930-2, and the reverse during the two world wars.

You should visit a large branch of your local bank and ask the manager if he will explain these things to you, and show you such figures as he is allowed to disclose. The head offices of the big banks are conscious of their educational responsibilities and will very possibly also permit your manager to explain how a loan is made by a bank, how securities are reckoned, and what sort of loans banks are unable to handle.

(B) HOW THE COMMUNITY LIFE OF THE DISTRICT IS CONDUCTED

MEN not only have to produce the material goods necessary for their bodies : they also have to satisfy their psychological needs. They live and grow in personality by their membership of communities. There are several aspects of man's community life which it is necessary to appreciate.

I THE VARIETY OF COMMUNITIES TO WHICH EACH INDIVIDUAL BELONGS

Every country or society consists of a large number of small communities, and every individual belongs to several of these at once. A schoolboy, for example, belongs simultaneously to his family, his street, his school, his church, his town. Some of them have far more influence on him than others : measurement has shown, for example, that children's opinions and their attitudes to moral questions, are usually closely related to those of their parents, whether in reflecting them or in reacting against them. Outside the family one child will be influenced far more than another by a particular group : the one may perhaps play regularly with the boys of his own street, while the other scarcely sees them from one year's end to another. Similarly in later life a man may find that the factory where he works provides also the clubs where he spends his evenings and the friends he gets to know really well ; or he may never think of the place when he leaves work in the afternoon. In either case, as we saw in chapters XIV and XVIII, the character of the group in which he works at the factory has a profound influence on his life. Again, it is worth noticing that some people belong to many more circles or small communities than others. You should put down a list of half a dozen names, of yourself and your relations and acquaintances, and see how many

HOW COMMUNITY LIFE IS CONDUCTED

communities of one kind or another they belong to. Attempt to estimate the relative importance of the various communities for yourself.

2 THE STATE'S JOB OF MAINTAINING LAW AND ORDER

No community can last long without some agreed, or imposed, method of maintaining order. Every community has its own codes of behaviour and tries to check infringements. We have to distinguish between the moral code and the legal code. The State has a duty of dealing with violators of the legal code that it has drawn up. It does so by means of the judicial system, of magistrates' courts, assizes and so on.

In England every offence is first brought before a police court, or court of petty sessions. Serious misdeeds are then referred to the quarter sessions or the assizes, while the magistrates deal themselves with the minor offences, such as violations of the Highway Code, and pronounce verdicts and punishments on their own authority. The lay-out of the court and its procedure are quite simple: they follow roughly the same pattern as all other courts, up to the High Court of Parliament. Fig. 31 shows the way in which an assize court is planned.

When a case comes up for trial, the defendant is called and the police give their story. If the defendant wishes to contest the case he then has an opportunity of doing so, with the option of legal help; if not, he may not even appear, but merely write to the magistrates to excuse himself.

The quarter sessions are the next higher court; a case is tried either by county magistrates or, in a larger town, by the lawyer who holds the post of recorder to the town. He may or may not have a jury.

The next level is that of the High Court of Justice, which is held in London¹ or at one of the assize towns. The judge

¹ In fact, in London it is the Central Criminal Court that handles criminal cases, the High Court proper dealing with civil cases, such as divorce.

STUDYING A COMMUNITY IN ACTION

will be an eminent barrister appointed by the Lord Chancellor. (The Lord Chancellor incidentally is not only head of the legal system in England but by virtue of his office a member of the Cabinet and Speaker of the House of Lords ; a combination of offices which shows how great the influence of the Law has been in this country from at any rate the fourteenth century.) There will be a jury of twelve ordinary people to give a verdict as to whether the prisoner is guilty or

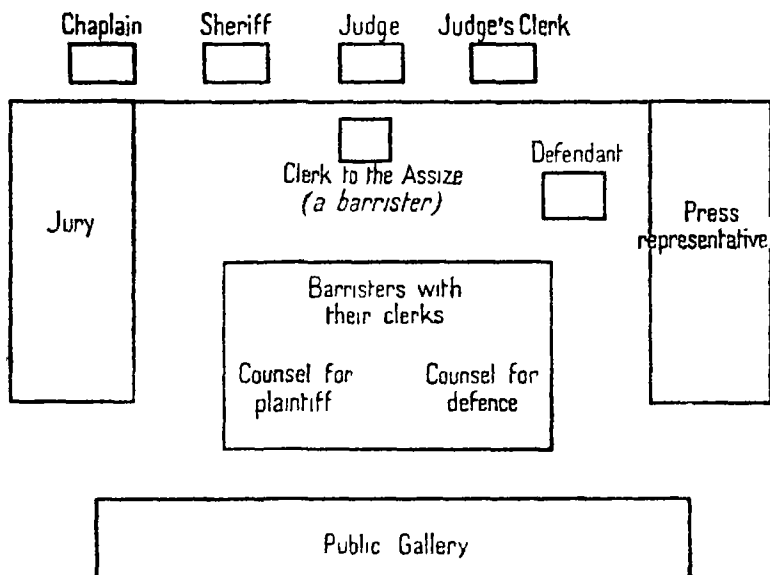


Fig. 31 Layout of an Assize Court in England

not, and there will be barristers to defend and to prosecute. (In Scotland the jury consists of fifteen members, and there are three possible verdicts—guilty, not proven, not guilty.)

If the defendant is found guilty and wishes to appeal, he may take his case to a yet higher court—that of Criminal Appeal, in London. If he is then still not satisfied—and if the case is considered to involve legal principles of sufficient importance—he may go to the final court of all, the House of Lords.

HOW COMMUNITY LIFE IS CONDUCTED

There are also the coroner's court and the county court, for other purposes. You should visit some of these courts in session—there is always a public gallery—and observe the procedure. A major point to notice is the large part played by the amateur in the administration of English justice. The great majority of the people who give verdicts on what are claimed by the police to be offences against the Law are unpaid magistrates or members of juries.¹ They have the guidance of experts—the professional lawyers—but they themselves are the representatives of your neighbours, of the ordinary people who live round you. The idea of a self-governing community, of a community that administers the national law for itself, is part and parcel of British justice.

The fact that English law is based on case-law, i.e. on the precedent of a particular judgment in a particular case, means that it has evolved within the life of the ordinary people, rather than having been imposed by a systematic theorist from outside.

3 THE STATE'S JOB OF GOVERNMENT

The State is responsible not only for maintaining law and order but for making new legislation, for defending the country, for supervising the relief of the destitute, for seeing that the education and public health services are properly run. Should it take so many things under its wing? That is a big question, which we cannot treat here. At present our aim is to see how the life of the community is in fact carried on, and whether we like it or not a great deal of the business and of the amenities of the country are conducted by public authorities.

The central government shares these tasks with the local government authorities, which are constituted in a very similar way. The bodies that have the legal power and responsibility consist of the elected representatives of the people: the Members of Parliament and the local councillors.

¹ A 'verdict' is a judgment of *fact*: whether the accused person is or is not guilty.

STUDYING A COMMUNITY IN ACTION

The former are paid, the latter not (except for out-of-pocket travel expenses). In both cases the elected authority employs a large staff of professional officers who in fact wield a good deal of power ; for they are the experts and their advice, based on training and continuous experience, is bound to carry weight. These people will include the senior Civil Servants of the central government, and such officials as the Medical Officer of Health, the Borough Surveyor, and the Town Clerk (a lawyer), in the municipal service.

It is most instructive to attend the sessions of a local borough or district council. They are normally open to the public, and they represent one of the most important units in a democratic system of government. A council always elects one of its members as chairman ; and this member then loses his privilege of voting and has the responsibility solely for seeing that meetings are run in the best interests of the people represented. His job is to interpret their interests not in terms of his own political views, but in terms of the views of the council : a Liberal chairman is not entitled to use his position to twist the views of a Conservative council to suit his own opinions.

The procedure will normally be the same as at a committee meeting of, say, a village football club or a school dramatic society. The chairman opens by calling on the secretary to read the minutes of the previous meeting. Members then vote as to whether the minutes are a correct record, and raise any questions prompted by them. The business will then probably devolve into a series of reports from its sub-committees : any busy council will have to divide itself up into small sections in order to handle its various departments and responsibilities effectively. Sub-committees make recommendations—about spending money very probably—but only the council as a whole will be empowered to take the decisions.

* Very much the same procedure is followed in the House of Commons, but the whole thing is on a much larger scale. And it is here that the tone is set for the conduct of public affairs throughout the country. It is an impressive experience

HOW COMMUNITY LIFE IS CONDUCTED

to attend a debate in the House ; educational institutions are usually able to secure in advance a batch of five seats by application to the Serjeant-at-Arms.

4 SOCIAL STRUCTURE

We have given some of the facts about social structure in chapter xviii, and section (1) above. But it is also essential for us to get a numerical perspective into our ideas on the way the population is made up. We can classify it in various ways. Do you, for example, live in a town or in the country? The odds are that you live in a town, for only 20 per cent of the population lives in the country. Fig. 32 shows that half the population lives in towns of more than 50,000 inhabitants.

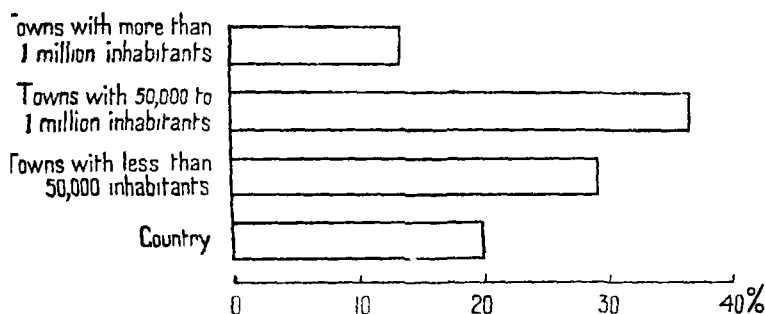


Fig. 32 Percentages of the population living in towns of different sizes

These figures are based on the Population Census taken in 1931. Usually a census is taken every ten years, but 1941 was missed on account of the war. The distribution may have altered appreciably since 1931.

The *Economic Survey for 1947* shows the way in which civilians were distributed among different types of occupation in June 1939 (see Fig. 33 overleaf).

Notice the three percentages in the left-hand column: we have only a minute proportion of our population engaged in producing food ; and nearly half the income earners are occupied in distributing the goods that the rest turn out,

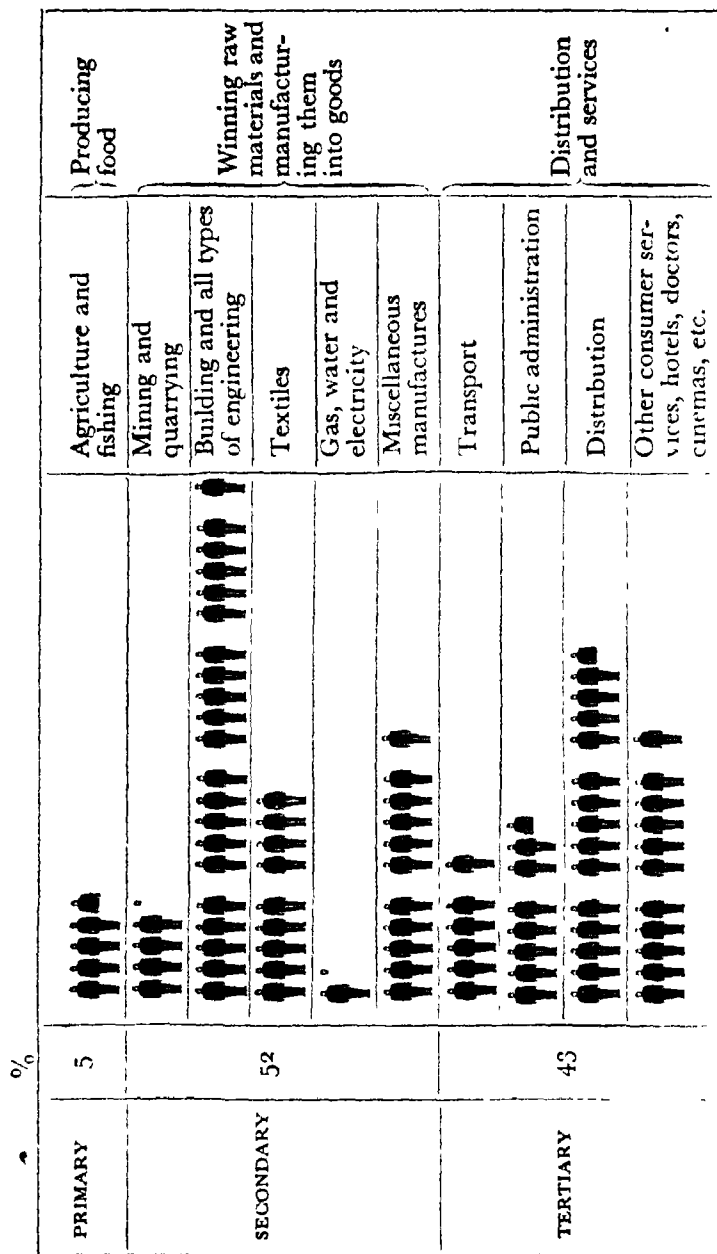


Fig 33 Distribution of civilians among different types of occupation, June 1939

HOW COMMUNITY LIFE IS CONDUCTED

Occupational Class	Children as % of non-fee-paying pupils	Children as % of fee-paying pupils	Children as % of all pupils	Parents as % of population (Census)
A 1 Larger business owners and executives	—	24.3	2.3	
2 Smaller ditto	1.9	—	2.0	
3 Shopkeepers	6.3	7.5	7.3	
	8.2	31.8	11.6	11.7
B Higher professional	0.4	20.3	2.3	3.6
C Other black-coated occupations	12.9	30.9	16.3	21.3
D Skilled manual	36.0	4.8	37.8	36.0
E Unskilled manual (including fatherless)	30.7	1.0	32.0	27.4
	88.2	88.8	100.0	100.0
	(Miscellaneous occupations are omitted from these columns)		(Miscellaneous occupations have been ignored in calculating these percentages)	

Table 23 The overlapping of social classes

and in staffing the ordinary services. We saw in chapter xvi the significance of this allotment of man-power.

In Britain everybody is very conscious of his social status, and it is well worth spending a short time discussing the numerical proportions of the different classes. The question is, how are we to draw the lines? On an income basis? But a skilled manual worker will often earn more than a clerk in an office, though the latter would probably consider himself as superior in class. An able business man who has left school at fourteen may well earn a good deal

STUDYING A COMMUNITY IN ACTION

more than a schoolmaster who has been at Eton and Oxford. On a basis of ancestry, then? But you would not have to go very far back to reduce the system to chaos. It is no easy matter to draw the lines; for no sharp lines exist. The table on p. 323 shows how different methods of classification produce overlapping categories.

It represents the parents of school-children classified (*a*) according to occupation, and (*b*) according to whether they do or do not pay fees for their children's education. The investigation from which the figures are taken was carried out in London in 1933-4, and does not therefore allow for the effects of the 1944 Education Act, or for possible variations in other parts of the country. But it will probably be agreed that a parent's willingness to pay fees for his children's education is often a guide to the social standing the parent considers himself (or herself) to possess. Approximately 11 per cent of the school population were fee-paying; and it is interesting to note that they were drawn from parents of all occupations.

REFERENCES
AND
FURTHER READING

REFERENCES AND FURTHER READING

CHAPTER I

References on the problems raised in this chapter will be found in the course of the book

CHAPTER II

On the subject of chapters II-v the reader will find lively summaries of modern knowledge in *The Physical Basis of Personality* by V. H. Mottram (Pelican 1944), and *Your Mind and Mine* by R. B. Cattell (Harrap 1934). The latter is also very readable on the subjects of chapters VII and VIII. Both books, however, are inclined towards a materialist interpretation of the facts, and a more balanced discussion is to be found in Julian Blackburn's *The Framework of Human Behaviour* (Kegan Paul 1947).

On the biological side the general reader may be referred to *An Interpretation of Biology* by Henry Collier (Gollancz 1938), and to *Science for the Citizen* by L. Hogben (Allen and Unwin 1938). The first of these is small and concise.

A good introduction to statistics may be obtained from *Statistics* by L. H. C. Tippett (Home University Library, Oxford University Press 1943), or *Mathematics for the Million* by L. Hogben (Allen and Unwin 1936). For the more serious student a good textbook is E. G. Chambers's *Statistical Calculation for Beginners* (Cambridge University Press 1915).

The psychological side of inheritance is discussed more fully in such a standard textbook as *Psychology* by R. S. Woodworth (Methuen, 12th edition, 1940), or in *The Framework of Human Behaviour*, mentioned above.

CHAPTER III

The standard work on sense-perception is *The Basis of Sensation* by E. D. Adrian (Christophers 1928). A short clear account was given in *New Biology 1* (Penguin 1945) by F. Le Gros Clark.

CHAPTER IV

The standard reference is Julian Huxley's *Evolution: the Modern Synthesis* (Allen and Unwin 1942).

CHAPTER V

The leading work on instinct psychology has been W. McDougall's *Social Psychology* (Methuen, 23rd edition, 1936). The shortcomings of the theory are discussed in two notable books by Julian Blackburn,

REFERENCES AND FURTHER READING

Psychology and the Social Pattern (Kegan Paul 1945), and *The Framework of Human Behaviour*, already mentioned.

The account of the katydid is taken from *Experimental Social Psychology* by G. Murphy, L. B. Murphy and T. M. Newcomb (Harper Bros., New York, revised edition, 1937).

CHAPTER VI

The tests of surgency and perseveration come from Cattell's book already mentioned.

CHAPTER VII

C. Spearman's classical works are *The Nature of Intelligence* (Macmillan 1923) and *The Abilities of Man* (Macmillan 1927).

On the distribution of intelligence amongst the social classes the leading source is *Political Arithmetic*, edited by L. Hogben (Allen and Unwin 1938).

CHAPTER VIII

Freud's own work is seldom easy to read, but the Hogarth Press has published *A General Selection from the Works of Sigmund Freud* (1937). His autobiography is an interesting document (Hogarth Press 1935).

The case of the shell-shocked gunner is quoted from William Brown's *Psychological Methods of Healing* (University of London Press 1938). That of the five-year old boy with the obsession is from *The Nursery World*, January 1944. The story of the children in the sand-pit appears in Susan Isaacs's *Social Development in Young Children* (Routledge 1933). This book repels some readers by its consistent exposition of Freud's sexual theories, but is nevertheless outstanding for its reports of children's actual behaviour and its penetrating analysis of the functions of authority in education. It is a standard work for the advanced student. It also contains some of the cases of projection quoted later in the chapter.

For further experiments on hypnosis the reader is referred to W. McDougall's *Outline of Abnormal Psychology* (Methuen, 5th edition 1947).

The best account I know of the power and the 'feel' of unconscious forces, for elementary and advanced student alike, is the anonymous *I Lost My Memory: The Case as the Patient Saw It* (Faber 1932).

Some of the cases of projection are quoted from a book that is mentioned again in chapter xvii, *Personal Aggressiveness and War* by E. F. M. Durbin and J. Bowlby (Kegan Paul 1939).

The experiments on the remembering of nonsense-pictures are described in *Psychology and the Social Pattern*, already quoted, and more fully, for the advanced student, in *Remembering* by F. C. Bartlett (Cambridge University Press 1932).

REFERENCES AND FURTHER READING

CHAPTER IX

For the subject of this chapter there are two outstanding and essential works, Margaret Mead's *Sex and Temperament in Three Primitive Societies* (Routledge 1935), and Ruth Benedict's *Patterns of Culture* (Routledge 1935). Some of Margaret Mead's books have been published in the Pelican edition. *Growing up in New Guinea* (1930); *Coming of Age in Samoa* (1928); and *The American Character* (1942). A brief but brilliant application of the principles of the modern anthropologist was published in *Science News* 1 (Penguin 1946), 'Japanese Character' by G. Gorcr.

CHAPTER X

The investigations on the nature of the will are presented in greater detail in *Personality and Will* by F. Aveling (Cambridge University Press 1931).

The observations on toddlers in nursery schools are reported in a small but illuminating book by Anna Freud and Dorothy Burlingham, *Infants without Families* (Allen and Unwin 1943). In my use of the word 'identification' I follow these authors.

The general reader who wishes to follow up the subject of values may be referred to the excellent *Structure of Morale* by J. T. MacCurdy (Cambridge University Press 1943). My own comments on the influence of a community's prestige on its members' convictions (on p. 133) are based on MacCurdy's analysis. But the most important work for the advanced student of chapters x and xi is K. Mannheim's *Diagnosis of Our Time* (Kegan Paul 1943).

CHAPTER XI

For further information on insanity see McDougall's book on abnormal psychology, already mentioned, and R. B. Cattell's *Crooked Personalities* (Nisbet 1938).

The fundamental contrast between introverts and extraverts is well illustrated (for the more advanced student) by such recent work on the standards of achievement of different types of neurotic patient, and their opinions of their performances, as that of H. T. Himmelweit, published in the *British Journal of Psychology* January 1947.

The account of the juvenile gangs in America is taken from the classical study, *The Gang* by F. M. Thrasher (Chicago 1936).

CHAPTER XII

The case of the sleep-walker was reported in *The Lancet* in December 1946.

The accounts of the vision of Frances Reddell are quoted from *Human Personality* by F. W. H. Myers (1903; abridged edition, Longmans Green 1933). This shortened version is still one of the most careful and lucid pieces of work on telepathy and related subjects available.

REFERENCES AND FURTHER READING

A clear and balanced summing-up of the more recent evidence is to be found in G. N. M. Tyrrell's *The Personality of Man* (Pelican 1946).

The main statistical research on telepathy is described in *Extrasensory Perception* by J. B. Rhine (Faber 1935).

On the relation of evolution to ethics C. H. Waddington's small *Science and Ethics* (Allen and Unwin 1942) will be found stimulating. It contains an essay by Waddington, followed by discussions with various eminent thinkers.

CHAPTER XIII

A standard work on the scientific study of society is *The Study of Society*, edited by F. C. Bartlett and others (Kegan Paul 1939). In it is described the method of Functional Penetration.

The best short account, for British readers, of the method of the Gallup Poll is a pamphlet brought out by the *News Chronicle* and the British Institute of Public Opinion, entitled *What Britain Thinks* (B.I.P.O., Aldwych House, W.C.2). The poll results quoted are taken from the *News Chronicle*. A clear account of the statistical principles is a monograph on *The Use of Statistical Techniques in Certain Problems of Market Research* by T. H. Brown (Harvard University Press 1935). Unfortunately it is not easy to obtain in this country.

Lord Woolton's remark is quoted from the *Journal of the Royal Statistical Society* 1946

The Mass Observation report referred to is *Puzzled People* (Gollancz 1947)

The work on the influence of factory life on girls' outlook is to be found in a paper by M. Jahoda in the *British Journal of Psychology* 1941

The book by Sir Fred Clarke referred to in the text is his *Freedom in the Educative Society* (University of London Press 1948).

CHAPTER XIV

Two short but striking books on slum life were published during the war, *Branch Street* by Marie Paneth (Allen and Unwin 1944), and *Our Towns*, a report prepared for the Women's Institutes (Oxford University Press 1943).

For the effect of diet on physique and outlook see Lord Boyd Orr's *Food, Health and Income* (Macmillan 1936), and his article on 'Nutrition and Psychology' in the *Journal of Education* 1943.

On the potential food-production of the globe more information can be found in the book by H. Collier, already mentioned, and in the monumental work by J. D. Bernal, *The Social Function of Science* (Routledge 1939).

The gulf between technical potentialities and human achievements in agriculture is one of the many important questions discussed with great discernment in *TVA* by D. Lalienthal (Penguin 1944).

Beveridge's remark on the effects of unemployment is quoted from

REFERENCES AND FURTHER READING

his great work, *Full Employment in a Free Society* (Allen and Unwin 1944), the pamphlet summary of which (published by the *New Statesman and Nation*) is excellent reading for the elementary student. The remark of the Derbyshire miner's wife is quoted from the former, the estimate of the numbers of people affected by unemployment from the latter

A good short account of vocational guidance is given in Cattell's book, already mentioned, *Your Mind and Mine*. The chart of Training Recommendations is reproduced from *Discovery*, May 1946.

The reports of men's attitudes to different kinds of work appear in *The Machine and the Worker* by A Barratt Brown (Nicholson and Watson 1934)

The great investigations of the Harvard Business Research Department have been fully described by F J Roethlisberger and W J Dickson in their *Management and the Worker* (Harvard University Press 1939). They have also been briefly and brilliantly discussed in Elton Mayo's *The Social Problems of an Industrial Civilization* (Harvard 1945, Kegan Paul 1949), which is essential reading for all students of the subject. All quotations from Elton Mayo are taken from it. Corresponding research in this country is not extensive. It has been summed up in an excellent pamphlet brought out by P.E.P. in 1948, *The Human Factor in Industry*. A larger British work is *Personnel Management*, by C. H. Northcott (Pitman 1945)

The experiment on boys' clubs was reported in a paper entitled 'Experimental Social Climates,' by K Lewin, in the *Journal of Social Psychology* 1939. Further experimental work, including some with adults, is discussed in an article by Elliott Jaques entitled 'Field Theory and Industrial Psychology' in *Occupational Psychology* July 1948, and described in *Readings in Social Psychology*, edited by Newcombe and Hartley (Holt, New York, 1947)

Evidence on the satisfaction that may be gained from a repetitive job when human relationships are good is to be found in *The Machine and the Worker* by S Wyatt and J N Langdon (H M S O 1938)

The examples of unco-operativeness on the part of both employers and workers in industry are quoted from the excellent but not up-to-date *Mind and Work* by C. S. Myers (University of London Press 1920).

CHAPTER XV

Estimates of numbers of unemployed vary surprisingly. The upper curve of Fig 24 is taken from the excellent *Economics for the Exasperated* by Gordon Rattray Taylor (Bodley Head 1947). A standard work which I have used in writing this chapter is *The Social Framework* by J. R. Hicks (Oxford University Press 1942). The White Papers and other Government publications referred to are *National Income and Expenditure of the U.K.* (published annually from 1941), *Employment Policy* (1944. Cmd. 6527), *Economic Survey for 1947* (Cmd. 7371),

REFERENCES AND FURTHER READING

Economic Survey for 1948 (Cmd. 7344), *Interim Index of Retail Prices* (1947). All these are published by H.M. Stationery Office.

The standard work on ownership of property is H. Campion's *Public and Private Property* (Oxford University Press 1939), but the main figures are also given in such a pamphlet as *Towards a Classless Society* by H. D. Hughes (Gollancz, for the Fabian Society, 1947).

The graphs of Figs. 25 and 27 come from a good pamphlet by P.E.P., *Employment for All*.

The estimate of the relative increases in national income and total savings in America is quoted from the unorthodox but stimulating essay on economic history, *The Two Nations* by C. Hollis (Routledge 1935). The remark on the American Power Trust is from the same source, as are also the facts about the Irish famine of 1845, mentioned on p. 231.

CHAPTER XVI

I am much indebted for the discussion of the British Balance of Trade to a series of articles which appeared in *The Economist* between August and October 1947. This journal is essential reading for a serious student, not of economics only but of all the social problems discussed in Part Two of this book.

On the subject of Operational Research, the reader is referred to a chapter in the official report, *Science at War*, by J. G. Crowther and R. Whiddington (H.M.S.O. 1947). For the statistical methods used, the book by Chambers mentioned after chapter II may be consulted.

CHAPTER XVII

I have already given details of the admirable study by Durbin and Bowlby, which I have followed in the earlier part of this chapter.

The American experiments on the processes of discussion are reported in *Experimental Social Psychology*, already mentioned after chapter V. An acute analysis of the advantages and conditions of successful argument round a table is given in a booklet by A. K. White, *The British Method of Government* (Craig and Wilson 1943).

On the subject of section 4 of this chapter the reader is referred to MacCurdy's book mentioned at the end of chapter X.

On Soviet Russia the book cited is *I Chose Freedom* by V. Kravchenko (Hale 1947).

Complementary pictures of the Japanese problem can be obtained from Gorer's article mentioned after chapter IX, and J. Hersey's *Hiroshima* (Penguin 1946). A bigger work, by one of the anthropologists referred to after chapter IX, is Ruth Benedict's *The Chrysanthemum and the Sword* (Secker and Warburg 1947).

REFERENCES AND FURTHER READING

CHAPTER XVIII

A scrupulous and penetrating exposition of the influence of economic structure on a community's outlook and values is *Aeschylus and Athens* by G. Thomson (Lawrence and Wishart 1941).

In much of this chapter my ideas have been influenced by the books by Mannheim, Mayo and MacCurdy already mentioned, and by Lewis Mumford's work. His large volumes are stiff going, but they contain much wisdom. Perhaps the most important is *The Condition of Man* (Secker and Warburg 1944), but the kernel of his doctrine is to be found in *The Social Foundations of Post-war Building* (Faber 1943). I am also indebted to Archbishop Temple's *Christianity and Social Order* (Penguin 1942). Two other stimulating books on these subjects are *The End of Economic Man* by P. Drucker (Heinemann 1939), and *The Managerial Revolution* by J. Burnham (New York 1941, Penguin 1945).

Statements about American life on pp 270-1 are based on the carefully documented *Handbook of Sociology* by W. F. Ogburn and M. F. Nimkoff (Kegan Paul 1947). This book contains a mass of useful facts. The account of the family at the Peckham Health Centre is from the awkwardly written but important book, *The Peckham Experiment* by Innes H. Pearce and Lucy H. Crocker (Allen and Unwin 1943).

The quotation on p 274 is from A. Loewe's small but profound book, *The Price of Liberty* (Hogarth Press 1937), and the Mass Observation report referred to is that mentioned at the end of chapter XIII.

The serious reader is strongly recommended to acquire the abridged edition of Arnold J. Toynbee's astonishing work, *A Study of History* (Oxford University Press 1946). Another important work on the subject of chapter XVIII is J. L. Halliday's *Psycho-social Medicine* (Heinemann 1948).

CHAPTER XIX

A good small book for Sixth Forms on the different approaches to truth is Abel J. Jones's *In Search of Truth* (Nelson 1945).

The relation of science to men's outlook on life is discussed from different angles in *The Scientific Attitude* by C. H. Waddington (Pelican 1941), *Faith, Science and Society*, by M. Polanyi (Oxford University Press 1946); and *The Fourfold Vision* by F. Sherwood Taylor (Chapman and Hall 1945).

For the growth of the fundamental ideas of science A. N. Whitehead's great work, *Science and the Modern World*, should be consulted (Cambridge University Press 1925, Pelican 1938).

A AND B

Many books are now available on the subject of these chapters. The following outstanding examples give full book lists. *The School Looks Around* by Elizabeth Layton and J. Blanco White (Longmans 1948), and *B.W.P. : The British Way and Purpose* (H.M.S.O. 1944).

INDEX

INDEX

- abstract ideas 7, 68, 75, 77-80
 acceleration of social change 280-2, 299
 adrenal gland 60-1
 aggressiveness, and adrenal gland 60-1; distribution of among tribes 105-7, as energy 62-3, 80-1, instinctive basis of 51; in primitive tribes 99-107, 123-6
 Arapesh, and development of values 115, 118-19, general account of 99-102, maladjustment among 123-4; and meaning of value 108-9, and poverty 170; and trade 265, and work 183
 Asia, movements towards independence in 171, 238
 Beveridge, Lord 175-7, 189, 211, 228, 285
 boys' clubs, experiment in leadership 187
 brain, structure and functions of 32-6, 138, 139
 cell, structure of 17; *see also* nerve-cell
 cement, manufacture of 306-10
 certainty, logical 13, 80, of science 13-16, 80, 149-53, 293-5
 chance distribution, curve of 24-5, 64, 105-6
 chance expectation meaning of 22-5
 character, assessment of 80-1, 178-82, national 254-5
 chromosomes 17-31, 41-5
 civilisation 280-7, 288-300, challenge to 278-80
 communities, increasing scale of, *see* scale; individual and 316-17
 compulsive actions 87-90, 117, 129; values 117-22
 conditioned response 53-7
 conscience nature of, *see* values
 consultation, joint 192-3, 283, 284, 286, 310
 co-operation, among Arapesh 100; among Mundugumor 102-3; *see also* democratic methods
 correlation coefficients 72-6
 delinquency 90, 95, 130-1
 demand, types of 212-13, variations in 212-16, 217-24
 democratic methods, active co-operation in relation to 175, 183-6, 192-3, 252-3, 275-8, 283, 284, and individual self-respect 252-3; leadership by in boys' clubs 187
 disintegration, in industrial life 265-7, in town life 269-74
Drosophila 41-5
 dumping 231, 235
 economics 195-246, 281, 284, 306-315
 endocrine glands 63-7, 126-8
 evidence, validity of 10-16, 96-7, 98, 157-8, 166, 169, 193, 200-3, 208-10, 244-6, 278, 288-9, 293
 evils, of economic origin 170-94, of modern world 5, 269
 evolution, cause of big jumps in 45-8; as criterion of goodness 149; experiments on *Drosophila* 41-5; of *Gryphaea* 40-1, of horse 37-8, influence of idea of 291-6, mechanism of 41-5; of *Microaster* 38-41; statistical evidence on 40-1; theories of 43-5
 expansion of markets 268-9, 279
 extraversion 63-7, 126-8
 farming 303-6
 foreign trade 228-39

INDEX

- Freud 83-90, 123, 128
functional penetration 164
- Gallup Poll 159-66, 178
government, machinery of 319-21 ;
necessity of 276-8
gregariousness 53-7
guilt 90, 92, 93-6, 109, 126, 130,
252, 254-7
- Harvard University Business
Research 183-9, 243-4
heredity 17-31
history, difference between science
and 10-16
hypnosis 83-90, 139
- id 86, 88-92
ideal of personality 282-3
identification 114, 116, 117-22,
131-3, 135-6, 167, 251
Income, National 195-210, sources
of large 202-3
index numbers 204-8
instinct, nature of 49-57, 105-7 ;
and value 113-14
intelligence, as adaptability 69-70 ;
as bundle of capacities 70-1,
as capacity for abstract thought
68 ; as capacity for learning 70
as capacity for grasping relation-
ships 77-80 ; and heredity 29-
30 ; Quotient 71-2, 80-2 ; tests
29-30, 70-82, 178-82
introversion 63-7, 126-8
Ireland, famine in 231-2
- Japan 226, 261
Jung 63-4, 256
- law, administration of 317-19 ;
British respect for 168 ; condi-
tions of submission to 250-1,
258-9 ; moral 151-3, 282-3,
296 ; of Mendel 19-31, 42, of
science 12-16 ; statistical 26-8 ;
of thought 77-80
leadership 187, 285
life, origin of 45-7
- machines, influence of 182-3
maladjustment 123-31
Malthus 172
- man, origin of 45-9 ; relation of
to other animals 6-7, 37, 47-8
Mass-Observation 164, 166, 178,
285
measurement in science 13-16
Mendel, laws of 19-31, 42
mind, nature of 80, 148 ; relation
of to body 6-8, 66-7, 138-48
misfits 123-31
money, functions of 312-15
moral law 151-3, 282-3, 296
Mundugumor, and development
of values 118-9 ; general account
of 102-4 ; maladjustment among
124-5
mutation 41-5
- natural selection 43-5
Nazis 94-6, 131, 247-8, 254-7
nerve-cell 17, 34-6
neurosis 83-97, 123-31, 138-9,
177-8, 257, 273
- Operational Research 239-44
- paradigmatic experiences 116, 137
Pavlov 54-5
Peckham Health Centre 271-3,
286
perseveration 65-6
Poll, Gallup or Sample 159-66,
178
population, distribution between
town and country 321 ; distri-
bution of classes in 323-4 ;
distribution of incomes in 200-5 ;
distribution of intelligence in
80-2 ; distribution of occupa-
tions in 321-2 ; distribution of
property in 202-3, 264 ; growth
of 268
- poverty, influence of 170-5
power generation 311-12
profit, undistributed 197, 308-10 ;
system 262-7
projection, of benevolence 92-3,
118-19, 134-7, 249-50 ; of hos-
tility 91-6, 117-23, 124-31, 248-
250, 255-6, 258-9 ; influence of
258-9, 260 ; nature of 91-7
- reflex, conditioned 35-7
re-interpretation of tradition 281-
283

INDEX

- relationships, importance of human
153-4; 174-5, 183-8, 192-4,
265-7, 282-7; perception of
77-80
- repression 85-92, 119, 128-9
- responsible attitude 263-4, 266-7,
276-7, 284, 298
- Russia 259-60
- savings 199, 218-14, 215, 221, 225
227-8
- scale of communities, relation to
slumps of 222; increasing 190-
191, 227
- science, and ethics 5, 149-53, 289;
and food supply 172-5; and
truth 290-1; as guide to action
281, 288, 289-90; assumptions
behind 292; certainty of 13-16,
80, 149-53, 293-5; in eco-
nomics 244-6; influence of on
thought 291-7; influence of on
values 4, 280, 296-300; laws of
12-16, 292; limitations of 3-5,
149-53, 289; measurement in
13-16; nature of 10-16, po-
tentialities of 3-5, 174-5, 281,
288-90
- self-reliance 167, 298
- self-respect 127, 129, 154, 176-7,
256, 267
- sense-organs 34-6
- sex, and endocrine glands 61-2,
and maladjustment 84, 125-9;
differences in Britain 168; dif-
ferences in primitive tribes 99-
105, 125; instinctive basis of 51
- size, of firms 227-8, 266-8, of
towns 176-1, 270-4
- sociology, as different from physi-
cal sciences 12-16, 278; use of
174-5
- Spearman 68-78
- standard deviation 26-8, 146, 161
- statistics, and differences of primi-
tive tribes 99-105; and intelli-
gence 72-6, and introversion
64; and Operational Research
240-3, and Sample Polls 160-3,
and telepathy 141-8; economic
data 208-10; inscientific method
22-31, 288; in study of evolu-
tion 40-1
- super-ego 86, 88-90, 92
- surgency 65
- Tchambuli 104-5, 125-6
- telepathy 141-8
- temperament 58-67
- terms of trade 235-6
- thyroid gland 58-60
- towns, influence of 269-75, 286-7;
size of 190, 270-4
- trade cycle 217-24
- TVA 173, 189, 253
- twins and heredity 30
- unconscious 83-97, 118-22, 128-9,
139
- unemployment, causes of 195, 210-
246, influence of 175-7, 207-8
- UNO 259, 260
- values, due to differences between
tribes 107, compulsive 117-22,
conditions of rejection of 120-2,
130, confidence in own 132-3,
255; crisis of uncertainty about
274-6; current in Britain 166-9,
266-7, increasing rate of change
of 280-2, 299, influence of
108-37, influence of science on
4, 280, 296-300, influence of
social structure on 262-75,
local versus universal 157-69,
maintenance by authority 251,
and maladjustment 123, mean-
ing of 108-9, more reasoned
attitude to needed 283, possi-
bility of derivation of from science
5, 149-54, 289, relation of to
desire 109, sources of 113-16
- vocational guidance and selection
178-82
- war 247-61
- water supply 311
- will, nature of 8, 110-13, 139
- work, attitude to in Britain 168,
new attitude needed to 284-5,
unsatisfying 177-94

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