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TOPICS AND OPINIONS

Selected and Edited by

A. F. SCOTT, M.A.

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PREFACE

IT is, perhaps, not too old-fashioned to claim that an educated person should be well-informed on a number of different subjects. This admittedly becomes more and more difficult as knowledge of the material world increases so rapidly. Many of us are tempted to take refuge in specialisation: seeking to cultivate a limited area of knowledge. But if we study the achievements of mankind from as many angles as possible we shall all of us, as G. M. Trevelyan says, 'gain in wisdom and understanding. We shall acquire a mentality which, when we return to our own problems, will be less at the mercy of newspapers and films, trying to make us take short cuts to truth, and to oversimplify the tangled skein of human affairs.'

Topics and Opinions is intended to give a general knowledge of many of the achievements of mankind. It deals with such different subjects as: nationalism, the Commonwealth, politics, law, economics, history, science, literature, music, architecture, films, television. The writers all speak with authority, whatever the topic under discussion. They have something interesting and informative to say, and frequently present their opinions in a highly provocative manner, which should stimulate comment and encourage further reading.

A. F. SCOTT

1955

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MAN AND SOCIETY

WHAT CIVILISATION IS NOT

RESPECT for the rights of property is not peculiar to civilised societies. That the brutes have no such respect is true, neither have they flint implements; savage human beings have both, which distinguishes them from the brutes but does not make them civilised. Flint implements and respect for the rights of property may be means to civilisation: but no more than flint implements can a sense of those rights be considered a peculiarity of civilisation. A contrary opinion has been held by many rich and thoughtful men; but Westermarck tells us that numerous savage tribes have as nice a sense of mine and thine as any English magistrate. Theft would seem to have been almost unknown amongst North American Indians till the coming of the whites, who, in justice be it said, did their best to counteract any moral laxity they might have imported by sending missionaries to remind the natives that eternal punishment awaits those who break the eighth commandment. It must not be supposed, however, that a belief in God and a future life is confined to the civilised—not here have we our first characteristic; on the contrary, most savage races have a lively faith in God and many make a practice of eating him. The very lowest Australian bushfolk—the most barbarous perhaps of barbarous creatures—'believe in the existence of a supreme being who is a moral lawgiver and judge.' They even call him 'Father' and worship him in the character of an elderly gentle-

man. Savages are rarely atheists: like us 'they entertain the larger hope.'

At public meetings I have heard ladies say that the measure of a people's civility is the position it accords to women; as the one is high or low so will be the other. This, however, is not the case. From the Bushmen, Andaman Islanders, and Veddahs, than whom no men are much nearer brutes, says Westermarck, women get more consideration than they got from the Athenians in the time of Aristotle. While the uxorious, albeit cannibalistic, males of many savage tribes regard their wives as little less than equals, in those notoriously civilised ages of Tang and Sung the Chinese seem to have regarded theirs as little better than livestock. Indeed, it is clear that many cannibals possess an infinitude of domestic virtues, being kindly, honest, and industrious, generous within their own tribe and hospitable to strangers; whence it seems to follow that even the merits of the British proletariat are not peculiar to civilised societies. The truthfulness of savages has often astounded explorers. The Veddahs of Ceylon are said to be models of veracity, and both Andaman Islanders and Bushmen 'regard lying as a great sin.' On the other hand, the Greeks and Cretans, it will be remembered, had a poor reputation in this respect; while on the continent of Europe the distinctive epithet reserved for Great Britain is 'perfidious.' Not only truthful, many savages are clean. The Megé, a miserable people of the Gold Coast, subject to the savage Monbuttu, 'wash two or three times a day' and wash all over. I wonder how many Europeans from the end of the Roman Empire to the accession of Queen Victoria washed themselves all over once a year.

In the important matter of sexual morality the practice of many backward peoples may well provoke our envy. The forest tribes of Brazil, for instance,

are inflexibly monogamous, and so are several of the tribes of California. It seems sad and rather strange that Professor Westermarck should yet have to describe these as 'a humble and lowly race . . . one of the lowest on earth.' 'The Karok do not allow bigamy even to a chief. . . .' I am not quite sure what the professor means when he says that 'among the Veddahs and Andaman Islanders monogamy is as rigidly insisted upon as anywhere in Europe'; but, at any rate, the natives of Kar Nicobar are irreproachable. These respectable savages 'have but one wife and look upon unchastity as a very deadly sin.' With them as with many other savage tribes it is punished by banishment or death. 'It is noteworthy,' says Westermarck, 'that to this group of peoples (the group that feels quite nicely in these matters) belong savages of so low a type as the Veddahs of Ceylon, the Igorrotes of Luzon, and certain Australian tribes.' It is noteworthy, he might have added, that whereas unchastity is regarded as a heinous crime by the most abject savages, in the most glorious ages of the world it has been regarded as a peccadillo at worst. . . . Plato advocated communism in women. Chastity was of small account in the circle of Alcibiades, the court of Hadrian, the Medici gardens, or the salons where Voltaire, Helvétius, and Diderot gave shape to a new intellectual order and preached the philosophy of pleasure. Socrates and Shakespeare, Raphael and Titian, Caesar and Napoleon, the Duke of Wellington and George Eliot herself appear to have led lives that would have rendered them unfit for the best Igorrotes society in Luzon. In the great periods of Chinese history, things, I fear, were no better. So, as the natives of Kar Nicobar look upon unchastity as a very deadly sin, we are forced to conclude that chastity is not one of the distinguishing characteristics of civilisation.

Let us not flatter ourselves by supposing that patriotism is a peculiarly civilised virtue. The North American Indians are renowned for it, Carver going so far as to say of the Naudowessies—'the honour of their tribe, and the welfare of their nation, is the first and most predominant emotion of their hearts.' Of the Yorubas of West Africa Mr. MacGregor writes: 'No race of men could be more devoted to their country'; yet, unless I mistake, this tribe has been suspected of eating missionaries. 'Solomon Islanders not seldom die from homesickness on their way to the Fiji or Queensland plantations.' While, according to Mr. Williams, a Fijian, who, having visited the United States, began, at his chief's request, to enumerate the respects in which that country was superior to his own, was promptly put to silence by an indignant audience with cries of 'he is a prating, impudent fellow: kill him.' However it may be with chastity, it is clear that as pure a flame of patriotism burns in the Fiji Islands as in any part of Europe. And though few modern nations have much to learn from them, many famous peoples of old might have profited by their example. For instance, the Chinese, soon after the time of Confucius, were learning from their philosophers that we ought to love all men equally: 'according to the Hindu work, Panchatantra, it is the thought of little-minded persons to consider whether a man is one of ourselves or an alien': and Democritus of Abdera held that 'every country is accessible to a wise man, and that a good soul's fatherland is the whole earth.' The later Cyrenaics and Cynics denounced patriotism as ridiculous, and their doctrine developed into that benign Stoic cosmopolitanism which was the religion of Seneca, Epictetus and Marcus Aurelius. 'Il est clair qu'un pays ne peut gagner [he is talking of war] sans qu'un autre perd, et qu'il ne peut vaincre sans

faire des malheureux,' was the final judgment of Voltaire. .

I think we must take it as settled that neither a sense of the rights of property, nor candour, nor cleanliness, nor belief in God, the future life and eternal justice, nor chivalry, nor chastity, nor patriotism even is amongst the distinguishing characteristics of civilisation, which is, nevertheless, a means to good and a potent one. Obviously the essence of civilisation is something to which savages have not attained; wherefore it cannot consist in primitive virtues. The antithesis between the noble savage and the civilised man which has been current these two hundred years implies a general recognition of the fact that civilisation is not a natural product. We should expect it rather to have to do with those last acquisitions of humanity—self-consciousness and the critical spirit. We should expect it to be the result of education. Civilisation is something artificial.

There lingers on, however, a school of thought, drawn chiefly from the half-educated and bumptious smattering a little science, according to which civilisation consists in absolute submission to Nature's law. 'Leave it to Nature' is their motto: the brute and vegetable kingdoms are the exemplars of civility. Men have made a mess of it, they say, by not allowing the fittest to survive: we shall not be truly civilised till we leave the weak to die and recognise formally that might is right. The fit shall inherit the earth. The question is, of course, who are the fit? If the physically inferior have succeeded in so organising society that overwhelming policemen hold the muscular undergraduates of London University in awe, may it not be because the physically inferior are the mentally superior? Cunning quite as much as guts, if we may trust the text-books, has done the

work of evolution. After all, that puny mammal, man, has fared better in the struggle for existence than the majestic mammoth. And even amongst men, perhaps the fittest to survive have survived. It begins to look as if the naturalist's argument stultified itself. If the survival of the fittest be a law of nature we may assume that the fittest to survive do survive. If, as seems not improbable, war is to become the normal condition of humanity, the future will be with those crafty weaklings who adapt themselves to their circumstances by devising means of evading military service, just as in the glacial period those species survived which learnt to protect themselves from the sharpness of the climate. 'You have tampered with Nature's Law,' say the science students; 'It is our nature to,' we reply.

All this, I fear, will strike the downright biologist as sophistic and vicious; and if he realises that he is getting the worst of the argument he will most likely fall back on morality. Few can take a higher moral tone than your half-baked man of science, who will brand remorselessly as sloppy, shifty, dishonest, cowardly, mean, silly, sentimental, and altogether pernicious those who believe we ought not to expose rickety children, strangle consumptive artists, or have our loves chosen for us by Professor Ray Lankester. 'We ought,' they exclaim indignantly: but here, again, are they not stultifying themselves? There is no 'ought' in Nature; only 'is.' When the biologist says that we ought not to tamper with Nature he introduces a non-naturalistic, an ethical, criterion. But if ethics are to be used as arguments in favour of Nature's law, with equal propriety they may be used as arguments against. We may say that it would offend our moral sense to murder babies and ailing poets and all those who cannot hope to attain the B 1 standard of efficiency: such

action, we may say, would not in our judgment make for good states of mind. 'Very well,' says the science student grimly, 'but be sure that if man refuses to obey the law of Nature man will perish.' 'And if,' we reply, 'the sole end and purpose of man's existence be but to continue his species, if the individual have no value save as a means to that end, does it matter?' That any given race of apes should become extinct signifies not a straw; and if man is to live for no other purpose than that for which apes live, his continued existence becomes equally unimportant. Once admit, however, that man exists for some other purpose than that of continuing his species and the whole Imperial Institute quivers to its foundations, since it may be precisely on account of those other purposes that we protect the weak and respect the individual.

The dilemma whose horns I have been furbishing for the benefit of the South Kensington science student is this: either, whatever is, is right; or, man knows better than Nature. In the first case there can be nothing to grumble about; in the latter the biologist must find better grounds for grumbling. The mastodon, having failed in his struggle for existence, goes out. Very well, some other species, carrying on the mastodon's mission, race preservation, takes his place. All is well. If the race of South Kensingtonians perish and one more biologically efficient take its place, where is the harm in that? All is well; Nature's purpose is served. Why should we put ourselves about to preserve the South Kensingtonians unless we believe that their purpose is different from and finer than that of Nature? 'And why,' interjects the reader, 'should you be betrayed by irritation into long-windedness? Surely two sentences would have sufficed to convince anyone that by a civilised society we do not mean a species

perfectly organised for its own preservation? What about the pismires?'

There remain one or two other things which it may be just worth pointing out that civilisation is not. For instance, elaborate mechanical contrivances are not, as some have supposed, of its essence. It would be worse than stupid, it would be unpatriotic, to hold that Germany, just before the war, was more highly civilised than France, yet in the application of science to industry the Germans surpassed all nations, except perhaps the people of the United States. No one imagines that Melbourne is to-day as highly civilised as was Athens in the time of Pericles, and we may be sure that the last to make such a mistake would be the best educated inhabitants of that great, electric-lit, train-served, tram-ridden city. Many Frenchmen admit, unwillingly, that even Paris at the present day is less highly civilised than Periclean Athens; but not only all Frenchmen, all educated Americans too, would agree that modern Paris is more highly civilised than New York. It is not denied, however, that in means of communication and transport, in sanitary arrangements and lighting, Paris is still behind the times.

Soon after the Russo-Japanese war I took to dine at a restaurant in Soho, where a dozen very young intellectuals were in the habit of meeting, once a week, one of those charmingly modest British officers who have lived so long in a world where it is their duty to be stupid that they have quite forgotten how intelligent they are. We fell, I recollect, to discussing the subject of this essay—'What is civilisation?' Fabianism was a good deal to the fore just then, and some of us were sure that no society could be described as civilised where provision was not made for paupers, invalids, and lunatics; others (ladies were of the party) felt that in a civilised community every adult

would have a vote; others again that a truly civilised people would give every poet and artist five hundred a year and establish picture galleries in the provincial towns; others—but perhaps what the others said would not seem so interesting now as it did then. What my soldier said was this: 'I can't tell you what civilisation is, but I can tell you when a state is said to be civilised. People who understand these things assure me that for hundreds of years Japan has had an exquisite art and a considerable literature, but the newspapers never told us that Japan was highly civilised till she had fought and beaten a first-class European power.' The irony was well placed; but the gallant captain himself would have been the last to maintain that proficiency in arms was really a test of civilisation. I know he would have denied as strenuously as the merest milksop that the barbarians who overran the Roman empire were civilised, or that the Tartars who overthrew the Sung dynasty and in Central Asia ruined Mahometan culture were anything better than a pack of brutes. With a couple of instances I could have persuaded him. The philanthropists might have been confronted with those examples which just now confounded, or should have confounded, the people who measure civility by mechanical development. And, as for the person who held that a civilised society is one where every adult has a vote, he (or she) was talking manifest nonsense. Political institutions may, or may not, be means to civilisation; they cannot be of its essence. Many savage tribes are ruled by despotic chiefs, others appear to be democratic. Athens in her prime was an oligarchy of free citizens, supported by voteless slaves; France, in the eighteenth century, an almost unlimited monarchy. Civilisation, we may be sure, has to do with something more fundamental than forms of government.

I have now succeeded, to my own satisfaction, in showing that certain characteristics which are sometimes mistaken for peculiarities of civilisation are, in fact, nothing of the sort. I have tried to eliminate the unessential. The primitive virtues are seen to be compatible with barbarism: jellyfish conform to Nature's law: no particular type of political institutions is common to civilised or to barbarous societies: savage hordes have gained great victories and conquered powerful States: and not all those societies which educated opinion universally recognises as having been highly civilised have brought mechanical invention or philanthropic organisation to a particularly high state of efficiency. It is these societies, universally recognised by educated opinion as highly civilised, that I must scour for common and peculiar characteristics. Such characteristics I shall take to be the essentials of civilisation. Anyone, therefore, who does not share the general, educated opinion as to the high civility of those societies will, since he denies my premises, see no necessity in my conclusions. For him this essay can have no more than an academic interest. I do assume, on the strength of a consensus of educated opinion which amounts almost to unanimity, the high civility of three different societies.

CLIVE BELL, *Civilisation*

BRITISH AND AMERICAN NATIONALISM

THE two nationalisms that I have experienced most vividly have been those of America and England. From 1938 till May 1944 I lived in various parts of the United States; I returned to England on a British boat, and was still at sea on D-day. The

nationalist feeling on both sides was very disquieting, for it is obvious to every sane person in both countries that their co-operation is absolutely necessary if disaster is to be averted. I am the more perturbed since I find in myself a proneness to respond to British nationalism and to contemn that of America, which I can only control by a great effort towards impartiality. Thus, my own emotions help me to know how difficult it is to eradicate this pernicious way of feeling—pernicious because it generates hatred between members of nations that ought to work together.

The highly educated minority in both countries is, on the whole, free from this unfortunate passion. In universities, on both sides of the Atlantic, one finds an attitude of mutual respect, and an ignorance of what is thought and felt by the man in the street. Government officials, and the innumerable unofficial emissaries whom the two governments send to London and Washington respectively, belong to the same social group as the university professors, and seldom encounter the fiercer forms of national feeling. If they did, perhaps even more would be done by the authorities to promote mutual understanding.

There is a great difference in the nature of the patriotisms of the two countries. British patriotism is quasi-biological, and has an affinity with family feeling; American patriotism is more analogous to party or sectarian loyalty. An Englishman may feel that the Socialists are subversive, or, alternatively, that the Tories are ruining the country; he may feel this strongly enough to hate the party to which he is opposed. But this feeling is totally unlike the feeling he has towards his country's enemies, and fades away in a time of national crisis. Our patriotism, like that of other European countries, is made up of love of

home, the feeling of cosy safety produced by what is familiar, the comfort of known traditions and prejudices, and the instinct that, in spite of superficial dissensions, we are at one on all really serious issues. A hen, terrified by a motor-car, will rush across the road in imminent danger of death, in order to feel the safety of home. In like manner, during the blitz, I longed to be in England. But all Americans said, 'how glad you must be to be out of it,' and were totally unable to understand my contrary feeling.

American patriotism is quite different. The United States is not biologically a nation; a minority of the inhabitants are descended from people who were in America a hundred years ago. When an American feels a glow of warmth about his country, he is not thinking, as an Englishman might, of hedgerows and the song of the cuckoo and wild roses in June, of village churches that keep alive what was best in the middle ages, or even of the traditional pomp of kings and Lord Mayors and judges in their wigs. Shakespeare speaks of the English as 'this happy *breed* of men'; Lincoln speaks of the Americans as 'dedicated to a *proposition.*' This contrast sums up the difference. English patriotism, like that of other Europeans, belongs to the instinctive and subconscious part of human nature, in which we are little different from the brutes; American patriotism belongs to the intellectual, conscious, reasoning part, which is more civilised but less compelling. To us, our country is part of our birthright; to Americans, theirs is part of a sacred Cause.

This fundamental difference, because it is not understood, is a source of mutual irritation. Every European in America has been worried by the constant question, 'how do you like America?' To us, there is a sort of indecency about the question, as if a man should say, 'how do you like my wife?' We

do not think it a mark of virtue to prefer another man's wife to one's own, nor do we think it right to prefer another man's country. I had in America a German friend (a refugee) who had lived many years in England; during that time (so he told me) he had never once been asked, 'how do you like England?' But if a country is 'dedicated to a proposition' the matter is different. If the proposition is true, we all owe allegiance to it; if false, none of us do so. Therefore the man who prefers his own country to America seems, to Americans, to be finding fault with the fundamental articles of their creed. I could not make it clear to Americans (with only two or three exceptions) why I did not wish to become naturalised. I said that an adopted nation was like adopted children, and could not give the profound emotional fulfilment that is to be derived from one's own children and one's own nation. But my words remained unintelligible, and produced no glimmer of response.

What is this 'proposition' to which America is dedicated? I shall venture to paraphrase and enlarge on Lincoln's few words on this subject, since I wish to set forth what the average American sincerely and profoundly believes. It is hardly relevant that the United States does not realise his ideals. Every clergyman will admit that the Christian churches fail to realise Christian ideals, but he is none the less quite genuinely loyal to these ideals and persuaded of their importance. So an American may admit this or that blemish, and still maintain, in all sincerity, that America is striving to go in the right direction, which in his opinion other nations, and especially the British, are not.

England, for most Americans, is still the England of George III. What has happened since may, in part, be known intellectually, but has not been assimilated

emotionally. America stands for those things in which Jefferson differed from George III: equality, absence of caste, political and religious freedom, abstinence from foreign conquest—the creed, in fact, of English and American Radicals in 1776. The English are disliked because they have hereditary titles, because they have an empire, and because socially they are felt to be haughty. It is also thought that they are effete and inefficient, but at the same time astute and always able to outwit the simple and honest Americans. On the highest moral grounds, therefore, it is the duty of Americans to oppose British cunning, arrogance, and lust of dominion.

. . . . . .

The nationalism of Americans, owing to the fact that it is not so deeply based on instinct as that of the British, is more vocal, more shrill, and more blatant. There is supposed to be something called 'The American Way of Life,' which is so excellent that it ought to be imposed throughout the world. The family, one gathers, was invented by the Pilgrim Fathers; from Adam and Eve to their day it was unknown, and is still unknown on this side of the Atlantic. It is quite useless to point to comparative statistics of divorce or to any other evidence; the belief remains unshakable. Leading articles in newspapers assure readers that the American young man, in contrast to the European, is sexually virtuous and hates violence. Here again, an appeal to the statistics of rape and homicide is useless. The wife of a Chicago professor assured me that there only *seemed* to be more murders in Chicago than in London because the English police were so inefficient. And if labour troubles are worse in America than in England, that is because English employees have no spirit and English employers are cowards.

I do not think Americans can be conciliated by

kowtowing to them. If we were to attempt this, we should have to do various things, some good, some bad. First and foremost, we should have to abolish titles. Next, we should have to surrender all the parts of the Empire that are not self-governing. Third, we should have to revert to unregulated capitalism, abandon all attempts at planning, and allow the unemployed to starve. Fourth, we should have to adopt the American attitude to negroes. Last, but not least, we should have to learn to talk American, for nine Americans out of ten believe that our way of speaking is an affectation, only adopted to show our superiority. We found, in America, that strangers in shops or buses at first took us for Germans and tolerated our way of speaking, but when they found that English was our native language they became indignant with us for not speaking as they do. It never occurred to them for a moment that the English have some rights in the English language.

. . . . . .

I do not think we can achieve anything by being mousy and humble, or by singing small about what we have done in the war. Americans, almost to a man, consider our loss of Singapore shameful, but their loss of Manila glorious. We do no good by giving in to this belief. They observe that in the battle of Normandy we remained stuck, while they careered over France; here, again, we should insist on explaining the strategical situation. We should shout from the house-tops that our war effort, per head, has been greater than theirs. Only harm is done by being 'tactful' in these respects.

American boastfulness is like that of small boys, and they expect it to be met by boastfulness in return. When we abstain from boasting, it is not from modesty, but from pride; they sense this, and as our pride is what they most dislike, our failure to brag increases

their dislike of us. It also causes them to be genuinely ignorant of the facts. Our newspaper publicity in America would be more useful if it were more self-assertive—not as to our virtues, but as to our efficiency. Not that we should ever hint at any shortcomings on their part, but that we should be more blatant about our own exploits.

The source of the trouble lies largely in American schools, which are in some regions exploited as agents for the propagation of nationalism. Education is a matter for each State, not a Federal matter; it is everywhere deeply involved in politics. Public sentiment is such that few politicians would dare to find fault with anti-English teaching in schools; the Federal Government might, as a war measure, express opinions as to what is prudent, but has no power to enforce its views.

The educational effect of 'democracy,' as understood in America, is curious. Every taxpayer feels that he has a right to object if, in any State-supported institution, anything is taught of which he personally disapproves. If, in a State university, a biology teacher ventures to express a belief in evolution, or a teacher of ancient history throws doubt on the complete historicity of the Pentateuch, or a teacher of astronomy mentions that the Inquisition opposed Galileo, the President of the university in question is inundated with indignant letters from uneducated farmers or fanatical Irishmen, saying that their hard-earned money ought not to be spent on the dissemination of such pestiferous falsehoods. If the President of the university is obdurate, the Governor and Legislature of the State are approached, by a powerful lobby if the matter is deemed of sufficient importance. Naturally the practical politicians see no reason why professors should insist on teaching anything unpopular. 'Democracy' is interpreted as meaning

that the majority knows best about everything. Are birds descended from fishes? Are there reasons for doubting whether Joshua made the sun stand still? Has the Church ever been hostile to scientific doctrines subsequently accepted? Is Aristotle's doctrine of the syllogism capable of improvement? The prevalent feeling in America, except among the highly educated minority, is that such questions should be decided, not by the opinions of those who have studied them, but by the prejudices of the ignorant majority. This makes the life of a teacher in a State institution somewhat hectic: at every moment he or she has to fear that a pupil will repeat something to his parents, they will repeat it to the priest or the pastor, and there will be the devil to pay.

The pressure of the ignorant multitude is, however, only half of what the teacher has to face. There is also the pressure of the plutocracy, exercised more discreetly, but not less drastically. The condition of immigrant labour in the State of California has long been appalling; it was set forth in a best seller, *The Grapes of Wrath*. A young instructor in the University of California ventured to investigate the question, and to publish his results, among which was the conclusion that trade union organisation was necessary if conditions were to be improved. He was in consequence dismissed from his post, on the alleged grounds that he was a bad teacher and did insufficient research. (Investigating the conditions of labour in California is not 'research.') Although the other teachers sympathised with him, they could do nothing, for fear of sharing his fate. If their children were not to starve, they had to acquiesce in *suppressio veri* and *suggestio falsi*.

The position of a teacher in an American university is utterly different from his position at Oxford or Cambridge. The independence enjoyed by the

Fellows of a College at Oxford or Cambridge is a legacy of the middle ages; it is derived from the autonomy of the medieval Church, and owes much to the courage of St. Ambrose and the philosophy of St. Augustine. Even in England, it is only tolerated as a survival; the modern provincial universities have not been allowed to possess the merit which makes Oxford and Cambridge unique. This merit is that the men who teach also control the finance. The Master and Fellows of a College have no one above them except the State; and as they belong to the same social caste as the men who (in effect) compose the State, they have seldom had difficulty in coming to terms with Parliament and the government. The Master is either elected by the Fellows, or is just such a man as they would have elected; moreover, he is a constitutional monarch, possessing only very limited powers. The consequence is that learned men have, in England, an independence and a status which, elsewhere, they have been gradually losing ever since the Reformation. We all know of their subjection in Germany and Russia, but in America there is something similar, though less in degree and less avowed.

An American university is a very different affair from Oxford or Cambridge. Its finances are in the hands of a Board of Trustees, who are business men, usually wholly devoid of academic qualifications. These business men appoint a President, who may or may not have had some academic education, but is selected for his supposed administrative ability, which, of course, includes agreement with the political and theological prejudices of the Trustees. The President, so long as he retains the support of the Trustees, has the powers of an oriental despot rather than those of a constitutional monarch. All the younger members of the faculty (roughly speaking,

those under about thirty-eight or forty years of age) hold their posts on a yearly contract; if the President, for no matter what reason, dislikes one of them, his contract is not renewed. And if the cause (avowed or unavowed) of his dismissal is one with which other Presidents of universities sympathise, he will find it very difficult, if not impossible, to obtain another post. Consequently cases in which younger teachers refuse to toe the line are rare. The older men, who have the title of Professor, have more security of tenure, but even they would find their position very difficult if they were on bad terms with their President. As a rule, by the time a man becomes a professor he has been tamed, and has learnt the advantages of submission.

The result of this system is that, while Presidents of universities are part of the governing class, mere men of learning are nobodies, having something of the position of Greek slaves in the Roman Empire. I found that when the President of a university invited me to dinner, if he wished to do me honour the other guests would be business men; only social inferiors were invited to meet mere professors. The difference of status is at once apparent to any one who has to visit both professors and the President in their respective offices. The President's office is in a palatial building, with carpets even in the passages; his rooms are vast and expensively furnished, with all the evidences of insolent luxury, while the professors' little dens are stowed away in stuffy corners. This expresses the relative estimation in which Americans hold administration and learning.

In regard to some subjects, the harm done by this system is not apparent. It does not affect the teaching of mathematics or physics, and it does no harm to the teaching of medicine or chemistry or crystallography or entomology. But whenever a subject is

related, even indirectly, to economics or politics or theology, the harm done is immeasurable. Among young students in America, as I have known them, there is a great deal of first-class ability, combined with a degree of enthusiasm and enterprise which is much less common in England. I cannot speak too highly of the best of the young men whom I have taught in America. But owing to the system, very few of them achieved as much as their abilities would have led one to hope. T. S. Eliot, whose acquaintance I made when he was my pupil at Harvard, turned his back upon America; his somewhat reactionary opinions are, no doubt, all due to revolt against the ideals of his native country. Of the rest of my American pupils, some were Jews, and had to combat the anti-semitic prejudice which makes it very difficult for Jews to obtain university posts; others were Radicals, who either surrendered and lapsed into listless cynicism, or stuck to their convictions and therefore abandoned the teaching profession. Those who somehow managed to fit in were so over-worked, as a result of the exploiting instincts of the ignorant business men whose employees they were, that they lost their resilience and the fine edge of their abilities was blunted. And so, in one way or another, America's immense heritage of idealistic ability is squandered by a system which divides all power between the prejudices of the ignorant many and the ruthlessness of the plutocratic few.

The situation in schools is much worse than in universities. In New York and Boston the Catholic Church is dominant; New York school teachers are taught to speak of the Reformation as 'the Protestant Revolt.' In the Middle West there is intense local patriotism, and teachers can hardly hope for an appointment except in their own city or its vicinity. They must of course carefully abstain from shocking

the prejudices or pruderies of even the most benighted parents, and from saying anything that might conceivably offend the plutocracy. All this is faithfully recorded in *Middletown*, a book which should be studied by all who wish to understand America. The actual instruction, from a technical point of view, is very poor; English young people who were sent to America in 1940 and who are now of an age to go to the university, find that they have to go to school again in England in order to reach the necessary scholastic level. My daughter, then aged fifteen, came to America to visit me in 1939, and had to stay there because of the outbreak of the war; young as she was, I had to send her to the university, because no school taught anything (except lying plutocratic propaganda) that she had not already adequately learnt.

All this is difficult to reform without a radical reform in politics, of a sort which seems very improbable, since it would have to go against the American conception of 'democracy.' According to this conception, not only are one man's political rights as great as those of another, but his judgment is equally to be respected on all points. On bimetallism or egyptology or astronomy, the opinion of an up-country farmer is allowed the same weight as that of a man who has spent his life in studying the question at issue; indeed, if popular passion is roused, the farmer's opinion has the greater weight, because he can find more people to agree with him. Nor is it only in opinion that conformity is demanded; in dress and manners and speech any departure from what is usual is frowned upon. A learned man must not be absent-minded, or display any of those amiable eccentricities described in Lamb's essay on Oxford in the vacation; he must learn to look and move like a business man, if he is not to be thought to be setting

himself up. This protective coloration gradually goes deeper, and in time, even in his dreams, he comes to prefer executive efficiency to thought and meditation. In Europe a man's profession can often be guessed from his demeanour, but not so in America, where the whole middle class apes the successful executive. All must be alike; none must be outstanding unless in income.

The intolerable boredom of such a vast uniformity is alleviated by certain tolerated forms of hero-worship; those who excel in athletics or the movies are allowed to be great, and have some of the privileges of aristocracy. But even for them there are strict limits; no movie star, however great, could avow himself or herself an agnostic and still appear on the screen. And as every one knows, an apparently virtuous life is essential, though a new wife or husband every few months is permissible.

There are in America very many individuals who are intelligent, high-minded, and in every way delightful; I have a large number of friends in that country whose friendship I value very highly. But unfortunately the system is such that almost all the most admirable people are devoid of power, and many of them know very little about how affairs are managed. In the public life of America, the best thing is the Federal Government, which is also what is most conspicuous; the worst things are those that happen under cover and do not become known. The power of the very rich, even under a Government that they abhor, is much greater than the average citizen supposes: they can give or withhold credit and custom and subscriptions, as advertisers they have a hold on the Press, and as trustees they control the majority of universities. A man who is in their bad books can succeed as an author, but in hardly any other career; that is why American literature is so largely radical.

It is to be hoped that the new world-wide responsibilities of the United States will lead to more respect for knowledge, and a greater readiness to accept guidance, in practical affairs, from those who have studied the matter in hand. In particular, to return to our earlier theme, we may not irrationally expect that supremacy will make American patriotism less uneasily self-assertive, and that the broad identity of interests between Great Britain and the United States will gradually soften the hatred of us which undoubtedly exists. It is of course the duty of every Englishman to do what he can towards this end, but a great part of the work will have to be done by Americans. The American Government is clearly aware of the necessity, and perhaps may find means to promote that friendly feeling without which the outlook for the world must be utterly black.

The problem is part of the larger problem of nationalism throughout the world. Since it has become impossible for even the most powerful nations to hold their own without the help of allies in war, the cruder forms of national self-assertion have everywhere become incompatible with self-preservation. This fact is not at all realised by the general public in America; I have frequently heard it said that, with the largest army, navy, and air force in the world, the United States could easily defeat a coalition of all other Powers. This state of mind is dangerous, and might lead in time to an attempt at world conquest. We in England have learnt (except for a few old men, some of them in high places) that it will not do to offend everybody; but many of us still have towards citizens of other countries the haughty attitude acquired during our period of unquestioned naval supremacy. It is a wholesome exercise to admit your own faults and other people's merits. In private life everyone knows this, but as between

nations those who claim a monopoly of patriotism are often blind to it. Human beings of different nations do not differ so much as they think they do; they have the same pains and pleasures, similar loves and hates, and an equal admixture of good and bad. Mutual hatred can only injure both; mutual esteem is enjoined not only by the moral law, but by common prudence.

BERTRAND RUSSELL, *Horizon* (1945)

THE QUEEN AND THE COMMONWEALTH

'THE Crown' has performed the even more remarkable feat of converting an Empire into a Commonwealth of independent nations. Incidentally we have mentioned above the Isle of Man and the Channel Islands. They have remained under the Crown and yet retained their own legislatures. When Englishmen (and Scots) made the perilous voyage across the Atlantic they, too, established, and were authorised to establish, their own legislatures, but they remained subjects of the King. Unfortunately that obstinate monarch George III got into controversy with his American subjects over the right of the Parliament of Great Britain to tax them. History now tells us that, to use the popular phrase, it was 'six of one and half a dozen of the other.' The result in any case was the tendentious, inaccurate, but extremely well-written piece of propaganda called 'the Declaration of Independence.' Thirteen of the American colonies became the United States of America with a republican Constitution: but there were other colonies in what we now call Canada and the West Indies. To them were added colonies in Australia, New Zealand, South Africa, Ceylon, East

and West Africa, Malaya, and the Pacific Islands. India was never a colony, and on the whole it was treated with rather less imagination than the colonies —or perhaps with too much imagination and too little realism. The mistake of George III was, however, never repeated. When Lord Durham was sent in 1839 to report on the constitutional problems of Canada, he said, in effect, that if a colony had its own legislature, it had to be allowed to govern itself except in matters of imperial concern. There were people in Britain who did not see how this could work, but it was really simple enough. The Queen could appoint Ministers for the United Kingdom, but she could also appoint Ministers for Canada. The Queen's Ministers in the United Kingdom could accept responsibility for matters of imperial concern and the Queen's Ministers in Canada could accept responsibility for matters of Canadian concern. In due course the matters of imperial concern diminished to nothing. The King's Ministers for the United Kingdom were responsible for the policy of the United Kingdom and the King's Ministers for Canada—which now stretched from sea to sea—were responsible for the policy of the Dominion of Canada.

The essential link was, and still is, the monarchy. To say that the Queen is Queen of Canada is not quite correct. She is Queen of all the territories that admit allegiance to her; she is one Queen and not a score of queens. This may read like metaphysics, but in fact metaphysics has been avoided. The Queen is a person and not an institution, and so she is one Queen. She has a score or more of governments, governing in her name. Of these seven are independent of each other—the United Kingdom, Canada, Australia, New Zealand, the Union of South Africa, Pakistan, and Ceylon. Two more, Southern Rhodesia and Malta, are almost independent. The

rest are controlled, in greater or less measure, by her Government in the United Kingdom: but some of them, notably the Gold Coast, are on their way towards independence.

The common relationship to the Queen is called 'allegiance,' but what it means in practice is not very easy to explain, for it differs in different parts of the Commonwealth. Generally speaking it means that a citizen of a Commonwealth country is a 'British subject' or a 'Commonwealth citizen'—the terms are interchangeable—but what that means depends on the local laws. In Britain a 'citizen of the United Kingdom and Colonies' has no greater rights than any other British subject: in South Africa he has no rights worth mentioning unless he happens to be of European descent.

What is important, though, is that—subject to a qualification to be mentioned presently—it is relationship to the Queen which determines membership of the Commonwealth. The idea of 'the Crown' has proved to be as flexible outside the United Kingdom as it proved to be inside. The British subject may speak French or Afrikaans, Urdu or Sinhalese, Chinese or Swahili. He may be a Christian or a Jew, a Muslim or a Hindu, a Buddhist or a Confucian. He may fly the South African tricolour, the Pakistani Crescent, or the Lion of Lanka; but he may also, if he pleases, fly the Union Jack. He may sing 'O Canada' or 'Advance Australia' or 'Die Stem van Zuid Afrika' or 'Namo, namo, matha'; but he may also, if he wishes, sing 'God Save the Queen.' When the Queen, as Princess Elizabeth, was to visit Ceylon it was arranged that she should be escorted to Colombo by the Royal Navy, the Royal Pakistani Navy, the Indian Navy, and the Royal Ceylon Navy. Everywhere in the Commonwealth the mails are the Royal Mails, engaged on Her

Majesty's Service. The relationships of the Commonwealth Governments are everywhere closer than the relationships of foreign governments, because they are all Her Majesty's Governments.

One disadvantage of this form of Commonwealth is that every one of its units must be a monarchy. Before Britain proved that a monarchy could also be a democracy—a proof supported by Belgium, the Netherlands, Denmark, Norway, and Sweden—it was thought that a monarchy was undemocratic. Even Joseph Chamberlain, before he became a Unionist, was a republican. It happens that the leaders of the Indian National Congress were brought up on Victorian political ideas, and so the Indian Constituent Assembly established a republican Constitution. It is not a very convincing document, for it is of a monarchical type. Instead of having a Governor-General appointed by the Queen on the recommendation of the Prime Minister of India, there is a President elected by an electoral college. From the point of view of machinery the result is exactly the same. Dr. Rajendra Prasad would have been Governor-General for five years; he is actually President for five years. The real difference is in the intangibles. India uses the word 'Union' or 'State' wherever another Commonwealth country would use 'Queen' or 'Crown.' Possibly that is an advantage, for the idea of 'India,' except as a geographical expression, is a very recent development in the long history of Asia. Perhaps the idea of union should be emphasised in order to offset disintegrating tendencies in a population so vast and so diverse. On the other hand the idea of monarchy is essentially Indian—in the neighbouring island of Ceylon, which shares the later part of the same history, the Queen is the latest of a line of monarchs which started a thousand years before there was an England—and it

is a much simpler idea than that of an amorphous, elusive, and intangible India. The Queen can have her picture in the papers; nobody has ever seen, or ever will see, the Union of India.

The issue was decided, as most political issues are, not by logic and experience but by emotion. Queen Victoria had proclaimed herself, with Disraeli's approval but against his better judgment, as Queen-Empress of India. Unfortunately it proved to be as bad a name as that given to the proverbial dog. In Asia if a person was objectionable, he was described not as a fool, a knave, or a cad but as an 'imperialist.' What is more the Congress politicians who fought for the freedom of their country, and now rule India, were necessarily opponents of the King-Emperor. British rule was the King-Emperor's rule: and so not only had the Emperor to go but the King too. On the other hand the Congress politicians were sensible people, realists like most Indians: they saw some advantages in being in the Commonwealth and not many disadvantages. Hence the Provisional Government of India informed the Government of the United Kingdom that India proposed to become a republic but wished to remain in the Commonwealth. This upset the pundits, who had been saying flatly that the Crown was the link that kept the Commonwealth together. The Prime Ministers of the Commonwealth, including India, were invited to Whitehall, and they brought their pundits with them. The Prime Ministers agreed forthwith that India might break the link but maintain the connection, and the pundits were told to put that into a formula. Actually the Government of India, no doubt in consultation with the Government of the United Kingdom, had already supplied the essential phrase. In relation to India the King was to become 'Head of the Commonwealth.' With that phrase all His

Majesty's Governments could agree. The difficulty was that they wanted the Head of the Commonwealth to be King also in relation to them. The problem was, therefore, so to draft the formula that those who preferred 'the King' to 'the Head of the Commonwealth' should be as satisfied as those who preferred the Head of the Commonwealth to the King. A great many pundits' heads were scratched for the next thirty-six hours, but they came together eventually and produced an agreed formula.

One must not exaggerate. The links which bound the members of the Commonwealth were far more substantial than the rather hypothetical link of the Crown. India proved it by wanting to stay: but the story shows how important is that extraordinarily flexible implement which the politicians and constitutional lawyers of England—for once it is England and not the United Kingdom—have devised.

If the Queen knew about everything that went on in her name she would be almost omniscient. Every day hundreds of thousands of people are acting in her name and millions are having dealings with her representatives. The Queen personally is not aware of it, but on the very morning on which this was written she received several letters from the Vice-Chancellor of the University of Ceylon. He was, for instance, very anxious to know whether the electric current which she had promised to supply by July would be enough; he also asked when he might expect a reply to a letter asking about the installation of telephones; he would be grateful if she would move certain furniture and clean the floors before he ordered university furniture to be put in; and so on. That kind of thing is constantly going on from Limehouse to Wagga Wagga.

Generally the Queen is 'the Crown,' the legal abstraction. If one starts exploring the stream of

political action, however, there is always the possibility that one will come upon the Queen in person, real flesh and blood. Amid the millions of pieces of paper circulating 'On Her Majesty's Service,' one will be found signed with the Queen's own hand—the 'sign manual,' Elizabeth R. Even that may be a fiction, for it may be a mere facsimile, printed under legal authority to save her time and energy. Nor is it always easy to say when the Queen in person will be involved, for it depends primarily upon her energy and range of interests.

One thing clearly she must do. She must make certain that she has a Government in the United Kingdom. Incidentally she has to make certain that she has six or more other Governments in the Commonwealth, but this she does by deputy; and, besides, we must not confuse the story, like Charles Dickens, by trying to tell seven stories at once. We are so accustomed to the idea that the day Mr. Attlee moves out of 10 Downing Street, Whitehall, S.W.1; Mr. Churchill moves in, that we forget how this remarkable coincidence occurs. 'The King's Service,' said the Duke of Wellington in 1834, 'must be carried on'; and so he took over the reins of government while Sir Robert Peel was posting home from Rome in what the newspapers would now call the 'record time' of nine days. In relation to this particular function the Queen in person must see that the Queen's Service is carried on.

This is usually an easy task. When in 1951 we heard the last (or almost the last) of the election results come over the wireless, we all knew the necessary consequence. Mr. Attlee would go to Buckingham Palace and tender his resignation; the King would thank him for his services and ask him to remain in office while he, the King, made other arrangements; the King would then send for Mr.

Churchill and ask him to form a Government; Mr. Churchill would not be surprised by the request, but for the sake of the record he would go away to consult his friends; and back he would go to accept office. The task was simple because the Constitution had supplied the answer. The Labour Party had lost its majority in Parliament and no longer had either right or power to govern; the Conservative Party had gained a majority in Parliament, and its leaders had both the right and the duty to form a Government. The fact that the task is usually easy, though, must not cause us to forget that somebody has to do it. Suppose a defeated Prime Minister did not resign? The answer is, no doubt, that the House of Commons would at the first opportunity pass a vote of no confidence. In fact, until 1868 that was the normal procedure. Suppose the Prime Minister still did not resign? The case has never happened because our political leaders always obey the rules; but if it did happen there could be no doubt about the Queen's duty: she would send a polite note of dismissal and commission the leader of the successful Opposition to form a new Government.

Even when everybody is anxious to obey the rules the task is not always easy. Though the British elector prefers the two-party system, the Ins and the Outs, there are periods of transition, like that from 1918 to 1935, when three parties are operating. If there were three parties of equal size, it is possible to have one of three types of minority government or one of three types of coalition. Nor does it follow that one of the three leaders would of necessity be Prime Minister. The Prime Minister of a coalition might well be a moderate man acceptable to both parties, rather like the Lord Aberdeen whose coalition took Britain into the Crimean War in a fit of absent-mindedness.

Again, the office of Prime Minister may suddenly fall vacant through his death or resignation, leaving the party in power without a recognised leader. The Queen then has the task not only of choosing a Prime Minister, but also, in effect, of choosing a party leader. It may not be an easy task. Politicians like actresses prefer to have their names at the top of the bill and, again like actresses, they can be very temperamental. There may also be constitutional issues involved. On the resignation of Bonar Law in 1923, George V had to find a Conservative Prime Minister. Several of the Conservative leaders were in Opposition, for they had supported Lloyd George at the break-up of his coalition. The choice lay between Baldwin, who had had only a very short Cabinet experience, and Lord Curzon, a peer, not as popular as he was able, and the victim of an undergraduate rhyme which made him 'a very superior person.' The King decided, after consulting several elder statesmen, that, with the Labour Party as the main Opposition, it was desirable that the Prime Minister should be in the House of Commons. This excluded Lord Curzon, who was by no means pleased with the decision.

A problem which arose in South Africa in 1939 might easily arise in Britain. The Prime Minister disagreed with his colleagues in the Cabinet over an issue of great importance—the declaration of war. Instead of resigning he advised the Governor-General to dissolve Parliament, evidently expecting that, after the election, he could reconstruct his Government more to his way of thinking. The Governor-General thought this an abuse of the King's prerogative of dissolution, and refused to accept the advice. Thereupon the Prime Minister resigned, leaving to the Governor-General the task of finding a new Prime Minister, a task which in this instance proved to be easy.

These examples show that the Queen is no mere figurehead. She does not steer the ship, but she has to make certain that there is a man at the wheel. Nor is it always easy to know when the problem will arise. Neville Chamberlain in 1937 had a large majority, but by 1940 George VI was looking for a Conservative Prime Minister who could secure Labour as well as Conservative support—and found him in Mr. Churchill.

It is, however, true that the cases are exceptional. Normally the machine runs efficiently because the Government has a majority and, if it loses it at an election, a Government will be formed by the Opposition. If the Queen chooses to let the machine run she can do so. Except in Army matters Edward VII was not very interested in the problems of government, and so his Prime Ministers—Balfour, Campbell-Bannerman, and Asquith—tended to forget him. If, on the other hand, the Queen is as conscientious as her father or Queen Victoria she can exercise considerable influence.

In the long run, of course, the policy of the country must be determined by the party in power, but it is far from being the case that the party policy determines the line of action without discussion or debate. It is not a question of turning on one of two taps, marked respectively 'Conservative' and 'Labour.' The process is much more like that in a chemist's shop, where almost any concoction can be made, whether to kill or to cure. What is more, the Cabinet has to write the prescription. The problem of government, it has been said, is the problem of choosing the better of bad alternatives. The Cabinet's choice is not necessarily the best, even when it has had the assistance of the civil service and the writers of leading articles. If the Queen chooses to read the documents and keep herself informed in other ways,

her advice may well be worth listening to. For most politicians the end of the road, at least for the present, is the next general election: the Queen can afford to look beyond and to point out that a solution which seems the best in the short run may be the worst in the long run.

Capacity to advise depends primarily on an odd quality called 'judgment.' It is not often associated with academic brilliance or political popularity. It is indeed often the product of a rather slow-moving mind. The man who jumps to inspired conclusions often forgets one-half of the problem. The popular orator has often finished his speech before he has thought out what he ought to say. The good solid citizen who has assimilated a long experience and conscientiously studied every question as it arises is more likely to be right than the virtuoso. What is usually wanted is sound common sense, and in politics that is rarer than its name would suggest.

To say that Queen Victoria possessed this sort of judgment would be an exaggeration. She was quite often swayed by her emotions, as Disraeli knew when he played upon them. On the other hand, she lived a truly Victorian life of virtuous toil. Towards the end of her long reign she had been longer 'in politics' even than that sprightly and (as some thought) incorrigible old man William Ewart Gladstone. What is more, while Gladstone had sometimes been 'in' and sometimes 'out,' she had been 'in' since the age of eighteen; and she had a remarkable memory. Of her successors George V and especially George VI had something of the same capacity for hard work and a capacity for judgment above the average. To have such a person at the centre of affairs, cool, calm, and judicious, is a great advantage, especially with a brilliant but wayward Prime Minister.

It must be remembered that the Queen has on her

table nearly all the documents that go to the Prime Minister. A person who has the responsibility for decision is apt to read them more carefully than one who has not; but every administrator knows the tendency to think out the consequences and reach a conclusion even when somebody else has the responsibility. If the reader has been a careful student of daily newspapers and weekly reviews for twenty years his mind will have moved away from the slogans which all parties use and will induce him to lay down the law in the home or the pub or the club. The Queen has not one newspaper a day but dozens of them, carefully marked by her staff so that her attention may be drawn to the more significant items. She also has more weeklies and monthlies than a public library. To all that must be added every confidential document that goes to the Cabinet and some that do not, every blue book and white paper, the letters from ambassadors and Governors-General, the talks with distinguished men and women who are invited to dine and sleep, and so on.

If only a fraction of this material be digested, the Queen can make herself one of the most learned people in her Commonwealth. What is wanted, though, is not so much learning as a capacity to understand the nature of a problem. The real difficulty of government is to take a decision which may have profoundly important consequences. Its elements mill round in one's head until they begin to sort themselves into a pattern. If while this process is going on one can 'think aloud' in the presence of one who has the same problem in his head the process of sorting out becomes much easier. To sleep on a problem is always helpful, because the refrain which seems to dominate the orchestra to-day may have diminished in volume to-morrow; but the same result can be achieved to-day by talking to a person

who hears a different refrain. Last time we had a Queen, Walter Bagehot said that the monarch had the right to be consulted, the right to encourage, and the right to warn. That is not quite what happened under George VI, and it probably will not happen under Elizabeth II. To express a doubt is often more helpful than to formulate a criticism; to throw in a casual remark is often more helpful than to write a memorandum. The easy personal relationship that George VI maintained with his Ministers probably had more influence than the letters which Queen Victoria wrote in such profusion.

SIR IVOR JENNINGS, *The Queen's Government*

THE PARTY SYSTEM

OUR Party System does not mean, as many people suppose, that differences of opinion always divide human beings into parties. Such differences existed ages before the Party System was ever dreamt of.

What it means is that our monarchs, instead of choosing whom they please to advise them as Cabinet Ministers in ruling the realm (to form a Government, as we say), must choose them all from whatever party has a majority in the House of Commons, however much they may dislike them or mistrust their ability, or however obvious it may be that a more talented Cabinet could be formed by selecting the ablest men from both parties.

This system carries with it some quaint consequences. Not only must the King appoint to high offices persons whom he may privately regard as disastrous noodles, or whose political and religious principles he may abhor: the ordinary member of Parliament and the common voter are placed in a similar predicament, because every vote given in the House or at a parlia-

mentary election becomes a vote on the question whether the Party in office is to remain there or not. For instance, a Bill is introduced by the Government to allow women to vote at the same age as men, or to put a tax on bachelors, or to institute pensions for widowed mothers, or to build ten more battleships, or to abolish or extend divorce, or to raise the age for compulsory school attendance, or to increase or diminish taxation, or anything else you please. Suppose this Bill is brought in by a Conservative Government, and you are a Conservative member of Parliament! You may think it a most detestable and mischievous Bill. But if you vote against it, and the Bill is thrown out, the Conservative Government will no longer be in a majority, or, as we say, it will no longer possess the confidence of the House. Therefore it must go to the King and resign, whereupon the King will dissolve Parliament; and there will be a General Election at which you will have to stand again (which will cost you a good deal of money and perhaps end in your defeat) before anything else can be done. Now if you are a good Conservative you always feel that however much you may dislike this Bill or that Bill, yet its passing into law would be a less evil than an overthrow of the Conservative Government, and the possible accession to power of the Labor Party. Therefore you swallow the Bill with a wry face, and vote just as the Government Whips tell you to, flatly against your convictions.

But suppose you are a member of the Labor Party instead, and think the Bill a good one. Then you are in the same fix: you must vote against it and against your convictions, because however good you may think the Bill, you think that a defeat of the Government and a chance for the Labor Party to return to power would be still better. Besides, if the Bill is good, the Labor Party can bring it in again and

pass it when Labor wins a majority.

If you are only a voter you are caught in the same cleft stick. It may be plain to you that the candidate of your Party is a political imbecile, a pompous snob, a vulgar ranter, a conceited self-seeker, or anything else that you dislike, and his opponent an honest, intelligent, public-spirited person. No matter, you must vote for the Party candidate, because, if you do not, your Party may be defeated, and the other Party come into power. And, anyhow, however disagreeable your candidate may be personally, when he gets into the House he will have to vote as the Party Whips tell him to; so his personal qualities do not matter.

The advantage of this system is that a House of Commons consisting of about a dozen capable ministers and their opponents: say twenty-five effectives all told, and 590 idiots with just enough intelligence to walk into the lobby pointed out to them by the Whips and give their names at the door, can carry on the government of the country quite smoothly, when 615 independents, with opinions and convictions of their own, voting according to those opinions and convictions, would make party government impossible. It was not, however, on this ground that the Party System was introduced, though it has a great deal to do with its maintenance. It was introduced because our Dutch king William the Third, of glorious, pious, and immortal memory, discovered that he could not fight the French king, Louis XIV, *le Roi Soleil*, with a House of Commons refusing him supplies and reducing the army just as each member thought fit. A clever statesman of that time named Robert Spencer, second Earl of Sunderland, pointed out to him that if he chose his ministers always from the strongest party in the House of Commons, which happened just then to be the Whig

party, that party would have to back him through the war and make its followers do the same, just as I have described. King William hated the Whigs, being a strong Tory himself; and he did not like Sunderland's advice. But he took it, and thereby set up the Party System under which we are ruled.

Is there any practicable alternative to the Party System? Suppose, for instance, that there was a general revolt against being compelled to vote for dummies and nincompoops, and that independent candidates became so popular that all party candidates were defeated by them, or, if you think that is going too far, suppose independent candidates returned in such numbers that they could defeat any Government by casting their votes in the House against it, like the old Irish Nationalist Party! Such a revolt already exists and always will exist. The upshot of the General Elections is determined, not by the voters who always vote for their party right or wrong, but by a floating body of independent electors who vote according to their interests and preferences, and often support one party at one election and the opposite party at the next. It is these unattached people who win the odd trick which decides which party shall govern. They either know nothing about the Party System, or snap their fingers at it and vote just as they please. It is probable that they outnumber the party voters, and return party members to Parliament only because, as no others are selected as candidates by the party organisations, there is seldom any independent candidate to vote for.

It is conceivable that the King might some day find himself confronted by a House of Commons in which neither party had a majority, the effective decision resting with members belonging to no party. In that case His Majesty might appeal in vain to the party leaders to form a Government. This situation

has occurred several times of late in France, where it has been brought about by the existence in the French Chamber of so many parties that none of them is in a majority; so that a leader can form a Government only by inducing several of these parties to combine for the moment, and thus make what is called a Block. But this is not always easy; and even when it is accomplished, and the Blockmaker forms a Government, it is so hard to keep the Block together that nobody expects it to last for five years, as our party governments do: its lifetime is anything from a week to six months. There have been moments lately in France when we did not know from one day to another who was Prime Minister there, M. Briand, M. Herriot, M. Painlevé, or M. Poincaré. And what has happened in France may happen here, either through an overwhelming party majority causing the party to split up into hostile groups and thus substitute half a dozen parties, all in a minority, for the two parties which are necessary to the working of the Party System, or through the return of enough independent members to make any Party Government dependent on them. You will therefore be justified if you ask me rather anxiously whether Parliament can not be worked on some other than the Party System.

As a matter of fact in this country we have, beside the House of Commons, parliaments all over the place. We have the great city Corporations, the County Councils, the Borough Councils, the District Councils, and so on down to the Parish meetings in the villages; and not one of them is worked on the Party System. They get on quite well without it. If you mention this, you will be at once contradicted, because on many of these bodies party feeling is intense. The members hold party meetings. The elections are fought on party cries. Votes are taken

on party lines, and members of the party which is in the minority are sometimes excluded from the committee chairmanships, which are the nearest things to ministerial offices available, though such exclusion is considered sharp practice if pushed too far. But all this does not involve the Party System any more than a pot of jam and a pound of flour constitute a roly-poly pudding. There is no Prime Minister and no Cabinet. The King does not meddle in the business: he does not send for the most prominent men and ask them to form a Government. There is no Government in the House of Commons sense of the word, though the city or county is nevertheless governed, and often governed with an efficiency which puts the House of Commons to shame. Every member can vote as he thinks best without the slightest risk of throwing his party out of power and bringing on a General Election. If a motion is defeated, nobody resigns: if it is carried, nobody's position is changed. Things are not done in that very puzzling way.

The way they are done is simple enough. The Council is elected for three years; and until the three years are up there can be no general election. Its business is conducted by committees: Public Health Committees, Electric Lighting Committees, Finance Committees, and so forth. These committees meet separately, and set forth their conclusions as to what the Council ought to do in their departments in a series of resolutions. When the whole Council meets, these strings of resolutions are brought up as the reports of the Committees, and are confirmed or rejected or amended by the general vote. Many of our Labor members of the House of Commons have served their parliamentary apprenticeship on local bodies under this straightforward system.

The two systems, though widely different today,

spring from the same root. Before Sunderland prompted William III to introduce the Party System, the King used to appoint committees, which were then all called cabinets, to deal with the different departments of government. These cabinets were committees of his Council; and in this stage they were the model of the municipal committees I have just described. The secretaries of the cabinets, called Secretaries of State, met to concert their activities. The activities thus concerted formed their policy; and they themselves, being all cabinet ministers, came to be called THE Cabinet, after which the word was no longer applied to other bodies. In politics it now means nothing else, the old cabinets being called Offices (Home Office, War Office, Foreign Office, etc.), Boards, Chanceries, Treasuries, or anything except cabinets.

The rigidity of the Party System, as we have seen, depends on the convention that whenever the Government is defeated on a division in the House, it must 'appeal to the country': that is, the Cabinet Ministers must resign their offices, and the King dissolve the Parliament and have a new one elected. But this leads to such absurd consequences when the question at issue is unimportant and the vote taken when many members are absent, and at all times it reduces the rank and file of the members to such abject voting machines, that if it were carried out to the bitter end members might as well stay at home and vote by proxy on postcards to the Whips, as shareholders do at company meetings. Such slavery is more than even parliamentary flesh and blood, to say nothing of brains, can stand; consequently Governments are forced to allow their followers some freedom by occasionally declaring that the measure under discussion is 'not a Party Question,' and 'taking off the Whips,' which means that members may vote as they

please without fear of throwing their Party out of office and bringing on a General Election. This practice is bound to grow as members become more independent and therefore more apt to split up into groups. The tendency already is for Governments to resign only when they are defeated on an explicit motion that they possess or have forfeited the confidence of the House, except, of course, when the division is on one of those cardinal points of policy which, if decided against the Government, would involve an appeal to the country in any case. No doubt the Whips will continue to threaten weak-minded members that the slightest exercise of independence will wreck the Government; and those whose election expenses are paid out of party funds will find that when the Party pays the piper the Whips call the tune; but I think you may take it (in case you should think of going into Parliament) that the House of Commons is becoming less and less like a stage on which an opera chorus huddles round a few haughty soloists, never opening its hundred mouths except to echo these principals and give them time to breathe. It is already evident that the more women there are in the House, the more refractory it will be to the logical extremes of party discipline, and the sooner party questions will become the exceptions and open questions the rule.

Here, however, I must warn you of another possibility. The two Houses of Parliament are as much out of date as instruments for carrying on the public business of a modern community as a pair of horses for drawing an omnibus. In 1920 two famous Socialist professors of political science, Sidney and Beatrice Webb, published a Constitution for the Socialist Commonwealth of Great Britain. In that Constitution the notion of going on with our ancient political machinery at Westminster is discarded as

impracticable, and its present condition described as one of creeping paralysis. Instead, it is proposed that we should have two parliaments, one political and the other industrial, the political one maintaining the cabinet system, and the industrial one the municipal system. I cannot go into the details of such a change here: you will find them in the book. I mention it just to prepare you for such happenings. Certain it is that if our old Westminster engine is left as it is to cope with the modern developments of Capitalism, Capitalism will burst it; and then something more adequate must be devised and set up, whether we like it or not.

BERNARD SHAW,
The Intelligent Woman's Guide to Socialism

WHAT IS LAW ?

'O great and sane and simple race of brutes,
That own no lust, because they have no law.'
TENNYSON

LAW has been defined as 'the just interference of the State in the interests and passions of humanity.' It will hardly be seriously disputed that it is necessary for the State to interfere in the affairs of the community to a greater or lesser degree, since community life would be a sad tangle if there were no laws or rules which had to be observed by all.

The average schoolboy will admit that his school would never function successfully without rules, and most boys prefer rules to be laid down with precision, for the more exact the definition, the better the boy understands his place in the school and the duties and obligations which he has to observe. Rules also help him to understand the meaning of co-operation, and even in schools which cater for the individual ego there is some limit to the latitude allowed to the

children. They are not, for instance, permitted to murder their masters, or to set fire to the school buildings. As a rule, the guiding principle of such schools is that a child is entitled to freedom, so long as he does not abuse that freedom by injuring others, but it is doubtful if a narrow interpretation and the absence of discipline help the child to understand the importance of co-operation, as distinct from rugged individualism.

It seldom occurs to anyone that when children have left school it is equally desirable for them to learn something of the rules which govern community life. They are rarely instructed as to what they may or may not do, and they are usually ignorant of the procedure laid down for the adjustment of disputes between individual members of the community. Although, however, they know little or nothing of these rules, they rarely hesitate to grumble at them, particularly when they realise how easily they are infringed. Yet the community has returned a Socialist Government to power for the first time in English history, and it has not been intimidated by the threat that Socialism would add to the spate of rules and regulations which have poured almost daily from Government offices since 1939. The majority of us are, apparently, prepared to abandon a certain amount of freedom, because we realise 'controls' are essential to the reconstruction of the world, in much the same way as scaffolding is required in the erection of a new building. When the building is finished, the scaffolding may be removed, and when the world has been rebuilt we may hope for the removal of the present restrictive controls—but this does not mean that even then we can dispense with all our rules. For example, when you are out cycling after dark without a light, and a policeman stops you and lays his hand on your shoulder, you may be infuriated

at this attack on your liberty. When, however, you appear in Court, a few days later, charged with the legal offence of cycling after dark without a light, you are not charged with this offence because the 'Government' is totalitarian or tyrannical. In fact, in a democracy, the 'Government' consists of the lawfully appointed representatives of the people. The Government will not object if you wish to career round your garden at night on a bicycle without a light, for in such a case you will only be a danger to yourself. It is, however, the duty of a Government to protect the community from the antics of irresponsibility. It is too late to remedy the disaster when a pedestrian is knocked down and killed by a cyclist riding at night without a lamp, so it is the duty of the Government to look ahead and endeavour to forestall accidents of this character. It therefore requires cyclists to carry lamps at night because it has a greater duty to safeguard the community as a whole than to respect the freedom of the individual.

If, in fact, everyone respected the rights of every other member of the community, we should not require any rule or law to deal with or punish crime. As, however, crime is in our marrow, it is necessary to define the exact nature of every criminal offence and prescribe the punishment to be exacted for breaking any particular rule. Even the disappearance of crime would not, however, relieve the country of its obligations to make laws. We should still require rules to regulate our relations with each other. Rules are necessary in every phase of life, even if we are engaged only upon a game of ping-pong, although in such an event infraction of the rules may not involve legal consequences.

Many rules which involve legal obligations are made by Acts of Parliament, and they are then known as Statute Law. Statute-making became a regular

practice in the thirteenth century. Before any rules derived from an Act of Parliament have the force of law to-day, the Government, or one or more Members of Parliament—*i.e.* the House of Lords or the House of Commons—must present a Bill setting out the proposed rules in exact terms. The Bill must be read and approved three times in the House of Commons, and also in the House of Lords, before it can receive the formal assent of the King. Thereafter it becomes law, and is placed upon the Statute Book. No law may be enacted without the direct or indirect approval of the House of Commons. As England is a democracy, and the Members of Parliament who constitute the Government are elected by the people, such laws may be said, accordingly, to represent the will of the people.

Statute Law, however, is applicable to only some of the problems which arise in the daily contacts which take place between individual members of the community. When, therefore, a dispute is brought before a tribunal for decision, and there is no Statute Law applicable, the Judge must find his solution to the problem by other methods. After he has heard all the relevant facts, he must consider what recognised legal principles are to be applied before he delivers his judgment. When a judgment is given in the High Court of Justice, a branch of the Supreme Court of Judicature in England, the judgment becomes almost invariably part of the law of the land, in the same way as a Statute. It is then known and described as part of the 'Common Law.' Common Law is therefore of an entirely different character from Statute Law, and the Common Law dates back to the Middle Ages, when Courts of Law were first firmly established in this country. From the outset, cases came for trial before the Courts which could not be decided by reference to any law on the Statute Book.

For the sake of convenience, it therefore became the practice when a Judge delivered his judgment for such judgment to become what is called a 'precedent,' and in this way the Common Law was built up on precedent. In any other case which involved similar facts the Judge who tried it had to deliver a similar judgment. To-day every Judge is bound by precedent, and when a judgment is delivered in the House of Lords—the final appeal tribunal of the country—only Parliament, by the enactment of a new Statute, can remake the law on the point in question. Frequently, in fact, laws are enacted which codify the existing Common Law, but many cases which are tried in the English Courts are still decided by the application of the principles of Common Law. The expression 'Common Law' is, accordingly, habitually used by lawyers to distinguish a class of case which is almost exclusively founded on 'precedent' as distinct from Statute Law, but the Common Law may never override Statute Law.

There is one other source which has greatly enriched our English legal system. It is known as 'equity'—*i.e.* 'right' or 'justice'—but we shall not stop to consider it here, because it lost much of its importance over seventy years ago with the passing of the Judicature Act 1873. Lawyers still speak of 'equity' and the 'equitable jurisdiction' of the Courts, for it has had such a powerful influence on legal history that no outline of English law could properly exclude a reference to the subject.

What does the average citizen mean when he says he is 'going to law'? He means that he intends to invoke the assistance of the Courts, in order to assert what he believes to be his legal rights. Since everyone is bound by the law, everyone is entitled to ask for its assistance against a defaulting member of the community.

A man goes to law because he believes the laws are fairly administered, and, subject to all-too-many human imperfections, he is not far wrong. He may rest assured that his complaint will be listened to with care. He will not run any serious risk of being told that he is in the wrong, because of political or other improper influence. He will receive a fair trial, and the strict impartiality with which his complaint will be heard and considered is the foundation upon which the whole of our present ordered structure rests.

If this were not so, the result would be disastrous. Indeed, you would not bring an action—the technical way of 'going to law'—unless you felt assured of an impartial hearing of your case. You would not be so foolish as to waste your time and money, if you thought the result could be influenced by bribery or corruption, or if you feared that politics would enter into the case. You would in such circumstances hold the legal system in contempt. What, then, would be the result if you had no legal remedy for an injustice? Swindlers, already a burden on the community, would multiply in the same way as other rats. Most of them, at present, still act with a certain caution and respect for the law, but if they realised they could break agreements or commit fraud without fear of the consequences, all observance of the law would immediately cease. Under such conditions civil administration would collapse, and would be followed by unrestricted crime. When I can punch your nose with impunity because you are weaker than I am, and when a felon can break into a house and steal without risk, it follows that the thugs will do exactly as they please. When there is no punishment and no retribution, thieves and bullies will assume full control of the activities of the community. Nazi Germany provided an outstanding example of this calamity. After 1933 a Judge was rarely allowed to

adjudicate any dispute on its merits. He was compelled to give his decision according to the interests of the Nazi State. Unless the claimant was a National Socialist, he had no legal rights. Many German Judges would not accept these conditions, and they were compelled to resign. Others were at once appointed in their place, because Hitler could retain control only so long as the Judges were willing to carry out his instructions. 'Racks, gibbets and halters were their arguments,' and if a German Socialist or a German Jew had been entitled to a fair trial of his complaint on its merits, there would have been a speedy end to the Nazi regime. A strong and impartial judicial system is the first essential in any country which makes claim to be recognised as a civilised community.

Why, then, do people so often scoff at the law? There are, no doubt, a variety of reasons; but, of these, ignorance predominates. Very few people are able to appreciate the problems involved in their true perspective, and are far too tempted by the attractions of exaggeration. They will refer you to cases in which the law has been abused, or a criminal has escaped detection or conviction, and they will cite these cases as examples of the futility of the law. Alternatively, perhaps, they will give you particulars of cases of injustice, which are true and deplorable, and they will use these instances to prove our legal system is worthless. They fail, utterly and entirely, to recognise that the law in England has to cope with a population which exceeds 40,000,000 individuals. If 400,000 of these suffer from some injustice in a greater or lesser degree, it represents less than 1 per cent of the population, and it leaves 99 per cent of the people in a position to benefit from the protection given to them by the law. Far be it from me to be complacent at injustice to 400,000—if this

number were accurate. It is a terrifying total when each figure represents a human soul. On the other hand, lawyers are not superhuman, and do not claim to be so. They are not immune from the general shortcomings of mankind. The problem involved in the endeavour to make rules which are to be sufficiently flexible to be just to every member of a community of over 40,000,000 individuals is beyond human capacity. Our best efforts are bound to fall far short of perfection.

The machinery of law has, in fact, changed beyond all recognition in the past hundred years. It has moved with the times and has been modernised, and even although it still has so many imperfections, there is a genuine desire among the majority of lawyers to remove impediments to justice and to assist in providing legal machinery adequate to the involved needs of modern life. Justice must, however, always be uncertain, however lofty our intentions may be. Every Judge is himself John Citizen, a member of the community, and he is subject to the same limitations of human intelligence, and has all the failings of our common lot. Two Judges may honestly arrive at two different opinions on identical facts. No man can say which of them, if either, is right. For this reason, even trained lawyers are unable to forecast the result of a lawsuit. It is made more uncertain, since no one can say exactly what evidence will be given by the opposing witnesses when they testify in Court, nor does anyone know how the Judge will react to the evidence of each witness. It is not the function of a Judge to decide a legal question until after the facts have been presented and analysed. Facts enable you to form a judgment, but as your neighbour's reaction to any given facts may be totally different from yours, you may each arrive at a totally different judgment.

You may be convinced in your mind that you performed a certain act on a certain day. If you are involved in litigation, and you give evidence to prove this fact, you may testify with complete honesty. Later, when your opponent gives his version of the case, he may tell a convincing story which is quite different from yours. This may not be due to any deceit on his part. He may feel as convinced as you do that he is telling the truth. The result, however, is that the Judge is confronted with two sets of facts which bear little resemblance to each other. Nevertheless, he must deliver his judgment. Since he is human, he will, of course, accept the evidence of the witness who has made the better impression. If he prefers the evidence of your opponent, and you are the disgruntled loser, you may leave the Court murmuring that there is no such thing as justice. This is very human, but very unreasonable. There is a loser to every lawsuit, and although there are many dishonest people, the majority of actions are contested by parties each of whom believes himself to be honest. When losers complain that it is the law which is at fault—that being the way of human nature—you learn of another reason why the law is unpopular. Many of those who hold the law in contempt never attempt to appreciate problems of this character, because critics are often as small-minded as those whom they criticise.

When you are willing to concede that the most honest legal system can never be infallible, you will the better understand the legal obligations of members of the community, as well as their legal rights. An obligation is a duty, and whilst it is generally recognised that crime is a wanton breach of duty, we do not so readily realise the extent of our legal obligations in our ordinary day-to-day contacts with our fellows. When we appreciate the vital truth, that

every legal right involves a legal obligation, many existing evils will disappear. If we ever realise that the real key to so many of our misfortunes is a failure to carry out these obligations, and a failure to observe the spirit as well as the letter of the law, we shall be on the way to Utopia. Nevertheless, this prospect places us in a predicament, for we shall only achieve such an ambition after our passions have become like the cold ash of an extinguished fire.' When that is achieved, we shall scarcely be justified in classing ourselves as 'human' beings, and Utopia may prove to be a dull affair.

RONALD RUBINSTEIN, *The Citizen and the Law*

WHAT IS ECONOMICS ABOUT?

ECONOMICS is about the everyday things of life; how we get our living and why sometimes we get more and sometimes less. Nowadays everybody realises the important part played in their lives by economic factors because the war, and the problems left by the war, have upset the ordinary routine to which we had become accustomed. There was a time when we took it for granted that the shops should be full of things we wanted to buy, and our only concern, from the economic point of view, was in wondering how we could get enough money to allow us to choose from amongst the quantity and variety of goods offered to us. As long as we had a job which brought in a reasonable income per week we assumed that there would be the things to buy and, unless prices altered very rapidly, we didn't usually bother our heads much to inquire why a loaf of bread cost 3d. and a packet of cigarettes cost 3d. Since the war, however, we have been brought up sharp against the complexities of the economic

world; and the scarcity of hundreds of the articles on which we had come to rely has made us realise the extent to which we are dependent on the four corners of the world for the goods we use in our day-to-day life.

There was a time when each family actually produced for itself most of the things it needed for its everyday life; it grew its own food, and made its own clothes and household equipment. In such circumstances there is an obvious and inescapable connection between the resources of the neighbourhood, the work done by the people who live there and the kind of life they live; and nobody bothers very much to speculate about the whys and the wherefores. If you have little to eat, it is because the land is not fertile, or a storm destroyed the crops, or you have not worked hard enough—something that is easy to understand. There are still some countries, India, for example, or China, where that kind of production is still the rule, but it is a long time since it ceased in this country and, for the matter of that, it is fast disappearing all over the world. Apart from growing a few vegetables in the garden, or knitting a jumper or two, most of us have no idea how to make the dozens of different things we use in the course of a day and should not have the slightest conception how to set about getting them if we could not buy them at a store. The breakfast table seems a humdrum affair enough; but if we think of the origin of the goods that were collected on it this morning it sounds more like the gift of a fairy godmother. The porridge oats came from Canada or Scotland, the wheat for the bread from U.S.A. or Argentine or, perhaps, England, the bacon came from Denmark or Ireland, the butter or margarine from New Zealand, the tea from India or Ceylon, the coffee from Brazil, the marmalade was made from oranges from Spain or California or

Palestine with sugar from the West Indies. The tablecloth was made of cotton grown in Egypt or America or India, and woven in Lancashire, the cups and saucers and the knives and forks were almost certainly manufactured in England. All these things were bought at a shop and paid for with money earned by work as a clerk or an engineer or a tram-driver or punching eyelet holes in shoes, for we specialise in doing one thing—it may be only a tiny process in the manufacture of an article—and with the payment we get for our work we buy the things we want from others.

In the modern world, therefore, the relationship between work and wants is much less direct than it used to be, for most of us spend our time making things for sale and not for our own use. This specialisation, which is the characteristic of the modern economy, enables us to enjoy things of which our grandfathers never dreamed, motor-cars and bicycles and planes, vacuum cleaners and refrigerators, rayon and plastic clothing, more varied foods, and all sorts of other goods, but it also makes the world very much more complex. We make for a market, so that the price we get from what we do, and the prices we have to pay for the things we want to buy, come to be of dominating importance, and anything which alters these prices has an immense influence on our lives. Our whole livelihood may be ruined by something happening in a far corner of the world; the Lancashire cotton weaver, for example, may find his pay packet smaller because the boll weevil has destroyed the cotton crop in the U.S.A. or because Indians desire national independence. Or the price of coal may go down because scientists find out how to harness water power to generate electricity in Italy.

We are all, in fact, bits of a gigantic jigsaw puzzle,

and it is not until we begin to see the pieces fitted together that we get any idea of the general pattern. Who decides what shall be produced in different places and arranges for it to be done? Why does the bacon come from Denmark and the cutlery from Sheffield? Who settles how much each of us has to spend—why do some of us get £6 a week and others £5000 a year?

The obvious question to ask at this point is, Why bother about the general pattern? Why cannot we content ourselves with doing our work and spending our incomes without bothering our heads about the way in which it fits together? The answer is that we bother because we are not satisfied with it and would like it to be different. We know that there are hundreds of thousands of people living in narrow poverty, that many are perpetually haunted by the fear of the future and the unemployment it may bring, that there is an enormous amount of misery and disease, that thousands live in insanitary, overcrowded houses, and that all sorts of unhappiness might be prevented by different economic conditions.

Need we be poor? Are we producing as efficiently as we could? and, if not, why not? and how could we do better? Are we producing the 'right' things? What are the 'right' things? Who ought to decide this and why? Is specialisation always a 'good' method of production? and in what sense 'good'? Might we become too dependent on foreign supplies and does this matter? Is it better to buy goods produced in your own country? 'Better' in what sense? Does it make one richer? or safer? or what? Is monopoly better than competition? always? sometimes? in what circumstances? Why does a miner usually earn less than a doctor? and what would happen if you insisted that they should get the same amount? Why does the Government settle some

prices and not others; and who settles the price if the Government doesn't?

These are the sort of questions that a study of economics helps us to answer, and they are the kind of questions which underlie the issues on which the ordinary citizen votes at elections. If a motor-car breaks down nobody but a fool expects to be able to repair it without some elementary understanding of the mechanism, and the economic system is a good deal more dangerous to tinker with than a car. Unfortunately it is also much more difficult to understand, and there are two main reasons for this.

1. The various bits and pieces of a car are identical in all the cars of one pattern, and you know exactly how each bit works in relation to the others. But the bits of the economic system are human beings who are not identical and whose actions cannot be precisely calculated or foretold.

2. More important than this variability of human actions is the fact that you cannot separate people's economic activities from the remainder of their lives, and that all sorts of things which are not primarily economic influence the way in which men and women behave in earning and spending their incomes. We are not robots, and there is no such thing as an economic man. We all live in social groups, and the things we value or despise, the kinds of behaviour that we extol or condemn, or simply take for granted as natural, and the ends for which we are ready to make sacrifices, are all products of our cultural codes of behaviour. From our earliest moments we are shaped by the social forces in which we live—even as babies we are kissed for one kind of behaviour and scolded for another—so that by the time we begin to take a place in the wider social groupings, at school, at work, or in the outside world, we have come to respond to certain stimuli and reject others. Our

scales of value are not individual ones; they are the personal variations we make on the social evaluations fixed by the community in which we have grown up.

We have only to think of the difference between the U.S.A. and, say, the greater part of China to realise the influence of this on economic activities. In America it is generally accepted that you ought to try and go one better than your father, and the man who, by daring experiment and readiness to break with the past, increases his material wealth, is the one on whom the stamp of social approval is set; in China it is exactly the reverse—the palm is given to the wisdom of age and there is the strongest urge to follow the traditional path. It is not surprising, therefore, that America and not China is the home of mechanical invention and higher material standards of living.

These two points are worth stressing because it is necessary to realise that economics is a study of a living and working society and not a blue-print for an ideal community. The aim is not to find out how people ought to behave in different circumstances but how, in fact, they do behave in the circumstances in which they live. By patient observation we try to discover if there are ways of reacting which are so general that we can use them as guides in our attempts to prognosticate the future, and it is to these generalisations, based on observed facts of human behaviour, that we give the name 'economic laws.' Such laws are not, therefore, in the same category as the laws of chemistry or of natural science; we cannot say that, given such and such circumstances, such a result is bound to ensue; all we can say is that it is likely to ensue with the proviso, either implied or explicit, that there may be—will be—innumerable exceptions to the general rule. It is, indeed, for example, true in a general sense that the majority of

people in an industrialised country such as England are eager to get as good a money return for their work as they can, so that a rise in wages in one industry may be expected to draw larger supplies of workers into it and a fall to cause many workers to withdraw and find other jobs. By and large, and given time for changes in wage rates to become widely known, this is true; but it does not mean that every person always goes to the job that pays best in this way. A man may be attached to a particular kind of work, or to the firm that has employed him for some time, or may not want to move from the locality where his friends and family live, or may prefer country life to urban (or the other way round) or may prefer the 'amenities' that go with one type of work, such as higher social prestige, or greater freedom, or what have you. In a society in which the material equipment of well-being (good furniture, good clothes, the frig. in the kitchen, etc.) is given the highest place in social evaluations, changes in wage rates are likely to have a much more direct influence on supplies of labour than in one in which all these other factors play a bigger part. What adds to the difficulty is that the pattern of behaviour is not a static thing—fixed once and for all—but is continually being modified by new circumstances and ideas, and one must be for ever on the alert not to assume that the series of economic reactions observed in the past will inevitably repeat itself without modification in the future. There is no doubt, for example, that during the present century both security and leisure have come to play a much bigger part in the economic calculations of the wage-earner than they did in his father's time, and this must be taken into account both in the attempt to explain what has happened in the occupational distribution of the population and in the efforts we make to alter it if we think this necessary.

Blunders are often made, and a good deal of ill temper is engendered, through ignorance of the influence of the cultural pattern on economic behaviour, when two communities of widely differing types of social organisation are brought into contact with one another. When the colonisation of Africa began, Western business men could not understand why native populations were unwilling to work regularly for fixed hours throughout the year, when the material rewards they could get for doing so were obviously so much higher than they could make on their own pieces of ground. They found it difficult to accept the fact that many Africans rated freedom from routine, idleness, and occasional ostentatious spending higher than the elaborate equipment of living which takes so high a place in the social evaluations of Western communities; and they thought they must be immoral if they were unwilling to work for the kind of life that the Western wage-earner thinks desirable.

If you remember what kittle-cattle human beings are you will not blame the economist because he is unwilling to make precise and categorical statements about people's actions in getting a living. Almost everything he says must be hedged about with qualifications and modifications if it is to have any relation to truth, for it is no use pretending that men are machines when they are not. But there is another accusation brought against economists on rather different grounds.

What is the use of asking economists for advice, it is asked, when they never agree on what should be done? You find economists who support free trade and economists in favour of tariffs; you find some who believe in the planned economy and others who are just as strongly in support of private enterprise, and so on. Whatever question you consider, on

which you think the economist could give you an expert opinion, you are fairly sure to find divided ranks. So why bother with their views at all? There are two answers to this criticism. The first is that economics is like every other intellectual discipline; it can develop only by accumulating more and more knowledge and by more and more careful experiment in the interpretation of the facts it collects. How often you find that doctors disagree in the diagnosis and treatment of a disease; but you do not, therefore, say that medical science is useless and that it is never of any value to consult a doctor. The same is true of economics. And moreover there is the added difficulty that the economic body is perpetually changing, and that the economist is compelled to try to make his analysis while the very thing he is studying is in process of becoming something else.

But there is a second and more important answer. The economist is concerned with the production and exchange of wealth; that is, he is concerned with that as an economist. As a human being and a citizen he is, of course, as concerned as anybody else with matters of right and wrong, virtue, duty, beauty, and the rest. But on these he is no more an expert than anybody else. He can give an expert opinion that, say, if we insist on growing all our cereals within our own political boundaries our standard of living is bound to fall and by so much, but he cannot say that we are *wrong* to do so, because man does not live by bread alone, and we may believe that it is better to eat less, but to have a larger proportion of the population engaged in agricultural pursuits, or to be less dependent on foreign supplies in case of war, or put forward any other objective we value. As getting a living is only part of a man's life there are practically no questions that are purely economic in scope, and we have always to balance the effect of our

actions on our wealth with the other non-economic results they are likely to have. The economist can give an opinion on the economic side of the matter; but he has no more right than anybody else to claim a special hearing on what constitutes the good life or right conduct.

GERTRUDE WILLIAMS,
The Economics of Everyday Life

HISTORY AND THE READER

THE older I get and the more I observe the tendencies and conditions of our latter day, the more certain I become that history must be the basis of humane (that is non-scientific) education in the future. Without some knowledge of history other doors will remain closed, or at best ajar. For example, the reading of poetry and prose literature, other than current books, must rest on some knowledge of the times past when the older books were written. Some understanding of the social and political scene of Chaucer's, Shakespeare's, Milton's, Swift's world, of the world of Boswell, of Wordsworth and Shelley and Byron, of Dickens and of Trollope, of Carlyle and Ruskin is necessary in order fully to appreciate the works in question, or even in some cases to understand what they are about. Music needs no such historical introduction to be fully appreciated, for it is not allusive, or only slightly. But literature is allusive; each book is rooted in the soil of the time when it was written. Unless our great English literature is to become a sealed book to the English people (as indeed I fear it is to many), our countrymen must know something of times past.

Literature and history are twin sisters, inseparable. In the days of our own grandfathers, and for many generations before them, the basis of education was

the Greek and Roman classics for the educated, and the Bible for all. In the classical authors and in the Bible, history and literature were closely intervolved, and it is that circumstance which made the old form of education so stimulating to the thought and imagination of our ancestors. To read the classical authors and to read the Bible was to read at once the history and the literature of the three greatest races of the ancient world. No doubt the Classics and the Bible were read in a manner we now consider uncritical, but they were read according to the best lights of the time and formed a great humanistic education. To-day the study both of the Classics and of the Bible has dwindled to small proportions. What has taken their place? To some extent the vacuum has been filled by a more correct knowledge of history and a wider range of literature. But I fear that the greater part of it has been filled up with rubbish.

Similarly, and only in a lesser degree than in the case of literature, the enjoyment and understanding of architecture and of painting and of all the domestic arts, are enhanced by knowledge of history. The man who knows no history can travel through Italy thinking it very pretty and picturesque and queer, but understanding very little of what he sees. Foreign travel is enjoyable and instructive largely in proportion to the amount of historical knowledge which we take with us across the Channel. But I am glad to observe that the power of enjoying old buildings by means of historical knowledge and imagination is very widely spread to-day. That is something to build on, educationally and culturally. Some 15,000 people every year visit Housesteads, to see its Fort on the Roman Wall, a property of the National Trust. That is to say, vast numbers of people, speeding along the Carlisle-Newcastle road, get out of their motor-cars

or buses, or leave their bicycles, and walk half a mile uphill to inspect the ruins of some old Roman buildings on that wild moor. There is no beauty in the ruins, which are little more than foundations, but the historical imagination of the visitors is touched. Some know, more go away desiring to know, something of the history of the Romans in Britain.

The visitors to ruined abbeys and castles, to country houses and parish churches, enjoy themselves in proportion as they are equipped with historical knowledge, and with the historical imagination and curiosity that leads them to desire such knowledge. Disinterested intellectual curiosity is the life-blood of real civilisation.

The Anglo-Saxons, though more important than the Romans in the History of England, have left fewer monuments, for the Saxons' buildings were of wood, not of stone, except only their churches, and most of their churches were replaced by lordlier structures after the Norman Conquest. So there is a tendency for the Anglo-Saxons to drop out of the popular picture of our island history. Out of sight, out of mind. Yet, even so, there is a considerable curiosity about those remote ancestors of ours, a desire to know the results of the very fine work, by which the Anglo-Saxon scholars and archaeologists of the last thirty years have done so much to reveal the truth about that long and vital period in the making of England. Mr. R. H. Hodgkin's *History of the Anglo-Saxons* is an admirable example of the way in which the results of the latest scholarship, difficult and abstruse in their nature, can be made understandable and attractive to the general reader. Professor Stenton's great work on *Anglo-Saxon History*, recently published in the Oxford History of England, will appeal, perhaps, to somewhat fewer readers, but those who apply themselves to read it will have the

fascinating privilege of seeing the very pulse of the machine of scientific historical discovery at work. Mr. Hodgkin's and Professor Stenton's Anglo-Saxon histories are excellent examples of two different kinds of scholarly history, somewhat differently related to the needs of the reading public.

But the interest and value of history is very much more than the key it affords to the literature, art, and monuments of the past. In itself history raises and attempts to answer two great questions—(1) what was the life of men and women in the past ages? and (2) how did the present state of things evolve out of the past? The reader can be interested in the past for its own sake, for the value or instruction he finds in former states of society, and former habits of thought which have passed away and left little or nothing behind. Or else the reader may be interested chiefly in the explanation which history alone can afford of the origin of the institutions, beliefs, habits, and prejudices of the various peoples of the world at the present day. In other words, he can be interested in the past, either for its own sake, or as the parent of the present. Similarly, he may be interested in static views of various past scenes and happenings, or he may be interested principally in the moving stream of events, the causal and evolutionary aspect of the history of mankind.

I will say a little about these two aspects of history separately. First, the value to the reader of discovering what life was like in various ages and countries of old: this kind of intellectual curiosity can in our day be satisfied more fully and more correctly than in any previous age, because of the wonderful work of modern scholarship. It is a relief to escape from our own mechanical age into a world when the craftsman was more and the machine less,

when imagination was more and science was less. Nor is this mere hedonistic escapism. It enlarges the mind and imagination, otherwise imprisoned in the present. We get glimpses of other worlds, human and faulty like ours, but different from our own, and suggesting many things, some of great value, that man has thought, experienced, and forgotten. Indeed, I know of no greater triumph of the modern intellect than the truthful reconstruction of past states of society that have been long forgotten or misunderstood, recovered now by the patient work of archaeologists, antiquarians, and historians. To discover in detail what the life of man on earth was like a hundred, a thousand, ten thousand years ago is just as great an achievement as to make ships sail under the sea or through the air.

How wonderful a thing it is to look back into the past as it actually was, to get a glimpse through the curtain of old night into some brilliantly lighted scene of living men and women, not mere creatures of fiction and imagination, but warm-blooded realities even as we are. In the matter of reality, there is no difference between past and present; every moment a portion of our prosaic present drops off and is swallowed up into the poetic past.

The motive of history is at bottom poetic. The patient scholar, wearing out his life in scientific historical research, and the reader more idly turning the pages of history, are both enthralled by the mystery of time, by the mutability of all things, by the succession of the ages and generations.

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Besides the contemplation and study of the Past for its own sake, there remains the second great value of History, namely the light it throws on the present. You cannot understand your own country, still less any other, unless you know something of its history.

You cannot even understand your own personal opinions, prejudices, and emotional reactions unless you know what is your heritage as an Englishman, and how it has come down to you. Why does an Englishman react one way to a public or private situation, a German another way, a Frenchman in a third way? History alone can tell you.

In this stage of the world, when many nations are brought into close and vital contact for good and evil, it is essential, as never before, that their gross ignorance of one another should be diminished, that they should begin to understand a little of one another's historical experience and resulting mentality. It is a fault of the English to expect the people of other countries to react as they do themselves to political and international situations. Our genuine goodwill and good intentions are often brought to nothing, because we expect other people to be like ourselves. This would be corrected if we knew their history, not necessarily in detail but in broad outlines of the social and political conditions which have given to each nation its present character.

You cannot understand the French unless you know something of the French Revolution, its causes and effects; or the Germans, without knowing something of the historical relation of the German to his government, and of the German government to the Army, and of the whole nation to military ideals, which became in Bismarck's day as potent and precious to them as Parliamentary institutions (and freedom to do what we like) have, in the long course of history, become to us English. You cannot understand the Russians, unless you have some conception of the long centuries during which they were hammered into the sense of community and of absolutism by the continual blows of Tartar and Teuton invasion sweeping over the unbroken Steppes. We are always

expecting other countries to 'play the game' as we play it, to see life as we see it, but they insist on following their own harsher traditions. The present is always taking us by surprise (as it did in 1914 and in 1938–1939) because we do not sufficiently know and consider the past.

Mr. Ford, it is commonly reported, once declared that history was 'bunk.' This remarkable utterance of his, if indeed he made it, was in itself an outcome of history: such contempt for all things past, and such engaging frankness in avowing it, were themselves the outcome of certain aspects of the social history of the United States in the nineteenth century. Yet the American, generally speaking, is by no means ignorant of history or uninfluenced by his knowledge of it. The Americans know more about our history than we know about theirs, though I hope that will soon be remedied. And the American's conception of his own country, his pride in the star-spangled banner, and in the constitution, and in America as the representative of freedom and of democracy, are products of history as popularly taught and conceived over there. His attitude towards Britain, both in its favourable and in its unfavourable aspect, is largely an outcome of historical reading and teaching.

There is, indeed, another political danger that arises out of imperfect historical knowledge. I mean the danger that comes, not from deliberate propaganda or falsification, but from learning bits of past history without bringing the story up to recent and present times. The Americans, for example, tend to think of England as she was long ago, as a monarchical and aristocratic country. Their knowledge of our past is greater than their knowledge of our present. A short while ago, a friendly and intelligent American officer said to me that when he first came over to England for this war he expected to find a land of

castles with serfs tilling the soil for the benefit of a feudal aristocracy. I told him that his historical knowedge of England would have been suitable if he had come over to lend a hand in the *earlier* part of the Hundred Years' War.

Some nations, like the Irish, are *too* historically minded, in the sense that they cannot get out of the past at all. And many of the countries of Eastern Europe, and above all the Germans themselves, have been brought up on one-sided, ultra-patriotic versions of things past. The harm that one-sided history has done in the modern world is immense. When history is used as a branch of propaganda it is a very deadly weapon. On the whole, that is not a fault of history as it is now taught and written in England. It is rather the ignorance of history than the misuse of it, from which we suffer in this island now.

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We become wiser—less foolish at any rate—if we study the problems of humanity in past ages, because we can read without violent *partis pris* about the things of long ago, and with knowledge of their outcome and consequence. It is still too early to form a final judgment on the French Revolution, and opinion about it (my opinion certainly) is constantly oscillating. On such great and complex issues there can never be a final 'verdict of history.' But at least it is more possible to have an opinion of some value about the French Revolution now than it was in 1789, 1794, or 1815. And the attempt to form such an opinion in all the historical light now available, is an education to the mind, the sort of education we all most terribly need.

Our own daily affairs, political and social, we approach with strong prejudices, with ignorance or one-sided knowledge of the issues, and with no knowledge at all of what is going to be the outcome. To

remedy this, the reading of history instils into us the habit of surveying broad-mindedly and calmly the pageant and process of human affairs. I do not mean that we should be 'impartial' in the sense of thinking that all sides in the past were equally in the right. We may, and we often should, feel that one side was on the balance much more in the right than the other. And we shall not all of us come to the same conclusions on these past problems. But if we calmly study the past from as many angles as possible, we shall all of us gain in wisdom and understanding. We shall acquire a mentality which, when we return to our own problems, will be less at the mercy of newspapers and films, trying to make us take short cuts to truth, and to oversimplify the tangled skein of human affairs.

I hope I have begun to make out to your satisfaction my case for the twin propositions, (1) that it is part of the duty of historians to present history in a readable form, or rather, in a variety of forms readable by various sections of the public. And (2) that the general reader ought to study history. If he knows no history he is not properly educated either as a citizen or as an intellectual and imaginative being. But few readers will study history because they think it a patriotic duty to do so, or even because they want to improve their minds. Readers read because they like reading, and the books they choose will be those that interest or delight them. People will read history if it fascinates them. It is therefore the duty of historians to make it as fascinating as possible, or at any rate not to conceal its fascination under the heap of learning which ought to underlie but not overwhelm written history.

And how fascinating history is—the long, variegated pageant of man's still continuing evolution on

this strange planet, so much the most interesting of all the myriads of spinners through space. Man's evolution is far more extraordinary than the first chapter of Genesis used to lead people to suppose. Man's history—prehistoric, ancient, medieval, and modern —is by far the most wonderful thing in the Universe of which any news has come through to us. It contains religion; it contains science; at least it contains their history. It contains art and literature. The story of man is far more wonderful than the wonders of physical science. It is a mystery unsolved, yet it is solid fact. It is divine, diabolic—in short, human. 'The proper study of mankind is man,' more proper to him than even the study of beetles, of gases, and of atoms. And this wonderful pageant can be viewed both in rapidly revolving films of large expanse of time and space, and in 'close-ups' of single people and single scenes.

What then is the likelihood that history will in fact fill the place it should fill in the national literature of to-day and to-morrow? In some respects the prospects are good. Historians often make a conscious effort to present their work to the general public in a readable form. And correspondingly a considerable interest in history is shown by large sections of the community at large. There is a demand for history books.

But I am bound to add that there is a less favourable side to the picture. The study of history depends more than any other branch of science or literature on the availability of a large number of books. And the book shortage which to-day debars the ordinary reader to a large extent from the study of history is, I fear, not going to come to an end in a night now that the enemy have surrendered. The present acute stage, due to the paper shortage, may gradually be

remedied, though very gradually, I fear. But even when paper is again plentiful, modern conditions will not be favourable to the supply of history books. This was already so before the war, and will be still more so in the future. The production of books, owing to the rising cost of printing and binding, gets more and more expensive, with the result that publishers cannot reprint old books of standard value, such for example as Lecky's works—I could give fifty other cases of good history books that are thus suffered to die. There is always a certain demand for them, but not enough to repay the costs of republication. Now the study of history depends on the reading of good old books, both primary sources and secondary narratives. If the reading public can in future buy nothing but the books of the day, its historical reading and knowledge will be a very poor affair.

The demand for standard histories and historical sources of ten, thirty, or a hundred years ago is not great enough to pay for their republication. One reason why the demand is not great enough to encourage publishers to republish, is the disappearance of the private library. Private libraries of many different kinds and sizes were among the best things in the Victorian civilisation. I fear they are disappearing and not being replaced. It is partly a result of reduced incomes, partly of reduced size of houses. In the brave new world of the near future, our one-class society will be housed in small houses where there is little room for book-shelves. And when the motor-car and its petrol are paid for there will be little money left over for books. Of course, the increase of public libraries and circulating libraries will be some compensation. But it will not fill the gap.

But I do not wish to end on a note of pessimism. The new civilisation will no doubt find means of meeting its own problems, if it can succeed in avoiding

world wars. And in so far as the higher civilisation can manage to survive, I have no doubt that history will play a greater part than ever before in the humanistic or non-scientific aspects of culture. History is not the rival of Classics or of modern literature, or of the political sciences. It is rather the house in which they all dwell. It is the cement that holds together all the studies relating to the nature and achievements of man.

G. M. TREVELYAN,
An Autobiography and Other Essays

A NEW ELIZABETHAN AGE?

THE [first Elizabethan] age valued ability: it did not hamper and discourage it at every turn, in the interests of a monotonous sameness not worth having. The Elizabethans appreciated quality, in the objects they made with their hands no less than in things of the mind; so, not unnaturally, their products in both kinds exemplify the sense of quality which the standardised products of a mass-civilisation, a herd-society, can never do. The Elizabethans admired nobility and breeding; they set much store by intellectual and artistic gifts, and rewarded them; they appreciated and praised genius—as opposed to the 'democratic' attitude of being awkward and shamefaced about it, a state of mind only too easy to interpret.

Naturally, in such an atmosphere, with such a mentality, they achieved so much more: when you reflect on what they accomplished at sea, in navigation, voyages of discovery, in politics, no less than in music, the drama, literature, building—and all by a small society of five million people with scanty resources compared with ours.

Their attitude of mind was essentially a creative one; their instinct was all towards construction. Writers and artists were as touchy and quarrelsome then as they are to-day—more so, for they had not learnt to disguise their jealousies and to transpose them into the feline and the disingenuous. But their rivalries were in themselves stimulating, rather than self-frustrating, paralysed with sophistication. The Elizabethans were naïve, like children, as all creators are naïve, for their naïveté is the seed-bed out of which they create. Nothing was ever created out of mere sophistication.

That is not to say that they were not clever men; but they used their cleverness to accomplish their work, not to frustrate themselves. The attitude, in short, was like that one sees in Vasari's *Lives of the Painters*: all of them vying with each other as to who could create best. The whole accent was on creation, not criticism. How much literary criticism is there in Shakespeare? Or Marlowe? Or even in Spenser or Donne; or for that matter, in Bacon? Except for the one first-rate figure of Ben Jonson, it is to be found mostly in the second-rate, in the Gabriel Harveys, Daniels, Campions.

And to-day? Are the intellectual and spiritual conditions of our time, the circumstances of our society, propitious to a new outburst of creativeness in the arts and sciences, or not?

Some factors, it is clear, are definitely adverse.

Take first the intellectual temper and tone of the age, the climate in which our work has to be done. The emphasis is all on criticism. There is far too much criticism of every kind, in every sphere, not only of literature: far too much art-criticism for the good of art; too much critical self-consciousness in the realm of music; far too much carping, denigrating criticism in politics—particularly from the Left intel-

lectuals—of the country's past, its whole record, its institutions, the British Empire, our rule in India, whatever comes to hand. It does no good whatever; it has done untold damage; it is quite unfair; it is for the most part historically untrue. Open our intellectual periodicals anywhere and you will come upon some references as these by a clever critic—to the English people: 'To the English reader, knowing that the Anglo-Saxons are a brutal, drastic, and sentimental race, there are discomforting echoes of Kipling and the jingles of the Law.' (These people seem never to be able to forget Kipling. I wish they could remember his genius and occasionally do it justice: they will never be able to rival it.) Now the Anglo-Saxons may be a sentimental folk—they are not a *race*, by the way; but they are certainly neither brutal nor drastic. Anyone who knows their history knows that it has been remarkable for its moderation—as peoples go—and for its quality of compromise. The truth is that, compared with the terror, the bloodshed, the cruelty of so many peoples' history—of France, Germany, Russia, Spain—the record of the English people has been an exceptionally, almost uniquely, kindly and humane one. That does not mean to say that they are not tough and courageous when they have to be. That is what so many stupid people, especially Germans, have failed to understand: that these men whom we know to be gentle and kindly and civilised—like Philip Sidney and Alun Lewis, Edward Thomas or Rupert Brooke, Falkland or John Hampden—can fight like heroes when called on, can yet lay down their lives—and all the richness of *their* lives—uncomplaining. You may not know, he has been so misrepresented, that Francis Drake, the greatest fighter of them all, was a humane man. Don Alonso de Sotomayor, who checkmated his last voyage to the Indies, knew: 'One of the

most famous men of his profession that have existed in the world, very courteous and honourable with those who have surrendered, of great humanity and gentleness, virtues which must be praised even in an enemy.'

Why don't these people know, before they begin to talk? If they don't know, why don't they learn? What these people say does damage all round the world; wherever there is denigrating criticism of this country abroad, the ammunition has been supplied by them at home. I would not mind if what they said were true; but it is not true: they are ignorant.

Back to our theme: that has an important bearing on it.

Criticism, as an end in itself, is antithetical to creation. Nothing was ever created out of mere criticism. Criticism has a humble, subordinate function, or rather there are two main purposes it should serve: the first, to understand, elucidate, and interpret a work of art; the second, as an aid in composing the creative work, of a subordinate kind, clarifying technique, improving and refining the means in question: the end is the creative work itself.

I wonder it never strikes these people—after all, it is an elementary psychological point—that the whole process of creation is so subtle that it is dangerous to be too conscious about it, for ever plucking the plant up to see how the roots are getting on. Creation grows in the dark of the unconscious, in the warm dark of the intuitive. (Was there ever a more apposite instance than Shakespeare, the 'child of nature,' as against the academics and the intellectuals?) Works of art are not made out of mere cerebration. And so we have the too clever writers of our time for ever writing about the great novel that could be written about this or that, but which they do not write.

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This is not the place to discuss the value of social equality as an end for society. As such it may, conceivably, have something to be said for it—and, even so, much against. But for its influence on the arts, on creative work of the mind of all kinds, it has nothing whatever to be said for it. The arts need for subject-matter and inspiration variety, colour, richness, contrast, social diversity, movement, ease, standards of culture. There is one reason, and a profound one, why the nineteenth-century American novel was so thin and impoverished compared with the rich, burgeoning riot of the nineteenth-century novel in England and France—Dickens and Balzac, Stendhal and Thackeray, Flaubert and George Eliot, the Trollopes and Brontës and Hardys, the Merediths and Conrads; the Hugos and Gautiers, the Goncourts and Daudets and Maupassants and all. It is the reason why Henry James and Edith Wharton and so many of the best American writers left America. Think of the contrast between the miserable literature of Soviet Russia, with its low, one-class standards, its crudity and its castrated social conformism—the same is true of its music and architecture, of its contributions to science and thought—and the outpouring of genius from Pushkin and Gogol, Turgeniev, Dostoievsky, and Tolstoy to Chekhov and Alexander Blok. Tolstoy had only to walk out on to the high-road on the edge of his estate for all the variety and colour and contrast of a medieval world to pass by: an aristocrat and country gentleman himself, he could talk with middle-class merchants, Jewish pedlars, peasants, emancipated serfs, monks and hermits, fakirs—like Father Sergius—on their way to or from Jerusalem, soldiers, deserters, visionaries, prostitutes, beggars. It is all in the various and rich imaginative world of his novels and tales.

What sort of literature or art can we expect from a

more or less one-class society, levelled down to the standards of the trivial insignificant average?

The poets can tell you:

'Come, bombs, and blow to smithereens
Those air-conditioned, bright canteens,
Tinned fruit, tinned meat, tinned milk, tinned beans,
Tinned minds, tinned breath.'

Or

'In the land of lobelias and tennis flannels
The rabbit shall burrow and the thorn revisit,
The nettle shall flourish on the gravel court,
And the wind shall say: "Here were decent godless people:
Their only monument the asphalt road
And a thousand lost golf balls." '

It cannot be without significance that so many of the best contemporary writers detest the new social order. How could anyone derive any inspiration from anything without standards, without sense of quality, without pride of ancestry or hope of posterity? Naturally it lacks any sense of the spiritual resources of the past, or how to draw upon them for the benefit of the present. Spain has just been celebrating Cervantes. Can one see the Labour Party celebrating Milton—who was, in a way, a precursor and was very much of a Left intellectual? These people seem ashamed of the country's past—perhaps because they are ignorant of it; if they knew more about it, they might grow proud of it. Contrast the attitude of the Elizabethans: look at the inspiration Shakespeare drew from it for the whole cycle of history plays from *King John* and *Richard II* to *Henry VIII*. Or Marlowe for *Edward II*; Drayton for his *Polyolbion* and his patriotic poems celebrating events in our history; or Samuel Daniel's. Or Hakluyt's spreading canvas of

the sea history of the English people, their maritime achievement, the voyages and discoveries of his own time, in what Froude called the prose-epic of the Elizabethans.

Naturally, with the erosion of standards that comes with the emergence of the masses, with the democratic assumption that everybody's opinion is as good as anybody else's about anything—a nonsensical assumption that we do not act upon in regard to our health or we should soon be dead—with the lack of appreciation of quality, the absence of standards so that people do not know what is good from what is bogus (and it is increasingly difficult for people to tell in the arts)—there follows a curious consequence. Whatever anyone writes or does, composes or constructs, there is *no reverberation.* It makes no difference what he says; for all the effect it has, he might as well save his breath.

How different this is from the Victorian Age! Then, writers were public figures of importance; I remember Sir Charles Oman telling me that we can hardly imagine with what respect the leading Victorian writers were regarded, the pedestals they occupied: Dickens and Thackeray, Tennyson and Browning, Carlyle and Ruskin were all major prophets. Their books were events of public interest; what they said mattered, was discussed, made a difference. To-day, not a ripple, not a reverberation. It does not matter what anyone says or thinks. I suppose the last generation whose books and pronouncements mattered—unfortunately, in some ways—was Bloomsbury. I remember the excited attention with which we awaited the appearance of a new book in the twenties, by Strachey or Virginia Woolf, D. H. Lawrence or Eliot. To-day, not a cat mews.

But perhaps that is only to be expected of an age that has no standards.

The Victorian Age had standards—they were the

standards of an educated governing class that cared for culture and was itself highly cultivated. It gave society leadership; the social order was a highly articulated one, with a class-structure corresponding to social function; and I have no doubt that that works better than the characterless mess we find ourselves in.

If our practice in this country is better than our theory and our activity in the arts and sciences more productive on the whole than in other countries, it is because the degeneration attendant upon mass-civilisation has gone less far here than elsewhere; it is precisely because of an instinctive social conservatism that has retained areas of a previous and richer social order in our midst, which still serve as a touchstone for standards. One recommendation I would make is that our efforts should be directed towards handing on those values and standards from an older world to the new society that is, alas, inevitable.

If writing is not at a high peak at the moment, English painting is enjoying a more creative period than it has had since the death of Turner. English music in the twentieth century—the age of Elgar and Delius, Vaughan Williams and Walton and Benjamin Britten—is more fertile than at any time since the death of Purcell, or perhaps since the Elizabethans themselves. When have we produced finer sculptors than Epstein and Henry Moore? And this is not to mention the unfailing proliferation of our contributions to science and, to a lesser extent, to the modern movement in philosophy.

If we look at our cultural output as a whole in this century, this country makes a better showing than any, with the possible exception of France. Certainly than the United States, where the factors that are unpropitious to high achievements in civilisation have

gone further than here. As for Soviet Russia and those countries that have followed her in opting for a deformation of the human spirit, nothing is to be hoped for there. For one thing is clear: the best achievements of civilisation demand a certain freedom of the human spirit, some freedom of mind, some scope for the mind to move about in and operate.

That leads me to a more hopeful reflection: the wind of inspiration blows where it lists; human genius is unquenchable; civilisation itself is a tough plant—it springs up anywhere, like stinging nettles among the ruins, or willow-herb flowering inextinguishably on the bombed-sites of London.

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What hope there is—and it is a hope to hold on to, to foster and nurse—is in this hearth of the English-speaking world: this country that is small enough to be an integrated society, with a cultural life that has a common centre, and yet large enough to have variety and to fuse diverse elements within it; and still important enough in the world for it to have significance, not only for ourselves. No doubt, the fact that this country is the old, fertile hearth of all the English-speaking peoples will become of increasing importance as the younger nations, its progeny, become more important in the world; and we shall see the prophecy of the Elizabethan poet fulfilled in them:

'And who in time knows whither we may vent
The treasure of our tongue, to what strange shores
This gain of our best glory shall be sent,
To enrich unknowing nations with our stores?
What worlds in the yet unformèd Occident
May come refined with the accents that are ours?'

A. L. ROWSE, *An Elizabethan Garland*

BRITAIN'S CHANGING FACE

No face is more deeply loved than that of Britain and none has been more relentlessly lifted. At Easter many people take their first good look of the year at what is happening under the revealing light of spring. If you guessed at what they see, forming your picture from some of the invitations issued to foreigners to come to Britain, you might suppose that half our cottages are thatched and their inhabitants dressed in smocks. This exaggeration of the 'Ye Olde' appeal appears at its most ironical in photographs in which a car is shown parked beside some ancient and lovely building. For cars have been active agents in bringing about the changes so distasteful to traditionalists. If, as an antidote to the rustic, gaffer school of protecting Britain, you turn to the mixed bag of Jeremiahs who plead for preservation at all costs and oppose any and every change, you would be led to believe that they are voices crying in a complete wilderness of vandalism.

So much cant is spoken on either side that it is worth while to look at Britain with a fresh eye. Do so from the air and the main impression is of green and brown fields, intricately patterned in hedges and rich in trees. The contrast after flying over the Continent with its bare, open fields is remarkable. A train journey gives much the same impression, though the sprawl of the cities and towns is more noticeable than from the air. These over-all views of the island landscape need to be corrected by following the roads. Then it is seen that few towns and even villages have stood still in the past few years.

How distasteful the alterations seem depends on the point of view of the traveller. Basically, the English landscape is a creation of the eighteenth

century which gave us the farms more or less as we now know them and the park lands on which the wealthy men of that day depended for social status. They were well served by artists in landscape design, and taste for other sorts of rural beauty took some time in becoming generally shared. Cobbett called Hindhead 'the most villainously ugly spot in God's earth.' He spoke for many of his contemporaries and we may think ourselves lucky that they were unable to tame the moors as they would cheerfully have done had they got a chance.

But even as long ago as Cobbett's day suspicion of any change, especially if it were made for practical reasons, can be found. Cobbett disapproved of the new signalling system that allowed a message to be sent in three-quarters of a minute from Greenwich to Portsmouth and back. 'This building is, it seems,' he wrote, 'called a *semaphore* or *semiphare* or something of that sort. What this word may have been hatched out of I cannot say: but it means a *job*, I am sure.' When he wrote that of Pewley, near Guildford, the hill was naked to the wind and the outskirts of all market towns could be walked through with pleasure. How often since then has the complaint gone up about new developments that they look ugly and, no doubt, mean a *job*!

Sometimes they do, but not always, and an attempt to treat the island as an open-air museum, a natural reserve of beauty and history, can lead only to frustration. It is more profitable to draw up a realistic balance-sheet of what has actually happened. Taking the black side of the ledger first, these items must be entered. Scarcely any built-up area in the country has been changed for the better—judging solely by appearance. But slums—and rural ones can be just as evil as their urban cousins, even if they strike a passer-by as being picturesque—have

diminished. The housing estates that have gone up in and around so many villages are a marked improvement, generally speaking, on the ribbon building of between and before the wars. Small factories are often a blot on the landscape, but they give work to country folk who would otherwise be unable to stay at home.

Arterial roads have too frequently led to the knocking up of an endless miscellany of unsightly little buildings. Even where they have not done this, they pain the eyes of those who remember how the old main roads went winding pleasantly along. As time marches the arterial roads may be regarded with affection and allowed to have some aesthetic value. At any rate, that is what has happened in the case of the railway lines, which were widely held to be an abomination when they were laid and are now seen as a pleasant addition to the landscape. Hostile reaction to a thing because it is novel is apt to obscure unbiased appreciation. A waterless gas-holder—a favourite target of the Jeremiahs—would be stoutly defended by them had it been erected by the Normans and were in danger of destruction. What an outcry there would be—and rightly of course—were the proposal made to demolish the Tower of London to make way for some City planning scheme. But is the Tower, with all its additions and restorations, in fact a thing of beauty? Longevity in stone sometimes hides a multitude of architectural sins.

One item on the debit side has to be set down in deepest black. The ruin of the coastline has, round much of our shores, been catastrophic. Shacks and bungalows, caravan sites and car parks ring round the edges of Britain with an almost unbelievable ingenuity and variety of visual horrors. A motorist who kept as near as the roads allowed him from Margate to Penzance would see a succession of sorry

sights and be reminded only at intervals of a vanished loveliness that survives alone in old prints. A walker who dared to follow the same route would be a stout fellow indeed if he had any sensitiveness to scenery and came at last in sight of St. Michael's Mount without having had a nervous breakdown.

Walkers have been the hardest hit of all lovers of the face of Britain. It is sad indeed for them to hear of their predecessors who, within living memory, could drop in on Meredith at Boxhill and stroll peacefully on a fine summer Sunday morning from Dorking to Reigate. But even for walkers there is a bright side to the balance-sheet. They do not need to flee like ancient Britons escaping from the Saxons to the moors or to the western hills. They can easily lose themselves among deserted field paths within a few miles of any great city. 'Beauty spots,' once they are labelled as such, draw the crowds, but anybody who cares to use a one-inch Ordnance map can walk through a Bank Holiday without meeting more than a handful of people.

The Downs from Beachy Head away to Wiltshire used to be the happiest hunting grounds for walkers, and so they still are, but on a much less free scale. The plough has bitten into the turf in many areas, and rights of way are not always easily discovered. Still, the Downs, nowadays, carry a traffic as mixed as Chaucer's Pilgrims—young people in droves, elderly gentlemen in shorts, solitary bird watchers, and, alas, car parties wherever a car can climb. Is it unreasonable of walkers to resent, as they do, the arrival at a view-point of able-bodied motorists who have been too lazy to take the trouble to use their feet for a few hundred yards from the road?

What conclusions are to be drawn from his facing of facts about the new look of Britain? First, there is no denying that the island is a good deal uglier

than it was even twenty years ago, and there are no signs of a change in the other direction. Free enterprise created beauty that, through the nineteenth and early twentieth centuries, free enterprise proceeded to destroy. Now, and in spite of all the talk about planning, the same tendency is busily at work. Satellite towns and airfields, military training areas and open-cast mining, water reservoirs, Forestry Commission plantations, and electrical plant are yearly adding fresh eyesores. That most, if not all, of them are necessary does not alter this fact, but against it must be set the equally true fact that far more of Britain remains unspoilt than is admitted by the pessimists. Even at the height of a holiday season rural beauty may be found and enjoyed in solitude.

From *The Times*

MAN AND SCIENCE

GALILEO AND SCIENTIFIC METHOD

SCIENTIFIC method, although in its more refined forms it may seem complicated, is in essence remarkably simple. It consists in observing such facts as will enable the observer to discover general laws governing facts of the kind in question. The two stages, first of observation, and second of inference to a law, are both essential, and each is susceptible of almost indefinite refinement; but in essence the first man who said 'fire burns' was employing scientific method, at any rate if he had allowed himself to be burnt several times. This man had already passed through the two stages of observation and generalisation. He had not, however, what scientific technique demands—a careful choice of significant facts on the one hand, and, on the other hand, various means of arriving at laws otherwise than by mere generalisation. The man who says 'unsupported bodies in air fall' has merely generalised, and is liable to be refuted by balloons, butterflies, and aeroplanes; whereas the man who understands the theory of falling bodies knows also why certain exceptional bodies do not fall.

Scientific method, simple as it is in essence, has been acquired only with great difficulty, and is still employed only by a minority, who themselves confine its employment to a minority of the questions upon which they have opinions. If you number among your acquaintances some eminent man of science, accustomed to the minutest quantitative

precision in his experiments and the most abstruse skill in his inference from them, you will be able to make him the subject of a little experiment which is likely to be by no means unilluminating. If you tackle him on party politics, theology, income tax, house-agents, the bumptiousness of the working-classes, and other topics of a like nature, you are pretty sure, before long, to provoke an explosion, and to hear him expressing wholly untested opinions with a dogmatism which he would never display in regard to the well-founded results of his laboratory experiments.

As this illustration shows, the scientific attitude is in some degree unnatural to man; the majority of our opinions are wish-fulfilments, like dreams in the Freudian theory. The mind of the most rational among us may be compared to a stormy ocean of passionate convictions based upon desire, upon which float perilously a few tiny boats carrying a cargo of scientifically tested beliefs. Nor is this to be altogether deplored: life has to be lived, and there is no time to test rationally all the beliefs by which our conduct is regulated. Without a certain wholesome rashness, no one could long survive. Scientific method, therefore, must, in its very nature, be confined to the more solemn and official of our opinions. A medical man who gives advice on diet should give it after full consideration of all that science has to say on the matter, but the man who follows his advice cannot stop to verify it, and is obliged to rely, therefore, not upon science, but upon his belief that his medical adviser is scientific. A community impregnated with science is one in which the recognised experts have arrived at their opinions by scientific methods, but it is impossible for the ordinary citizen to repeat the work of the experts for himself. There is, in the modern world, a great body of well-attested

knowledge on all kinds of subjects, which the ordinary man accepts on authority without any need for hesitation; but as soon as any strong passion intervenes to warp the expert's judgment he becomes unreliable, whatever scientific equipment he may possess. The views of medical men on pregnancy, child-birth, and lactation were until fairly recently impregnated with sadism. It required, for example, more evidence to persuade them that anaesthetics may be used in child-birth than it would have required to persuade them of the opposite. Anyone who desires an hour's amusement may be advised to look up the tergiversations of eminent craniologists in their attempts to prove from brain measurements that women are stupider than men.*

It is not, however, the lapses of scientific men that concern us when we are trying to describe scientific method. A scientific opinion is one which there is some reason to believe true; an unscientific opinion is one which is held for some reason other than its probable truth. Our age is distinguished from all ages before the seventeenth century by the fact that some of our opinions are scientific in the above sense. I except bare matters of fact, since generality in a greater or less degree is an essential characteristic of science, and since men (with the exception of a few mystics) have never been able wholly to deny the obvious facts of their everyday existence.

The Greeks, eminent as they were in almost every department of human activity, did surprisingly little for the creation of science. The great intellectual achievement of the Greeks was geometry, which they believed to be an *a priori* study proceeding from self-evident premises, and not requiring experimental verification. The Greek genius was deductive rather

* See Havelock Ellis, *Man and Woman*, 6th edition, pp. 119 ff.

than inductive, and was therefore at home in mathematics. In the ages that followed, Greek mathematics were nearly forgotten, while other products of the Greek passion for deduction survived and flourished, notably theology and law. The Greeks observed the world as poets rather than as men of science, partly, I think, because all manual activity was ungentlemanly, so that any study which required experiment seemed a little vulgar. Perhaps it would be fanciful to connect with this prejudice the fact that the department in which the Greeks were most scientific was astronomy, which deals with bodies that only can be seen and not touched.

However that may be, it is certainly remarkable how much the Greeks discovered in astronomy. They early decided that the earth is round, and some of them arrived at the Copernican theory that it is the earth's rotation, and not the revolution of the heavens, that causes the apparent diurnal motion of the sun and stars. Archimedes, writing to King Gelon of Syracuse, says: 'Aristarchus of Samos brought out a book consisting of some hypotheses of which the premises lead to the conclusion that the universe is many times greater than that now so called. His hypotheses are that the fixed stars and the sun remain unmoved, that the earth revolves about the sun in the circumference of a circle, the sun lying in the centre of the orbit.' Thus the Greeks discovered not only the diurnal rotation of the earth, but also its annual revolution about the sun. It was the discovery that a Greek had held this opinion which gave Copernicus courage to revive it. In the days of the Renaissance, when Copernicus lived, it was held that any opinion which had been entertained by an ancient might be true, but an opinion which no ancient had entertained could not deserve respect. I doubt whether Copernicus would ever have become

a Copernican but for Aristarchus, whose opinion had been forgotten until the revival of classical learning.

The Greeks also discovered perfectly valid methods of measuring the circumference of the earth. Eratosthenes the Geographer estimated it at 250,000 stadia (about 24,662 miles), which is by no means far from the truth.

The most scientific of the Greeks was Archimedes (257–212 B.C.). Like Leonardo da Vinci in a later period, he recommended himself to a prince on the ground of his skill in the arts of war, and like Leonardo he was granted permission to add to human knowledge on condition that he subtracted from human life. His activities in this respect were, however, more distinguished than those of Leonardo, since he invented the most amazing mechanical contrivances for defending the city of Syracuse against the Romans, and was finally killed by a Roman soldier when that city was captured. He is said to have been so absorbed in a mathematical problem that he did not notice the Romans coming. Plutarch is very apologetic on the subject of the mechanical inventions of Archimedes, which he feels to have been hardly worthy of a gentleman; but he considers him excusable on the ground that he was helping his cousin the king at a time of dire peril.

Archimedes showed great genius in mathematics and extraordinary skill in the invention of mechanical contrivances, but his contributions to science, remarkable as they are, still display the deductive attitude of the Greeks, which made the experimental method scarcely possible for them. His work on Statics is famous, and justly so, but it proceeds from axioms like Euclid's geometry, and the axioms are supposed to be self-evident, not the result of experiment. His book *On Floating Bodies* is the one which according to tradition resulted from the problem of

King Hiero's crown, which was suspected of being not made of pure gold. This problem, as everyone knows, Archimedes is supposed to have solved while in his bath. At any rate, the method which he proposes in his book for such cases is a perfectly valid one, and although the book proceeds from postulates by a method of deduction, one cannot but suppose that he arrived at the postulates experimentally. This is, perhaps, the most nearly scientific (in the modern sense) of the works of Archimedes. Soon after his time, however, such feeling as the Greeks had had for the scientific investigation of natural phenomena decayed, and though pure mathematics continued to flourish down to the capture of Alexandria by the Mohammedans, there were hardly any further advances in natural science, and the best that had been done, such as the theory of Aristarchus, was forgotten.

The Arabs were more experimental than the Greeks, especially in chemistry. They hoped to transmute base metals into gold, to discover the philosopher's stone, and to concoct the elixir of life. Partly on this account chemical investigations were viewed with favour. Throughout the Dark Ages it was mainly by the Arabs that the tradition of civilisation was carried on, and it was largely from them that Christians such as Roger Bacon acquired whatever scientific knowledge the later Middle Ages possessed. The Arabs, however, had a defect which was the opposite of that of the Greeks: they sought detached facts rather than general principles, and had not the power of inferring general laws from the facts which they discovered.

In Europe, when the scholastic system first began to give way before the Renaissance, there came to be, for a time, a dislike of all generalisations and all systems. Montaigne illustrates this tendency. He

likes queer facts, particularly if they disprove something. He has no desire to make his opinions systematic and coherent. Rabelais also, with his motto: 'Fais ce que voudras,' is as averse from intellectual as from other fetters. The Renaissance rejoiced in the recovered liberty of speculation, and was not anxious to lose this liberty even in the interests of truth. Of the typical figures of the Renaissance far the most scientific was Leonardo, whose note-books are fascinating and contain many brilliant anticipations of later discoveries, but he brought almost nothing to fruition, and remained without effect upon his scientific successors.

Scientific method, as we understand it, comes into the world full-fledged with Galileo (1564–1642), and, to a somewhat lesser degree, in his contemporary, Kepler (1571–1630). Kepler is known to fame through his three laws: he first discovered that the planets move round the sun in ellipses, not in circles. To the modern mind there is nothing astonishing in the fact that the earth's orbit is an ellipse, but to minds trained on antiquity anything except a circle, or some complication of circles, seemed almost incredible for a heavenly body. To the Greeks the planets were divine, and must therefore move in perfect curves. Circles and epicycles did not offend their aesthetic susceptibilities, but a crooked, skew orbit such as the earth's actually is would have shocked them deeply. Unprejudiced observation without regard to aesthetic prejudices required therefore, at that time, a rare intensity of scientific ardour. It was Kepler and Galileo who established the fact that the earth and the other planets go round the sun. This had been asserted by Copernicus, and, as we have seen, by certain Greeks, but they had not succeeded in giving proofs. Copernicus, indeed, had no serious arguments to advance in favour of his view.

It would be doing Kepler more than justice to suggest that in adopting the Copernican hypothesis he was acting on purely scientific motives. It appears that, at any rate in youth, he was addicted to sun-worship, and thought the centre of the universe the only place worthy of so great a deity. None but scientific motives, however, could have led him to the discovery that the planetary orbits are ellipses and not circles.

He, and still more Galileo, possessed the scientific method in its completeness. While much more is known than was known in their day, nothing essential has been added to method. They proceeded from observation of particular facts to the establishment of exact quantitative laws, by means of which future particular facts could be predicted. They shocked their contemporaries profoundly, partly because their conclusions were inherently shocking to the beliefs of that age, but partly also because the belief in authority had enabled learned men to confine their researches to libraries, and the professors were pained at the suggestion that it might be necessary to look at the world in order to know what it is like.

Galileo, it must be confessed, was something of a *gamin*. When still very young he became Professor of Mathematics at Pisa, but as the salary was only 7½d. a day, he does not seem to have thought that a very dignified bearing could be expected of him. He began by writing a treatise against the wearing of cap and gown in the University, which may perhaps have been popular with undergraduates, but was viewed with grave disfavour by his fellow-professors. He would amuse himself by arranging occasions which would make his colleagues look silly. They asserted, for example, on the basis of Aristotle's Physics, that a body weighing ten pounds would fall through a given distance in one-tenth of the time that

would be taken by a body weighing one pound. So he went up to the top of the Leaning Tower of Pisa one morning with a ten-pound shot and a one-pound shot, and just as the professors were proceeding with leisurely dignity to their respective lecture-rooms in the presence of their pupils, he attracted their attention and dropped the two weights from the top of the tower to their feet. The two weights arrived practically simultaneously. The professors, however, maintained that their eyes must have deceived them, since it was impossible that Aristotle could be in error.

On another occasion he was even more rash. Giovanni dei Medici, who was the Governor of Leghorn, invented a dredging machine of which he was very proud. Galileo pointed out that whatever else it might do it would not dredge, which proved to be a fact. This caused Giovanni to become an ardent Aristotelian.

Galileo became unpopular and was hissed at his lectures—a fate which has at times also befallen Einstein in Berlin. Then he made a telescope and invited the professors to look through it at Jupiter's moons. They refused on the ground that Aristotle had not mentioned these satellites, and therefore anybody who thought he saw them must be mistaken.

The experiment from the Leaning Tower of Pisa illustrated Galileo's first important piece of work, namely, the establishment of the Law of Falling Bodies, according to which all bodies fall at the same rate in a vacuum and at the end of a given time have a velocity proportional to the time in which they have been falling, and have traversed a distance proportional to the square of that time. Aristotle had maintained otherwise, but neither he nor any of his successors throughout nearly two thousand years had taken the trouble to find out whether what he said was true. The idea of doing so

was a novelty, and Galileo's disrespect for authority was considered abominable. He had, of course, many friends, men to whom the spectacle of intelligence was delightful in itself. Few such men, however, held academic posts, and university opinion was bitterly hostile to his discoveries.

As everyone knows, he came in conflict with the Inquisition at the end of his life for maintaining that the earth goes round the sun. He had had a previous minor encounter from which he had emerged without great damage, but in the year 1632 he published a book of dialogues on the Copernican and Ptolemaic systems, in which he had the temerity to place some remarks that had been made by the Pope into the mouth of a character named Simplicius. The Pope had hitherto been friendly to him, but at this point became furious. Galileo was living at Florence on terms of friendship with the Grand Duke, but the Inquisition sent for him to come to Rome to be tried, and threatened the Grand Duke with pains and penalties if he continued to shelter Galileo. Galileo was at this time seventy years old, very ill, and going blind; he sent a medical certificate to the effect that he was not fit to travel, so the Inquisition sent a doctor of their own with orders that as soon as he was well enough he should be brought in chains. Upon hearing that this order was on its way, he set out voluntarily. By means of threats he was induced to make submission.

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It is not true that, after reciting this abjuration, he muttered: 'Eppur si muove.' It was the world that said this—not Galileo.

The Inquisition stated that Galileo's fate should be 'a warning to others to abstain from delinquencies of this sort.' In this they were successful, so far, at least, as Italy was concerned. Galileo was the last

of the great Italians. No Italian since his day has been capable of delinquencies of his sort. It cannot be said that the Church has altered greatly since the time of Galileo. Wherever it has power, as in Ireland and Boston, it still forbids all literature containing new ideas.

The conflict between Galileo and the Inquisition is not merely the conflict between free thought and bigotry or between science and religion; it is a conflict between the spirit of induction and the spirit of deduction. Those who believe in deduction as the method of arriving at knowledge are compelled to find their premises somewhere, usually in a sacred book. Deduction from inspired books is the method of arriving at truth employed by jurists, Christians, Mohammedans, and Communists. Since deduction as a means of obtaining knowledge collapses when doubt is thrown upon its premises, those who believe in deduction must necessarily be bitter against men who question the authority of the sacred books. Galileo questioned both Aristotle and the Scriptures, and thereby destroyed the whole edifice of medieval knowledge. His predecessors had known how the world was created, what was man's destiny, the deepest mysteries of metaphysics, and the hidden principles governing the behaviour of bodies. Throughout the moral and material universe nothing was mysterious to them, nothing hidden, nothing incapable of exposition in orderly syllogisms. Compared with all this wealth, what was left to the followers of Galileo?—a law of falling bodies, the theory of the pendulum, and Kepler's ellipses. Can it be wondered at that the learned cried out at such a destruction of their hard-won wealth? As the rising sun scatters the multitude of stars, so Galileo's few proved truths banished the scintillating firmament of medieval certainties.

Socrates had said that he was wiser than his contemporaries because he alone knew that he knew nothing. This was a rhetorical device. Galileo could have said with truth that he knew something, but knew he knew little, while his Aristotelian contemporaries knew nothing, but thought they knew much. Knowledge, as opposed to fantasies of wish-fulfilment, is difficult to come by. A little contact with real knowledge makes fantasies less acceptable. As a matter of fact, knowledge is even harder to come by than Galileo supposed, and much that he believed was only approximate; but in the process of acquiring knowledge at once secure and general, Galileo took the first great step. He is, therefore, the father of modern times. Whatever we may like or dislike about the age in which we live, its increase of population, its improvement in health, its trains, motor-cars, radio, politics, and advertisements of soap—all emanate from Galileo. If the Inquisition could have caught him young, we might not now be enjoying the blessings of air-warfare and poisoned gas, nor, on the other hand, the diminution of poverty and disease which is characteristic of our age.

It is customary amongst a certain school of sociologists to minimise the importance of intelligence, and to attribute all great events to large impersonal causes. I believe this to be an entire delusion. I believe that if a hundred of the men of the seventeenth century had been killed in infancy, the modern world would not exist. And of these hundred, Galileo is the chief.

BERTRAND RUSSELL, *The Scientific Outlook*

THE DUTY OF DOUBT

We are taught that faith is a virtue. This is obviously true in some cases, and to my mind equally false in others. There are occasions when the need for it must be emphasised. Nevertheless, at the present time I believe that mankind is suffering from too much, rather than too little faith, and it is doubt rather than faith that must be preached. I am not thinking wholly or even mainly of faith in the Christian or any other religion, but simply of the habit of taking things for granted. Nor am I praising a blind and haphazard doubt, which is as unintelligent as blind faith, and far less fruitful. Greece and Rome produced a sect of sceptic philosophers who gave valid reasons for doubting anything whatever, and finally left themselves with no motives except the gratification of their instincts. Christianity swept away scepticism along with many nobler philosophies. And any system in which the suspense of judgment leads to the suspense of action will inevitably perish at the hands of men who are prepared to act, however utterly nonsensical be the motives that lead them.

Modern science began with great acts of doubt. Copernicus doubted that the sun went round the earth, Galileo that heavy bodies fall faster than light ones, Harvey that the blood flowed into the tissues through the veins. They had each a theory to replace the old one, and their observations and experiments were largely designed to support that theory. But as time went on these theories, too, were found wanting. The planets do not go round the sun in circles as Copernicus thought; gravitation is a more complex affair than Galileo or even Newton believed. And nowadays, though many experiments are made to support old or new theories, large numbers merely

go to prove them false without putting anything in their place. One can hardly open a scientific journal without finding a paper with some such title as 'On an Anomalous Type of Inheritance in Potatoes,' or 'Deviations from the Law of Mass Action in Concentrated Sugar Solutions.' The statement of any general principle is enough to raise active doubt in many minds. Moreover, the authors very often make no attempt to put forward an improved theory; and if they do so it is generally in a very tentative form. 'The results so far obtained are consistent with the view that . . .' has taken the place of 'Thus saith the Lord . . .' as an introduction to a new theory. Moses apparently regarded 'An eye for an eye and a tooth for a tooth' as an absolute principle of right conduct; Einstein would certainly not regard any of his laws as final accounts of the behaviour of matter.

Now, the method of science, which involves doubt, has been conspicuously successful over a certain field. But there are many who affirm that that field is strictly limited. 'In the realm of religion and ethics,' they assert, 'we have reached finality. You may not be certain about the principles of physics, but I and every right-minded man and woman are certain about the principles of right and wrong; and those who question them deserve to be treated as criminals.' This attitude is rather commoner in the United States than in most civilised countries, not because Americans are more stupid or less educated than other nations, but because they live amid a more homogeneous moral tradition. The Russian who regards making a fortune as a disgusting vice has only to enter Finland (if his Government will let him) to find quite decent and useful individuals practising it. But the American has a long way to travel before he or she will find otherwise respectable women smoking cigars without

exciting unfavourable comment, or governing classes who regard the self-made millionaire as inevitably vulgar and unpleasant.

Now, there are conditions under which it is an advantage that moral principles should be unquestioned. It is roughly true that our laws are the laws which would have been suitable for our grandparents, and our moral code that which would have sufficed for our great-great-grandparents. It takes about two generations of effort to effect a great legal change, say Prohibition or Irish Home Rule, and a good deal more to dethrone a generally accepted principle of moral conduct, such as the different moral standards of the sexes or the wickedness of sport on Sundays. In a society which is not altering much in other respects this stability is an excellent thing, though of course the desirable moral code will vary from place to place. Thus the South Pacific islanders almost universally practised infanticide or abortion, and very often cannibalism or head-hunting. The islands were as thickly populated as was possible with the methods of agriculture and fishing available, and if the population had not been kept down by these methods famines would have occurred. The missionaries have taught them that these practices are wrong; and so they are now, since European diseases and drinks have replaced them as checks on over-population.

Now, the moral code of Europe, North America, Australia, and New Zealand is to a large extent the code which was found to work in medieval Europe. Of course, it has altered since the Middle Ages, but it is far more similar to its ancestor of six hundred years back than to the codes, say, of China, Arabia, New Guinea, or Central Africa to-day. The medieval code was evolved in a society mainly engaged in small-scale agriculture and small-scale industry, dominated

by a small educated class of priests, and a still smaller military nobility. And the oddest traces of this survive even in the United States. University professors are no longer in holy orders, but they are expected to conform to a standard of conduct much stricter than that demanded of business men or soldiers. The head of the state no longer wears a sword and chain-mail on public occasions. (I am not talking about kings, who still occasionally wear swords, and who, when explosives have been superseded by other methods of killing, will probably carry dummy bombs.) But he still behaves to the heads of other states in a manner appropriate to a medieval knight. We are delighted (at least if we are shareholders) when company presidents and directors effect a combination with another corporation in the same line of business, but we expect our premiers and presidents to maintain our national independence to the last drop of our blood.

And the same applies to property. It was obviously right that a medieval workman should own his own tools and workshop. It is obviously impracticable for a modern factory worker to own half a lathe and twenty square yards of floor space. It is only gradually being realised that the idea of absolute personal ownership so suitable when applied to a spade or a chisel leads to inconveniences when applied to a share certificate. And those who realise it most fully are convinced—why, I am not very clear—that those inconveniences would vanish if only the ownership were transferred to the State. The truth is more probably that the idea of absolute ownership is ceasing to work and will have to be replaced, as the idea of absolute position has been in physics or that of fixed species in biology. The believer in absolute ownership will at once ask me what I have to put in its place, and will raise a triumphant shout when I say that I do not know.

Now, supposing I go to a physiologist and convince him that his otherwise admirable theory of conduction in nerves will not explain, let us say, the action of cocaine in blocking them, he will not immediately ask me to produce a theory better than his own. Nor will he abandon his former view; he will try out modifications of it and see whether they work. He will quite probably spend a couple of months in experiments suggested by a theory which he regards as likely to be false. And when he arrives at a scheme of ideas which will fit all the facts so far known he will hardly dignify it by the name of theory, but call it a working hypothesis.

'Yes,' my opponent will say; 'and do you expect men to die for a working hypothesis as they will die for a faith?'

Well, men have died for odder things. On the occasion of Napoleon III's *coup d'état* in 1851, Baudin, a deputy of the Second Republic, was trying to rally opposition in the streets of Paris, though with little hope of success. A workman shouted, 'Why should we risk our lives for your twenty-five francs?' referring to his daily salary as a deputy. 'Stay here,' said Baudin, 'and you shall see how a man dies for twenty-five francs.' He died.

And every day men do risk their lives for working hypotheses. Half the art of war consists of doing so. The dispositions of the enemy during a modern battle are more or less unknown. On the available evidence the commander-in-chief forms a hypothesis on which he must then act with the utmost vigour. The great general is the man who stakes everything on his hypothesis while realising that it is only a hypothesis and must be modified from moment to moment.

Just the same is true of scientific work. A good many biologists experiment on themselves. Of course, it is occasionally necessary to make experiments which

one knows are dangerous, for example in determining how a disease is transmitted. A number of people have died in this way, and it is to my mind the ideal way of dying. Others make experiments which are apparently risky, but really perfectly safe provided the theory on which they are based is sound. I have occasionally made experiments of this kind, and if I had died in the course of one I should, while dying, have regarded myself not as a martyr but as a fool. For all that, I have no doubt that the theories to which I entrusted my life were more or less incorrect. One at least has already been proved so, and the history of science makes it clear enough that many of the others will be. But though they had their flaws, they were good enough to enable me to predict the safety of those particular experiments, and I hope that I never regarded them as much more than working hypotheses.

My objection to the thought of many people on all subjects, and of all people (including myself) on some subjects, is that it is in a pre-scientific stage. They seem to be incapable of acting on certain momentous topics unless they are certain of their premises. Now, all I should be prepared to say in favour of democracy is that it is, in my opinion, the least objectionable form of government so far devised for men and women of certain sections of the human race. But acting on that opinion I should be willing to risk my life on its behalf in defending it against government by a military autocrat like the Kaiser or a secret society like the Ku Klux Klan. Yet I hope that I have not closed my mind to the claims of other forms of government, for example the rule of a voluntary aristocracy.

Similarly, in the field of religion it seems to me very probable that in certain respects the structure of the universe resembles that of my own mind. This opinion leads, I think, to implications as to moral

conduct different from those of materialism. But if we try to clothe this idea in the terminology of religion we can do it in many different ways. Some of these may serve to make man more like God; they also have the converse effect in bringing God, in our ideas at least, down to the level of man.

It is characteristic of a good scientific theory that it makes no more assumptions than are needed to explain the facts under consideration and predict a few more. For example, it is quite likely that the inverse square law describing the force between two electrically charged bodies ceases to hold when they are very close or very far apart. In half an hour I could write down a dozen laws of a more complicated kind which would agree equally well with all the observed facts. But no one nowadays would be interested in such a law. Scientific men agree to suspend judgment when they do not know. On the whole, however, the opposite has been the case in the history of religion. Where there was obvious room for different opinions, for example as to the nature of Jesus' relationship with God, a highly complex theory was gradually built up and was accepted by most Christian churches. The Unitarians regard themselves as more reasonable than the Trinitarians and have adopted a quite different theory. To my mind a far more rational view than either would be as follows: 'I believe in God and try to obey and imitate Jesus, but I do not know exactly what is their relationship.' That is certainly the view of millions of Christians, but no important religious body dares to adopt it. They prefer to go on thinking along pre-scientific lines. And it is this pre-scientific outlook of religion, rather than anything specific in its tenets, which brings it into conflict with science. 'A creed in harmony with the thought of to-day' is no better than the Athanasian Creed if it is taken as a creed

and not a working hypothesis, for the simple reason that it will not be in harmony with the thought of to-morrow.

As a matter of fact, the Christian attitude to faith probably rests on a misunderstanding. Diseases of the nervous system and chronic diseases of the skin are particularly amenable to cure by suggestion and other psychological methods. Jesus' recorded healing work was mainly confined to these complaints, and required faith in the patients. But this faith was a belief that they would be cured, and not an assent to historical or metaphysical propositions. Christian Science is so often therapeutically successful because it lays stress on the patient's believing in his or her own health rather than in Noah's Ark or the Ascension. But the Christian churches have tended to accumulate more and more dogmas in their schedules as time went on, so that faith has become more and more intellectual and more and more of a strain on the intellect.

It is just the same with politics. Political creeds fall into two classes. There are the conservative beliefs that institutions which have worked fairly well in the past will go on working under new conditions. Opposed to them are the radical beliefs that policies which have not been tried at all, such as universal disarmament, or have been tried far away or long ago, for example Prohibition in Arabia, are the only solutions for our problems. The good party men honestly hold these beliefs; the politicians say that they hold them. Fortunately, this is rarely the case, though occasionally an honest man like Robespierre or W. J. Bryan rises to power and acts as if he believed in his own speeches. As long as the average voter's thought is pre-scientific, a politician dare not say: 'I am inclined to think the tariff on imported glass should be raised. I am not sure if this is a

sound policy; however, I am going to try it. After two years, if I do not find its results satisfactory, I shall certainly press for its reduction or even removal.'

Nevertheless, the successful politician often acts in very much that way, and quite calmly goes back on his policy of a year ago. His enemies accuse him of broken pledges; his friends describe him as an inspired opportunist. In England and the United States the two-party system permits a government to remedy the grosser mistakes of its predecessors, while continuing their successful policies without too great a show of enthusiasm. The tacit agreement to this effect between the party leaders gives our politics a certain air of unreality, and many of those who seek for truth in the mouths of politicians turn with relief to Russia. The government of the Soviet Union not only admits but boasts that its policy is experimental. Many items in its early programme were failures, and some of these have been withdrawn. Others equally daring in their conception have proved successful. Hence the evolution of the new social order has been amazingly rapid. The Communist party has been in power for less than forty years, but it has contrived to evolve a fairly stable system combining some of the advantages of capitalism and socialism. No doubt the Russian people has proved an ideal subject for large-scale experiments. But the growing distrust of constitutional government in Europe suggests that there, too, the present generation is more prepared to be experimented on than were its fathers. And if we are to escape the despotism which will follow a revolution either to the Left or the Right, our present rulers and those who support them will be well advised explicitly to imitate the extremely capable Bolshevik leaders, and adopt an experimental method.

In the sphere of ethics the same principles must, I believe, be applied. The circumstances postulated by

the older ethical codes have ceased to exist. In a more primitive community our most obvious duty was quite literally to our neighbour. In a village we knew our neighbour's affairs pretty well, and if we did not always succeed in loving him as ourself we could pretty often be of assistance to him. In a great city one may have a department-store on the left and a man one never meets on the right. An occasional gift to charity or even an evening a week spent on welfare work in a poorer quarter is not the psychological equivalent of taking in Mrs. Johnson's children during her illness and going to the assistance of Mrs. Kelly when her husband comes home drunk. All through the civilised world experiments are being made as to how best to help one's fellow-creatures without falling into hard officialism on the one hand or indiscriminate gifts to the undeserving on the other. The mere multiplicity of these experiments goes to show how few of them have been completely successful.

. . . . . .

Such then is the case, or rather a fragment of the case, for doubt. It is very nearly the same as the case for freedom of speech. Plato described thought as the dialogue of the soul with itself, and doubt is just a refusal to deprive either side of a hearing. Just as freedom of speech facilitates right action by the State, provided the speakers and those who listen to them have a share in deciding policy, so doubt is a virtue if, and only if, it is the prelude to action. A merely negative doubt is like freedom of speech divorced from political responsibility. This was the condition of affairs in India in the ten years before 1919, when the Indian politicians were permitted to talk indefinitely, but possessed no effective share in the government.

There are some who will admit that doubt may be a necessity in a scientific era, but hold that art and

literature flourish best in an age of faith when they become the interpreters of a great religious or philosophical system rather than the symptoms of intellectual unrest. While such opponents bring forward Dante and the architects of the European cathedrals, forgetting Milton and Phidias, I shall do no more than cite the opinion of John Keats in a letter to his brother: 'Dilke is a man who cannot feel he has a personal identity unless he has made up his mind about everything. The only means of strengthening one's intellect is to make up one's mind about nothing —to let the mind be a thoroughfare for all thoughts, not a select party.' Keats certainly did not strengthen his intellect at the expense of his aesthetic powers, and his *Hyperion* is little more than an account of the supersession of good ideas by better, a process which, as he showed, so far from stifling art, may inspire it.

Finally, I shall perhaps be told that I am preaching pragmatism. But where the pragmatist says that a belief is true because it works, I have attempted to suggest that it is often false although it works, and that belief is not, as James preached, a necessary preliminary to effective action. And where the pragmatist exalts the will to believe, I have attacked it. The desire for intellectual certitude is laudable in the young, as a stimulus to thought and learning; in the adult it easily becomes a vice. History, when it is taught as the history of human thought, makes it abundantly clear that most of the intellectual certitudes of our forefathers were illusory, though often of temporary value. One intellectual certitude has from time to time been replaced by another at the expense of a sufficient number of martyrs. So long as our education aims at inculcating dogmas, religious, political, ethical, or scientific, fresh relays of martyrs will be necessary for every step of human progress.

And while I do not suggest that humanity will ever be able to dispense with its martyrs, I cannot avoid the suspicion that with a little more thought and a little less belief their number may be substantially reduced.

To sum up, science has owed its wonderful progress very largely to the habit of doubting all theories, even those on which one's action is founded. The motto of the Royal Society, 'Nullius in verba,' which may be paraphrased 'We take nobody's word for it,' is a sound rule in the other departments of life. The example of science shows that it is no check on action. Its general adoption would immeasurably hasten human progress.

J. B. S. HALDANE, *Possible Worlds*

LIFE IN THE UNIVERSE

'Tis surely a most shabby thinker
Who, looking on Nature, finds not the reflection appalling.
ROBERT BRIDGES

Sheer multitudinosity has power to oppress the mind.
R. KNOX in *Let Dons Delight*

WHAT is life? A little scum of no importance on the surface of an unimportant globe circling round a second-rate star? An accidental conglomeration of atoms which have come together by an odd chance, the result of an exceedingly improbable happening? That is what some astronomers would have us think. Looking out into the depths of space, they have discovered a universe of unthinkable dimensions. A billion suns in our own galaxy, beyond it perhaps a billion galaxies, only revealed to us as tiny smudges on a photographic plate. No wonder they are impressed by the enormous disparity between the scaffolding and the result. Life seemed to be, as

Jeans said, 'an utterly unimportant by-product' in 'a universe which was clearly not designed for life, and which, to all appearances, is either totally indifferent or definitely hostile to it.' It seemed 'incredible that the universe can have been designed primarily to produce life like our own; had it been so, surely we might have expected to find a better proportion between the magnitude of the mechanism and the amount of the product.'

It also used to be thought that the conditions under which life could possibly arise in the universe were not likely to occur frequently among the stars. Life, as we know it, requires water, light, a moderate temperature neither too hot nor too cold, and a variety of chemical elements. It is not at all certain that these conditions are to be found, in our own solar system, except on the earth. Planetary systems, probably the result of a near encounter of two stars, were believed until recently to be of comparatively rare occurrence. This view was based on calculations of the chance of stellar encounters. The stars are separated by enormous distances, and though they are in motion, the chance of a close approach of two stars is comparatively small. When such an encounter takes place, enormous tides in the liquid or gaseous surfaces of the stars are set up, which may result in large masses of material being pulled away from them and, condensing, giving rise to planets.

These calculations have had to be revised in some respects. According to the recent theories of Hoyle and Lyttleton, the planets originated in the break-up of a companion of the sun in a tremendous explosion. Explosive stars, called *supernovae*, are not at all infrequent and it has been estimated from such occurrences that at least a million planetary systems may have been produced in our own galaxy.

If this is so, it is not unlikely that in many of them

there will be planets in which the essential requirements of life are present. All we know about the material universe suggests its great uniformity. We know from the light they emit that the stars contain many of the elements we have on the earth. There is nothing whatever to indicate that our present world is unique, or even exceptional. Should we not expect that conditions which have produced life on the earth will operate wherever similar conditions exist? There is no reason why we should not be willing to think that life may exist in great profusion in other worlds. If this is so, we must not expect that evolution has followed similar paths everywhere, or has gone on at the same speed. There may be worlds in which life has not yet produced thinking and reasoning creatures like ourselves; there may be others in which organised rational societies have existed for many millions of years. Life may also have developed other and perhaps fantastic forms. Some worlds may be completely covered by the oceans, and have developed fishy societies. In worlds which are much greater than the earth, the greater intensity of gravitation will have forced living things to solve quite different structural problems. A man's limbs would not be strong enough to support his weight on a larger planet, where the force of gravitation is considerably higher.

Since we have no prospect whatever of exploring these other worlds, these are idle speculations at the present time. All we can find out about life, we must discover from what we see in our own world. We must turn away from the macrocosm to look at the microcosm, which exists everywhere around us and within us. At the same time as telescopes were being constructed to look into space, microscopes in the hands of Robert Hooke and A. van Leeuwenhoek began to reveal the complexity of living things. John

Ray described the revelations of the microscope as follows:

'Our sight doth not give us the just Magnitude of Things, but only their Proportion; and what appears to the Eye as a Point, may be magnified so, even by Glasses as to discover an incredible Multitude of Parts; nay some animals there are, so small, that if a Grain of Sand were broken into 8,000,000 of equal Parts, one of these would not exceed the bigness of those Creatures, as Mr. Leeuwenhock affirms. And Dr. Hooke proceeds farther, and says, that he had discovered some so exceedingly small, that Millions of Millions might be contained in one Drop of Water. If these whole Creatures be so incredibly little what shall we think of their Parts, containing and contained, their Entrails and Muscles, their Ovaries and Eggs?' *

The world was found to be teeming with microscopic life wherever there was water and warmth. A drop of water taken from a pond was seen to contain creatures of many kinds all engaged in complex modes of living. The larger organisms were found to be not unitary, but societies of cells, each possessing its own life to a limited extent, co-operating in a common purpose.

Notwithstanding all this diversity of size and form, it has been suspected for a very long time that all kinds of life had an underlying similarity. About 500 B.C. the Greek philosopher, Empedocles, is reported to have said that 'Hair and leaves and the thick feathers of birds and the scales that form tough limbs are all the same thing'—a fairly accurate statement of what modern chemistry has found. Detailed study has in fact disclosed an extraordinary similarity in the underlying chemical constitution of all living things. Whether they are microscopic organisms,

* *Three Physico-Theological Discourses.*

tiny blobs of jelly, or large animals, they are, as we shall see, all made of very much the same substances.

In earlier times, when every substance was believed to have its own qualities, there was no difficulty in believing that some substances were endowed with life, others not. Wood was wood, and water water; and though transformations did occur, as in the disappearance of wood in the fire, they were not surprising in a world where the most miraculous changes were taking place under everyone's eyes every day. There was nothing but

> 'doth suffer a sea-change
> Into something rich and strange.'

A seed put into the ground became in a short time a plant with leaves and flowers; the white and yolk of an egg turned into the flesh and bones and feathers of a chicken, which, no sooner was the shell cracked, jumped out and started running about.

Chemistry emerged as a science when it was understood that all substances are combinations of the same primary elements, which are to all intents and purposes indestructible (except under such violent actions as occur in the atomic bomb). Wood turns out to be a combination of carbon, hydrogen, and oxygen, and when it is burnt the carbon is turned to carbon dioxide and the hydrogen to water, and one can make an accurate balance sheet accounting for everything originally present in the wood. The first stage of scientific chemistry, which was begun by Lavoisier with the correct account of combustion, was guided by the atomic theory of Dalton, which served to explain the facts of chemical combination in simple compounds. It was concerned with the elementary composition of substances. This was understood when it was expressed in an atomic formula. NaCl stood for the combination of one

atom of sodium (Na) with one of chlorine (Cl), forming sodium chloride or common salt. Water was H_2O, the combination of two atoms of hydrogen (H) and one of oxygen (O). These formulae were based on the facts of chemical combination, but they have stood the test of time and the more powerful physical methods which later became available, and undoubtedly represent the real structure of the molecules, *i.e.* the smallest natural unit of these substances. The great profusion of substances which come from living things, like alcohol, oils, fats, sugars, waxes, resins, rubber, cellulose, starch, were originally called *organic* compounds and thought to be entirely different from the *inorganic*. Although they were compounds of carbon, hydrogen, oxygen, etc., chemists thought they were an entirely different class of compounds from those which they had managed to prepare. But the distinction broke down when a German chemist, Wöhler, prepared urea, which had previously been regarded as a typical product of life.

For a long time chemists could not see how so many different compounds could be formed from the same elements. The secret of their mode of combination was not discovered at first, but eventually it was found that the carbon atom can combine with itself, as well as with other elements, to form an enormous variety of chain and ring structures.

This discovery opened up the road to the synthesis of large numbers of organic compounds, many of them the products of life, others types which have not been found in Nature.

The success of organic chemistry in making these compounds—natural and artificial colouring matters, drugs, solvents, essential oils, etc.—has given rise to an exaggerated idea of its capabilities. It is true that some types of compounds, such as the more complex carbohydrates like cellulose, and also proteins,

still resist the efforts of chemists. But perhaps it will only be a matter of time before all these compounds can be made. Will it then be possible to create a living system by putting together all the compounds which make up a living organism? Shall we be able to create life in a test-tube?

I do not think there is any scientific knowledge which leads to a certain answer to this question; we can only explore what has been found out about the chemical basis of life, and my readers can judge for themselves how far chemists have progressed on the long path of its reconstruction.

We will inquire, then, just what is involved in reconstructing living things, starting with the simplest we can find. It might be thought that this is a technical question of no great human importance. If this achievement is in any case very remote, does it matter very much what progress has been made or how distant is the goal? You are willing to agree that the achievements of chemists are impressive and that living things are also very complex. No doubt scientists will continue to make discoveries, and some day they may manage to make a microscopic spot of jelly which, they will tell us, is alive. Does it really matter very much? Are not the real problems of mankind elsewhere, in politics, in personal relations, in artistic endeavour, in finding out how the human population of the earth can agree to share it and to make the most of it, or in avoiding a world-wide famine?

A little reflection will convince most people that what we think and do are greatly influenced by our conceptions or misconceptions of the nature of life. The cosmology of Galileo did more than displace the earth from its pre-eminent position in the centre of the universe. It entirely changed the world picture of Western man and his estimate of himself as the

lord of creation, 'the master work, the end of all yet done,' made to rule

'Over the fish and fowl of sea and air,
Beast of the field, and over all the earth
And every creeping thing that creeps the ground.'

He became an insignificant inhabitant of an unimportant planet. Newton extended the rule of law from the earth to the planets, which moved no longer of their own caprice but in orbits determined by the laws of gravity. Darwin's theory completed the picture. It brought the origin of species within the realm of natural law. It was 'blind forces, blindly acting' which had brought human beings out of the primeval slime. Man was not only of less significance in the universe than a grain of sand on the seashore, he was also the result of the operation of the laws of chance, operating under the sole criterion that only that which is efficient can survive.

This was the picture most scientists had towards the end of the nineteenth century, and though many of them were aware of its limitations and were willing to exercise the suspense of judgment which a consciousness of their great ignorance required, it became in a debased form the popular picture of life and man. The prevalent view of man is in fact very low. He is a mere unit of man-power, a cog in a machine. Even scientists are referred to to-day, in Government reports, as so much scientific man-power. Much of the conflict of the present-day world is due to this belittling of man. No doubt industrial civilisation, which made men the servants of machines, and was contemptuous of the aspirations of ordinary men to live a good and satisfying life, is partly responsible; but it could only arise in a society where a low view of the value of human beings was taken for granted.

Because they had learnt a little about living things, uninformed people jumped to the conclusion that what was still to be learnt was unimportant. Because they were impressed by machines, they assumed that human beings were like them, only a little more complicated. The mechanical concept of life runs through innumerable books and newspaper articles and has done much to produce and foster this low opinion of human ability. A calculating machine is called a mechanical 'brain.' It is true that these machines are wonderful pieces of mechanism and ingenuity, but the operations they perform are really rather limited. Their main value is to carry out quickly certain repetitive operations which human beings find tedious and time-consuming. To call them 'brains' is a gross libel on real brains, the fantastic operations of which, as we shall see, are quite beyond our understanding even in comparatively unintelligent animals.

The idea of a 'mechanical man' is another sign of the times. 'Rossum's Universal Robots' have had plenty of successors, which have spilled over from literature into the films and comic strips. The popular magazines of 'science fiction' are full of them. The girl in the mass-production factory takes them for granted; but it is not surprising that she should think that an automaton could put a squiggle on the chocolates nearly as well as she can, and if an automaton could do that, she might easily imagine there was little difference between it and her.

The ultimate horrors in this direction are the grotesque representations of the human body, which are supposed to be educational and have been seen in exhibitions—a crude human shape, with a few lamps that go on and off and perhaps a coloured liquid circulating through some pipes; the ability to perform a few simple movements and perhaps respond

to one or two words of command.* This is supposed to represent what science has learnt about man and what it can do to re-create him! It is significant that in a mechanical age people should be willing to accept such a crude model as something even vaguely human.

Scientists themselves are turning away from the cruder mechanical ideas. Their exploration of living things has revealed an extraordinary complexity. Whatever life is, we shall see that it is certainly not a simple phenomenon and cannot be described in simple terms. Scientists of many kinds: biologists who study intact organisms and their mode of life, physiologists who study the mechanism of action of the various organs, biochemists who study the constituents of living things, physicists who bring their powerful instruments to the study of living matter: all find that their work reveals an ever-increasing complexity, the bottom of which has not been reached. The fact of this complexity, alone, means a revolution in our assessment of life and its significance, which must have great implications when it is more widely known and understood. Nineteenth-century science, being concerned with the elemental forces, sought and found simplicity in the universe, a simplicity which Eddington brought to its ultimate conclusion in his view that all the physical quantities such as the size of the universe, the number of particles in it, and the mass of the electron could be derived from a few inter-relations between the ultimate physical constants.

A simplicity of the ultimate particles is not incompatible with an extreme complexity of the patterns they make. The main emphasis of science is now changing from the study of the elementary forces and

* The New York Fair of 1939 had one; so did the Paris Exhibition of 1937. It is still on view, I believe, in the Palais de la Découverte.

simple particles to the complexities of living textures. This may bring about a revaluation of man's estimate of himself. For although the austere and noble studies of astronomers, mathematicians, and physicists, which have revealed the foundation stones and dimensions of the universe, have enriched mankind by their demonstration of the power and sweep of the human intellect, they also left them a little naked, exposed, and insignificant in the chilly vaults of space. The balance may be redressed by the complementary studies of living structures, which, by revealing a world as rich in texture as the other is vast, may make men feel again that they are not out of keeping with the splendour of their setting.

J. A. V. BUTLER, *Man is a Microcosm*

LIFE IN OTHER WORLDS

A QUESTION that I am often asked is whether life exists in other worlds, either on one of the other planets belonging to our own solar system, or possibly on a planet belonging to some other Sun. Before attempting to give an answer to this question, some assumptions must be made. The forms of life which have evolved on our Earth are forms which are presumably adapted to the varied conditions which are found on the Earth—or beneath the ground or in rivers and seas. It is conceivable that life may exist under conditions that differ widely from any of which we have experience. Yet it is difficult to believe that there can be life of any sort on a world that is entirely devoid of an atmosphere or on one that has an atmosphere containing no oxygen. Water is probably also essential. Nor does it seem probable that life can exist under great extremes of temperature—either intense heat or intense cold, though we should be

rash if we attempted to state limits of temperature outside which life could not exist.

Given that conditions on any world are such that life is possible, can it be assumed that life must necessarily exist there? The conditions under which life can exist may not necessarily be conditions under which it is possible for it to originate. We really know nothing about when or how life began on our Earth. It is believed that the Earth and the other planets condensed out of a long filament or tongue of matter drawn out of the Sun by another star passing near it. Whether or not this theory of the birth of the planets is correct in detail, it seems reasonably certain that the planets of the solar system were formed in some way out of the Sun.

In the beginning there could have been no life on the Earth or on any of the other planets, for no life is possible on the Sun. The temperature of the Sun is so high that all but a few of the simplest chemical compounds are broken up into the constituent atoms. A single living cell is a complicated structure from the chemical point of view and could not exist on the Sun.

At some time, then, in the past history of the Earth —a history which we have already seen extends back somewhere about three thousand million years—life first made its appearance. Geologists have found primitive marine invertebrates in rocks of the Archean period, of an age of about 1300 million years. Life may therefore have appeared comparatively shortly after a solid crust formed on the Earth. Are we to suppose that life developed spontaneously, because conditions were suitable for it, or that its appearance was due to a special act of creation on the part of the Creator? If we adopt the latter viewpoint, further discussion becomes superfluous, and for the sake of argument we assume that life developed spontaneously.

As to the conditions which may be necessary for such spontaneous development we can perhaps argue that —since no biologist has ever succeeded, even with all the resources of modern laboratory technique, in producing life of any sort—a delicate balance between various factors is essential before life will appear.

If this is so, the way to further discussion is again blocked because we are in ignorance as to the conditions in which life will originate. All we are able to do is to inquire whether conditions elsewhere in the Universe are such that life could exist, recognising the limitation that even though conditions on any world are suitable for the support of life, it does not necessarily follow that life exists on that world.

Considering the solar system, it seems probable that we can at once rule out of consideration most of the planets and all of their satellites. Mercury appears to be entirely devoid of any atmosphere; moreover, the temperature of the face which is turned to the Sun is about the temperature of molten zinc, whilst the night face of the planet, in the absence of any atmosphere, must be extremely cold. Jupiter and Saturn have very extensive atmospheres, but both observation and theory agree in indicating a complete absence of oxygen and water-vapour. The outer atmospheres of these planets apparently consist predominantly of hydrogen, ammonia, and marsh-gas. The atmospheres are many thousands of miles in depth and the pressures in their lower portions are so great that the gases are mostly liquefied. We cannot conceive that life can be supported under such conditions, even if the intense cold on the planets did not by itself make life impossible. Conditions are even more extreme on Uranus and Neptune; there is a greater degree of cold, and in the outer atmospheres marsh-gas is more prominent than ammonia merely because the ammonia cannot

remain gaseous at such low temperatures. Pluto is a small body, probably without any atmosphere and with a temperature so low that neither nitrogen nor oxygen could exist on it in a gaseous condition. We cannot regard it as at all probable that any form of life, either vegetable or animal, could exist on any of these worlds.

Is it possible that life may exist on one or other of the larger satellites in the solar system? We can at once disregard all the small satellites, because they must long ago have totally lost their atmospheres. We have seen that our own Moon is a dead world, completely devoid of any atmosphere. The only other satellites which perhaps demand some consideration are the two largest satellites of Jupiter, Callisto and Ganymede, and the largest satellite of Saturn, Titan. The two satellites of Jupiter are not very different in size from Mercury, but they are considerably less massive. Ganymede weighs rather more than half as much as Mercury. Callisto, though about equal in size to Ganymede, has less than one-third of its weight. The pull of gravitation at the surface of either of these satellites is therefore less than at the surface of Mercury. It follows that the velocity of escape from each of these satellites is lower than the velocity of escape from Mercury. We should not therefore expect to find any atmosphere on either of them. Direct observational evidence seems to support this; the surfaces of both satellites can be seen, and spectroscopic observations give no evidence of any atmosphere on either. Similar remarks apply to Titan; it is smaller and not so massive as Mercury, and there is no indication of any atmosphere.

Venus and Mars remain for consideration. Venus keeps her secrets well guarded. Her face is permanently hidden from us by a thick layer of cloud which even the haze-penetrating infra-red rays cannot

pierce. Neither oxygen nor water-vapour has yet been detected in her atmosphere. But we cannot at present regard the failure to detect them as absolutely conclusive proof of their absence. It may be that the clouds on Venus extend to such a great height in her atmosphere, that the sunlight is reflected back from them before it has had the opportunity to pass through a thickness of atmosphere great enough for the absorption, by oxygen or water-vapour, to be of sufficient amount to be capable of detection by the tests which are at our disposal. These tests are not capable of detecting very small amounts of either oxygen or water-vapour.

The clouds presumably provide direct evidence of the presence of water-vapour; the failure to detect water-vapour above the cloud-layer is probably due to all the water-vapour having been condensed out of the upper atmosphere.

The only positive information as yet obtained about the atmosphere of Venus is a definite proof of the presence of carbon dioxide. This is present in much larger amount in the atmosphere of Venus than in our own atmosphere. The amount of carbon dioxide above the cloud-layer is so considerable that it is possible with some justification to argue that the failure to detect oxygen is really due to its total or almost total absence. We should expect to find both water-vapour and carbon dioxide present on a cooling planet of the size of Venus. As the molten rocky mass cooled and began to solidify, large quantities of water-vapour, carbon dioxide, and other gases would be evolved from it. When the surface had cooled sufficiently, the water-vapour would condense and oceans would cover much of the surface; the atmosphere would contain the inert gases, nitrogen, argon, and neon, and a large amount of carbon dioxide. It is unlikely that oxygen would be present at this stage

in any appreciable amount; most terrestrial volcanic rocks are incompletely oxidised and, if free oxygen had been present in the Earth's atmosphere when the crust solidified, these rocks would have greedily laid hold upon it. The present abundance of oxygen in the Earth's atmosphere is probably due to the action of vegetation, which steadily extracts carbon dioxide from the air and returns oxygen in its stead. The carbon dioxide supply is in turn replenished by processes such as respiration, combustion, and the decay of vegetable matter. Life on the Earth probably started at a time when the atmosphere contained comparatively little oxygen and was in the form of primitive vegetable life. The vegetable life, as it developed, gradually increased the amount of oxygen in the atmosphere, and conditions at length became suitable for animal life. Venus is apparently at a stage which the Earth passed through millions of years ago, having an abundance of carbon dioxide but little, if any, oxygen.

So far as the temperature of Venus is concerned, conditions are probably favourable. Though warmer than the Earth, it is not excessively warmer; there is probably a hot, humid climate which, provided only that free oxygen is present in sufficient quantity, should be quite capable of supporting life. There is nevertheless the possibility that the blanketing effect of the carbon dioxide in the atmosphere may raise the temperature at the surface very considerably, and in the equatorial regions even to the boiling-point of water. Conditions suitable for life might therefore develop first in the polar regions.

What type of life there may be if it exists we can only hazard a guess. On the Earth we find the extremes of climate within which it seems possible for the human race to exist. Is this the result of chance, or is it not rather the result of evolution,

conditioned by the prevailing physical conditions? The conditions on Venus now are possibly not greatly unlike the conditions which prevailed on the Earth at an earlier stage in its history, when the climate was warmer and more humid than it now is and when vast swamps covered the Earth. If so, it is possible that a form of life adapted to such conditions, somewhat akin to the swamp-dwelling mammoths which once lived on our Earth, may have evolved on Venus.

The balance of evidence would seem, however, to be in favour of the view that the amount of oxygen in the atmosphere of Venus is not at present sufficient for the support of any life, except possibly primitive vegetable life.

We know more about Mars than about Venus because we can see its surface. We have found that Mars possesses a thin atmosphere, in which both oxygen and water-vapour may be assumed to be present. The atmosphere is scanty, it is true, the amount of oxygen being considerably less than on the Earth. We know that man can become acclimatised in a short time to live at considerable heights, in a very thin atmosphere, and it is quite conceivable that, by the process of evolution, forms of life may have developed on Mars which can exist in the attenuated atmosphere of that planet. A great impetus to the belief that Mars may be inhabited by a race of intelligent beings was given by the publication of Professor Lowell's book entitled *Mars as the Abode of Life*. Lowell studied the surface of Mars under the exceptionally favourable climatic conditions, and at the high altitude of the Flagstaff Observatory in Arizona. He observed a large number of the fine straight markings which had been discovered by Schiaparelli and named 'canals' by him. He found that the canals covered the surface of the planet in a complex network, forming a fairly regular

geometrical design. Many of them extended for thousands of miles. At various points, called *oases* by Lowell, several canals intersected. The oases are darker regions which may cover a large area of several thousand square miles. There is no doubt as to the existence of these darker patches or oases. Many of the canals were believed by Lowell to be double, appearing as two fine equidistant lines, somewhere about one or two hundred miles apart. From a study of many drawings of the planet, Lowell concluded that the canals changed their appearance with the Martian seasons. Usually faint or invisible during the spring, they gradually become more prominent as the polar cap shrinks, appearing to grow towards the equator at a rate of some fifty miles a day, and often extending beyond the equator well into the opposite hemisphere. This appearance gradually fades away and then, half a Martian year later, the canals are again seen to be growing towards the equator, but this time they are extending from the opposite polar cap.

Lowell interpreted these observations as providing evidence of the activities of a race of intelligent beings who were engaged in a desperate struggle for existence on an arid world, where there was little or no rainfall. He supposed that the canals were artificial channels constructed to bring water from the melting polar caps towards the equator, for purposes of irrigation, in regions where there was little or no rainfall, and he believed that the darkening of the canals was due to water flowing along them. The oases were interpreted as large irrigated areas; here were to be found the centres of population, the inhabitants being driven from the arid regions by the scarcity of water.

Lowell asserted that some of the canals disappeared for several years at a time and new canals appeared where none had previously been seen. This was

apparently due to some of the canals silting up from time to time and after a lapse of years being opened up again, or even to new canals being constructed.

To cover a planet with a network of 'canals,' or water channels, each of which must be at least fifty miles wide, extending for hundreds or thousands of miles, would be an immense undertaking, which might not unfairly be attributed to a race of beings in a higher state of civilisation than our own. Such was Lowell's opinion. The theory is a fascinating one, if only we could be certain that the canals are really there!

But another equally skilled observer, Professor Barnard, possessed of remarkable acuity of vision, who had, moreover, the advantage of years of observations with some of the largest telescopes in America, was unable to see the fine geometrical network of lines described and drawn by Professor Lowell. At times Barnard could see 'short, diffused, hazy lines, running between several of the small very black spots which abound in this region of the planet.' Observing Mars with the great 60-inch reflector at the Mount Wilson Observatory in California, Barnard said that it gave him 'the impression of a globe whose entire surface had been tinted a slight pink colour, on which the dark details had been painted with a greyish coloured paint, applied with a very poor brush, producing a shredded or streaky and wispy effect in the darker regions.'

Such differences between competent observers are probably to be attributed to complex psychological factors. The observer gazes intently at a highly magnified image of the planet; the detail which he strives to see is at the limit of vision. The slightest tremor in the atmosphere is magnified by the telescope, with the result that the image becomes somewhat unsteady. For a moment it settles down, if conditions are of the best, to an almost perfect image; but

before the eye can see the fine detail, another tremor has spoilt the image. Faint details which the eye has seen momentarily (and the surface of Mars is certainly rich in fine detail) the mind tends subconsciously to connect by straight lines. The final picture, though as faithful a representation as the observer can draw, may bear but a faint resemblance to the real object or even to the picture drawn by another observer. We may compare the early drawings of some of the spiral nebulae by Lord Rosse with modern photographs of the same nebulae. The spiral structure of these nebulae was discovered by Lord Rosse with his great 6-foot reflector about 1850. Though the spiral structure is certainly there, a comparison of the details of the drawings and photographs shows little resemblance; the spiral formation is not nearly so much in evidence in the photographs as in the drawings.

The balance of astronomical opinion is against the objective reality of the system of canals depicted by Lowell. If we do not accept the objective reality of the canals, we must also abandon his graphic picture of the race of intelligent beings struggling desperately for existence. In answer to the question whether Mars is inhabited, we can only point to probabilities. We have seen that the atmosphere of Mars, though rather rare, could probably support life. The conditions as regards temperature, though not very pleasant, are not such as to make life impossible. Near noon, in the equatorial regions, the temperature rises to about 50° F.; but in the afternoon, as the Sun gets lower in the heavens, it rapidly falls and after sunset the cold becomes intense, the minimum temperature at night probably reaching 130° F. below zero. This enormous daily range of temperature and the rapidity of the changes must prove very trying for any form of life.

It would seem probable that such life as may exist must protect itself from the bitter cold at night by taking refuge in caves or holes in the ground. Vegetable life is most likely to be in the form of lichens or mosses.

Our conclusion is that life of any sort is unlikely to exist anywhere in the solar system, apart from our own Earth, except possibly on Venus or Mars. Conditions on neither of these planets appear particularly favourable, but, in view of our present incomplete knowledge of these conditions, the possibility of life cannot be ruled out. The conditions on Venus may be compared with those on our Earth many million years ago; those on Mars are perhaps similar to those that will prevail on the Earth many million years hence, when the Sun is cooler than it is now and when our oxygen supplies may have been largely used up.

The possibility of life elsewhere in the Universe than in our solar system remains for brief consideration. We can only deal with probabilities, for we have no means of detecting whether any of the stars, other than the Sun, has a system of planets; if such systems exist, we can never know anything about the actual physical conditions which prevail on them. It seems probable that planets are only born when two stars pass so close to one another that enormous tides are raised on their surfaces; great jets of matter are then drawn out of each star, which break up and finally condense into a system of planets.

This theory of the origin of a planetary system is not without its difficulties, but for want of any more plausible theory we may accept it provisionally. It would seem to imply that the birth of planets must be an event of extremely rare occurrence. On the basis of the random wandering of the stars, as we find them distributed in the neighbourhood of the

Sun, a sufficiently close approach of two stars can happen on the average only about once in every five thousand million years.

This argument was a valid one before the expansion of the Cosmos had been discovered. But it is now known that the Cosmos is expanding at such a rate that in about 1300 million years the distance of any one stellar universe from any other universe is doubled. It may be thought that this is an extremely slow rate of expansion. But when we consider that our Earth is some 3000 million years old, it will be seen that when it was born distances were less than one-quarter of what they are now, provided that we can assume the expansion to have been uniform in the meantime. It is therefore more than probable that close approaches of two stars were formerly far more frequent than they are now. In that case, there must have been a progressive diminution in the birth-rate of planets. In our Universe, which contains about 200 thousand million stars, it may consequently be regarded as not improbable that there are many stars—even though an extremely small percentage of the total number—which have planetary systems.

But even when this possibility is granted, life is not likely to develop on any planet unless there be a suitable combination of various factors. The planet must be at such a distance from its parent Sun—whose output of radiation in the form of heat and light may be either very much greater or much smaller than the output from our Sun—that its temperature is neither too high nor too low. It must be of sufficient size and weight to be able to retain its atmosphere; it is probably necessary that it should not be so large and massive as to retain the hydrogen which would initially predominate, for then the whole of the oxygen would be likely to combine with

some of the hydrogen to form water, leaving an atmosphere entirely devoid of oxygen. Conditions suitable for the support of life are not likely therefore to prevail in more than a small proportion of planetary bodies.

Our own Universe is one of many millions. It is estimated that, up to the distance to which the most powerful telescope yet made can probe, there are some 75 million universes, generally comparable in size and in other respects. There must then in the Cosmos as a whole be many millions of stars with families of planets belonging to them. Though we cannot make any definite assertion, it is reasonable to suppose that conditions on some at least of these must be such that life is possible. If we can assume that life will appear when conditions are suitable for it, the balance of evidence must be in favour of the conclusion that the probability is that there are many other worlds scattered through the Cosmos on which life exists.

From *Worlds Without End*, by Sir Harold Spencer Jones, published by English Universities Press, Ltd.

IS MAN A MACHINE?

NOWHERE is the scientist more deeply at a loss than in dealing with man himself. Atoms can be split, light from the most distant stars analysed, and electricity harnessed. But when the scientist turns to life, and even more to man, the difficulties at once become greater. Neither life nor man are so readily amenable to controlled experiment.

How far, it is natural to ask, can man's actions be explained in terms of the ordinary laws of physics and chemistry? Is he, putting the question in its old-fashioned form, a mere machine? To what extent is

liability to disease, whether of body or mind, determined in advance, and to what extent could it be eliminated by sterilising the unfit? How far do the known laws of heredity, coupled with environment, determine human behaviour? Questions such as these involve, or border closely on, the nature of life itself. Translated into practical terms, they are of more than passing social importance. If man, for example, is in essence a machine, can he properly be regarded as responsible for his actions? Is punishment, other than as a deterrent, justified?

Leaving the main question on one side, is heredity something which is in the main fixed, or may the benefits of training and education be passed on, in part, from one generation to the next? Again, how far are men the slaves of heredity as such, and how far of the conditions under which they are born and brought up? There is no doubt of the importance of the issues raised. In time, perhaps, complete answers may be provided. At present knowledge is 'here a little, and there a little,' which is no doubt the reason that biology has not yet been accorded the position of importance in public affairs which it must in time be given.

The biologists of a century ago were sharply divided into mechanists and vitalists and, so far as the rank and file were concerned, both were equally dogmatic. To-day no one is quite so certain. An increasing number of the mechanisms of life are being explained, but there is not the same assurance that life itself is no more than a mechanism. The procedure is one of elimination. This and this have been explained. Elsewhere it seems that ignorance may soon be turned to knowledge, but when all has been done there may still be something left to defy explanation and analysis.

The outsider who would guess the final issue can do little more than take note of a few of the outstanding

cases in which the ordinary methods of scientific inquiry have been successful, and draw his own conclusions. Much of the knowledge that has been won is, in any case, impressive and, even at the present stage, has practical implications. It would be possible, for a beginning, to expatiate at length on the relatively crude type of experiment in which a man is shut up in a heat-recording chamber and fed with food of precisely calculated heat value. Provided he does not eat too much, his fuel consumption exactly balances his energy output, just as would be the case with a machine. Such a test is interesting enough in itself, but it is from the gradual exploration of the more complex mechanisms of the body that conviction will come if at all.

Pride of place may be given, at the moment, to the mechanism of heredity, although relatively little of our knowledge in this field has been derived from man himself, or even from any of the higher forms of life, in which breeding is slow and the influence of heredity correspondingly difficult to study. It was the obscure monk Mendel, working in his monastery garden at Brünn in Silesia, ignored by his own generation, who discovered the essential fact that heredity is atomic. By this is meant that all the individual qualities of any organism, from tallness to a capacity to do sums, are inherited from the generation which went before, in the shape of definite 'factors,' which the modern scientist calls 'genes.'

Mendel worked with pairs of contrasting qualities in garden peas, for example tallness or shortness and seed colour. One of his most important discoveries, both in the explanation of heredity and for practical purposes, is that both of such opposing qualities may be present in the same individual, the apparent result depending on whether the one quality was 'dominant' or 'recessive' compared with the other. Thus yellow

seed colour proved to be dominant over green, so that individuals which inherited both qualities were indistinguishable to the eye from those that were 'pure yellow.' But they none the less carried the germ of greenness within them, and he showed that there was a definite mathematical probability that this would come out in subsequent generations. In human beings brown eye colour is dominant over blue. Blue-eyed parents can never have brown-eyed children, but blue eyes may make their appearance in the children of brown-eyed parents.

This work of Mendel's is alone sufficient to give a general explanation of both the virtues and the dangers of inbreeding. The result of prolonged inbreeding within the same stock, in which the same recessive characters are unusually likely to be repeated, is therefore to bring out a large number of qualities which would normally be hidden. Provided that the individuals which show the unwanted hidden qualities can merely be weeded out, inbreeding is an admirable procedure. It is, of course, regularly used in the case of animals. With human beings the position is very different and, although cousin marriages may breed genius, the age-old tabu against marriages between closely related persons is, in the present state of knowledge, fully justified.

The difficulty is that there is no means of telling how many rare recessive genes may be lying dormant in the human race, waiting only for an opportunity to come together in the same individual to make their presence felt. If human heredity is ever fully worked out, it may be possible to tell which individuals carry what dangerous genes and to warn them against marrying together. At present it is probably wisest to play for safety. An interesting exception, which well illustrates the point that inbreeding need not be dangerous if the stock is sound, is provided by the

Pharaohs of Egypt. There, the rule of royal marriage was that the Pharaoh should marry one of his half-sisters. So far as history relates, there were no serious ill-effects, whereas if eugenic principles had been followed there would have been no Cleopatra.

Mendel also deduced that, however mixed the characteristics of a plant might be, its heredity factors were somehow sorted out or 'segregated' in the reproductive cells which give rise to the next generation. That is why children, both in physique and mental qualities, are more than a mere blend of the corresponding qualities of their parents. They are the result, in a phrase familiar to-day, of a 'new deal.'

All this was as far back as 1865, although it was not until the present century that Mendel's work was rediscovered, the scope of his laws extended and made clear, and their physical basis explained. To-day it is known that the mysterious genes which Mendel studied are carried by a number of worm-like units, called 'chromosomes,' which are present in every cell of every living organism, and are the visible vehicles by which heredity is transmitted. In one case at least, these chromosomes have even been mapped out, so that it is known on which of them and in what order the different genes are carried.

A single glance through a microscope at the worm-like chromosomes in any of our body cells would probably not suggest that they had any connection with heredity. On closer inspection, however, it might be noticed that although they always numbered forty-eight, they could be arranged in a series of like pairs, *AA*, *BB*, *CC*, and so on, according to their sizes and shapes, so that the number of different kinds of chromosomes was only twenty-four. Further, if the microscope was turned instead on to a reproductive cell, whether male or female, it would be noticed that there were in this case only twenty-four chromosomes

instead of forty-eight, and that there was only one chromosome of each kind.

It is here that the secret of the heredity mechanism has been found. Out of any pair of chromosomes in a body cell, one comes from the male parent, and the other from the female. One, therefore, may carry a tallness gene and the other one for shortness, and that individual will be mixed so far as height is concerned. But that is only true for the body cells with their two sets of chromosomes. The reproductive cells, with their single set, must be either tall or short. So it is that between successive generations all the different characters which go to make up heredity are 'segregated,' only to be reblended when two reproductive cells are united to form the nucleus of a new individual. That is how Mendel's 'new deal' is achieved.

So far, however, we have not been able to penetrate behind the gene-carrying chromosomes, to the genes themselves, the real atoms of heredity. This achievement stands mainly to the credit of Professor T. H. Morgan of America. His pioneer experiments at Columbia University have carried our knowledge a long way farther, and at the same time clearly illustrate another point of direct social importance. Professor Morgan works with the fruit fly *Drosophila*, which feeds on rotting banana skins. This insect has two great advantages for the student of heredity. Its whole life extends over no more than a fortnight, and it has only four pairs of chromosomes. An almost unlimited number of generations can therefore be bred within the lifetime of a single experimenter, and it is relatively easy to decide which factors are carried by the same chromosomes. The latter type of deduction depends on the fact that certain chromosomes tend to stick together in the redealing process, so that one may be only exceptionally inherited without the others.

More important from the point of view of sterilisation is the discovery that a very large number of genes may be concerned with the control of a single physical quality. In the case of *Drosophila* more than fifty factors have to do with eye colour alone. It is evident that the heredity of such a complex creature as man is not likely to be easy to elucidate, and that a large number of genes may be necessary for the production of, say, a single type of mental deficiency.

This point has a direct and practical bearing on the various proposals which have been put forward for the legal sterilisation of defectives. From the examination of human pedigrees it appears that relatively few qualities are inherited on a simple Mendelian basis, that is through a single gene, and that this is certainly not the case with the great majority of mental deficients. A particular individual might therefore possess a group of genes which took him some way towards deficiency, but would yet have to marry a wife who carried the appropriate missing genes before deficiency would appear in his children. If it is added to this that many of the genes in question are probably recessive, and so do not necessarily show themselves, it will be realised that the control of deficiency is far from easy.

This interpretation is strengthened by the fact that the great majority of defectives are unquestionably the offspring of sub-normal, not of mentally deficient parents. While, therefore, there may be something to be said for sterilising defectives as a measure of economy, this would be a futile policy from the point of view of reducing their numbers in the total population. The only advantage is that money need not be spent on maintaining them in an institution provided that they can be otherwise looked after, and this is an economic, not a scientific, argument. The whole lesson of any detailed study of human heredity is

indeed that any drastic proposals for the improvement of the race, whether by sterilisation or eugenic marriage, should be viewed with extreme caution. Far too little is known of human heredity in relation to its obvious complexity.

It is probable, although the problem has not been worked out with the same certainty as in the case of *Drosophila*, that more than a hundred genes are concerned with human teeth, skin, and eye colour alone. It is also probable that most physically measurable characteristics, height included, are affected by a large number of different genes, for the possible variations in all such qualities appear to be limitless. Relatively few conditions, including myopia and some forms of night-blindness and deaf-mutism, are known to be inherited on simple Mendelian lines. But, beyond the common-sense advice that deaf-mutes should not marry, genetical science has little practical guidance to offer. Even this negative conclusion may be of some value when it is remembered with what immense enthusiasm eugenic control is even now sometimes advocated. Those who have religious objections to compulsory sterilisation may reflect that, for the present, science is on their side. When it has more knowledge, it may change its mind—in particular cases.

Yet if we regard heredity as one of the mechanisms of life, the position is very much more encouraging. Whatever the difficulties of detail, the statement is certainly justified to-day that the main basis of the whole elaborate mechanism of heredity has been made clear. Within the short space of the present century cases of Mendelian heredity have been worked out in practically every form of life from crustaceans to man. There is, therefore, good reason to believe that Mendel's laws apply to every species in which reproduction is bisexual. It has even proved possible,

again in the case of *Drosophila*, to make some sort of estimate, not only of the positions occupied on the chromosomes by particular genes, but of their size as well. While the parts played by more than five hundred of them have been fully worked out, it appears that their total number must be more than eighteen hundred. On this basis their average length must be of the order of two-millionths of an inch, which is appreciably too small to be visible in the most powerful microscope.

On the other hand, in one particular type of cell, those of the fly's salivary glands, it has lately been discovered that the chromosomes are greatly extended. If the heredity factors, strung out along the chromosomes, are correspondingly elongated, it is just possible that it may be practicable to observe them individually. In the meantime, although so much is known of their working, no one can put forward any real claim to know what they are. It only appears that they must be material entities of some kind. The explanation is not yet complete, but there is certainly no reason to believe that anything outside the ordinary laws of physics and chemistry will ultimately prove to be involved.

After heredity, the next great mystery of life is the power possessed by a single cell to divide and multiply into the whole variety of specialised cells which makes up the complete organism. It is perhaps the most extraordinary fact in the whole of biology that a single minute cell should have the power to turn itself in Shakespeare's words into 'Item, two lips, indifferent red; item, two grey eyes, with lids to them; item, one neck, one chin and so forth,' and even more surprising, if Olivia had not been solely concerned with her woman's beauty, into the human brain. Here, it might have been thought, if anywhere, was the point at which the merely mechanical processes

of physics and chemistry must break down and prove inadequate. Yet it appears that the secret of nature's building process is nothing more romantic than a chemical.

In this case it was Professor Spemann of Dahlem in Germany who made the first vital discovery. He found that a particular region of every embryo seemed to play the part of an 'organiser' of growth, so that in an embryo which was deprived of its centre of development the different cells failed to differentiate in the usual way. Similarly, he found that, by grafting an additional organising centre into an embryo, the embryo could be made to duplicate many of its organs —so that twin-headed monsters could be reared analogous to the many-headed Cerberus of Hades. . . . Next it is logical to turn to the maintenance and further growth of the body, once its different parts have been differentiated. Just as Professor Morgan's genes control heredity and Professor Spemann's organiser early development, so it has been found that the ductless glands control a large part of our later lives. Their activity also is chemical. The glands are in fact factories for the manufacture of specialised chemicals, called 'hormones,' within the body, and the blood stream the vehicle which carries the chemical messengers from these 'general action' glands about the whole system. The thymus, which overlies the heart in young children, is connected with growth. It has been found that baby rats which are given thymus extract from calves develop more quickly, the effect being cumulative if the same treatment is repeated in successive generations. Whereas normal rats grow their first hair when they are twelve to sixteen days old, the fifth generation of thymus-treated rats will show their first hair within two or three days of birth. This is one of the latest gland discoveries. It is due to three American research workers, Dr.

Rowntree and Dr. Clark of Philadelphia and Dr. Hanson of Faribault, Minnesota.

As the thymus disappears during puberty, its special function is evidently to control childhood growth. During this vital period, however, it is also assisted by two other glands, the prepituitary and the thyroid, both of which continue active into adult life. Nature's arrangements for growth control are therefore essentially complicated, although this perhaps was only to be expected. The task itself is obviously far from simple. Over-activity of the prepituitary makes giants, but this gland must be concerned with more than bone growth, for under-activity holds up sexual development as well as merely retarding growth. There is also no doubt that it remains important throughout life. If over-activity begins after maturity is reached, it stimulates an abnormal and unwanted bone growth in the hands, feet and skull.

The thyroid gland of the neck is connected with mental as well as physical development. A deficiency of the chemical which it produces results in the condition known as cretinism, in which a grotesquely childish appearance is retained into adult life, and mental development is completely arrested. But, although the thyroid gland is also connected with growth, its most important function is the control of the body's chemical activity. A man whose thyroid is too active has a large oxygen consumption and literally lives too fast. He may, as a result, show all the signs of nervous irritation. On the other hand, a deficiency of thyroid produces general sluggishness. It is here, perhaps, that the effect on growth comes in. If the chemical changes of a child's body are being slowed up, it is natural that it should be prevented from developing normally. There are therefore at least four directors of the various stages of

growth and development—first Professor Spemann's 'organiser,' then the thymus, and finally the pre-pituitary and thyroid. There is much more to be learnt about the chemistry of growth, but it is no longer the complete mystery that it was.

In addition, there are two other glands which cannot be omitted from even the shortest account of this most important body mechanism. The chemical adrenin, produced by the adrenal glands near the kidneys, is of special importance to athletes. It makes all the necessary arrangements for any form of special physical effort. As well as speeding up the beating of the heart, it facilitates the blood flow throughout the body, slows down the irrelevant process of digestion, stimulates the supply of fuel to the muscles and urges the sweat glands to action. As a reminder of more primitive conditions, it even does its best to terrify the supposed adversary by causing the hair to stand on end and enlarging the pupils of the eyes. Finally, the pituitary has a real claim to be called the master gland of the whole body for, in addition to various special functions of its own, it both stimulates other glands to greater activity and encourages the growth of their tissues.

As with heredity and the cell's 'organiser,' so also with glands, it is the mechanism, rather than the cause behind it that has been successfully explored. Only in two cases, those of adrenin and of thyroxin from the thyroid, has the product manufactured been isolated and made by the chemist in his laboratory. Yet the fact that this can be done at all is an indication that here also scientists are dealing with nothing super-normal, but that many of the body's most important activities are controlled by chemicals, all of which it will one day be possible to make and examine outside the body. The chemical study of the sex 'hormones,' which will not be here discussed, also points the same

lesson. Even in these three examples—heredity, the development of the embryo, and bodily activity—science has already gone a long way towards removing the element of the unknown from the mystery we call life.

A. W. HASLETT (1935), *Unsolved Problems of Science*

THE LARGER LUNACY

I must entreat you, friends, below!
The angry storm begins to blow,
For the weather changes with the Moon.
LONGFELLOW

IT is a sad comment upon human intelligence that the chief controlling factor in our weather, according to popular belief, should also be the one that has given us our name for a madman. And the belief is not new. . . . Theophrastus records that 'whatever the crescent Moon indicates, it indicates when it is three days old.' Virgil, however, favours the fourth rising, 'for that is surest of warrant,' but agrees that 'if indeed thou wilt regard the hastening Sun and the Moon's ordered sequences, never will an hour of the morrow deceive thee.' Pliny supports him about the fourth rising, and adds that this 'most commonly determines the force and direction of the wind.' Aratus, needless to say, is bursting with lunar lore, but restricts the operative period of any prognostic to the end of the lunar quarter.

Roman opinion ultimately expressed itself in the proverb:

'As the fourth and fifth days' weather,
So's that lunation altogether.'

And that is roughly the form in which we find the larger lunacy summarised in our own country, although Bacon does introduce a critical note when

he states that 'the dispositions of the air are shown by the new Moon, though still more at the fourth rising, as if her newness were then confirmed; but the full Moon itself is a better prognostic than any of the days which succeed it'—apparently because there is more of it to be seen!

Yet oddly enough, insistence on the Moon's prowess as a long-range forecaster from the fourth rising in no way impaired faith in its ability to support Virgil's day-to-day theory, particularly at full and change.

> 'Late, late, yestreen, I saw the new Moon
> With the old Moon in her arms;
> And I fear, I fear, my master dear,
> We shall have a deadly storm.'

—says *The Ballad of Sir Patrick Spens*, and this simple phenomenon of reflected light would doubtless have become a really popular prognostic, had not the men of Suffolk stoutly declared it to be a sign of fair weather.

The same happy contradiction marks the belief that a crescent Moon 'lying on its back' with its horns level denotes fair weather because in that position it holds the water like a bowl, whereas if the crescent is reversed so that the horns point down, or is tilted so that one horn is lower than the other, rain follows because the water runs out—a belief of which Southey wrote that 'it will be a long time before the march of intellect shall produce a theory as original as this, which I find, upon inquiry, to be the popular opinion here' (in the Lake District). In Wales the same view is held, though for a different reason: when the Moon is on its back, you can hang your hat on its horns.

Yet in the south of England men say the reverse—that if the Moon is on its back it collects the water to use as rain, and when it is not, no water can collect

and, therefore, fine weather follows. In Scotland men express this view as a proverb:

'The bonnie Moon is on her back.
Mend your shoes and sort your thack.'

Actually the slant of the crescent depends on the position of the Sun and Moon in relation to the observer on the Earth, and if there were any truth in either belief, the same weather would have to prevail throughout any belt of latitude.

So the tale goes on.

Shakespeare calls the Moon 'the governess of floods.' The Shepherd of Banbury declares that 'mists in the old Moon' indicate 'rain in the new,' and 'rain in the old, mists in the new.' Even the great Luke Howard was sufficiently impregnated with the lunar myth to introduce the Moon's position into his diagrams for relating pressure changes and weather in his *Barometrographia*. Nevertheless, separately and collectively these gentlemen are wrong. For the Moon, apart from an extremely small, local, and indirect tidal influence, has no effect upon the weather at all. Our weather depends on the movement of the great air masses, a movement that is sustained by the heat received from the Sun. If the Moon added to or diminished that supply according to the position it occupied relative to the Earth and Sun, that is, according to its phases, then it would influence the weather. But it does not. Its exact influence has been calculated mathematically and found to be so small that it can be regarded as negligible. Incidentally, if the new Moon did change the weather by reason of its newness, it would have to change the weather from pole to pole; for when the Moon is new on the meridian of one observer, it is new to any other observer on the same meridian, and there is no evidence to support the belief that the new Moon will

come in with 'a good deal of wind and rain' or anything else simultaneously from Spitzbergen to South Africa, for example, by way of Lapland, Poland, Rumania, Greece, Egypt, the Belgian Congo, Rhodesia, and the Transvaal. . . .

The small indirect tidal influence on the weather that the Moon exerts comes about from the slight variation in surface temperature sometimes caused through tidal movement. But even so, the Moon is not solely responsible. The Sun must be given a three-to-seven share in the tides.

Only when the appearance of the Moon is studied is there anything of meteorological worth to be gained, for then the Moon shares with all other heavenly bodies the ability to reveal changes in the atmospheric state, and these, in turn, may reveal an approaching change of weather. As Aratus puts it:

'But chiefly look to Cynthia's varying face,
There surest signs of coming weather trace.'

—though modern meteorology would not rate the signs so highly.

There is, for example, an element of truth in the saying that 'sharp horns do threaten windy weather,' for the temperature differences in the air that give rise to uncertainty in the definition of heavenly bodies are removed by a strong upper wind, and sooner or later that wind may descend to surface level. When these temperature differences exist, it may mean rain, as Virgil recognises poetically:

'When Luna first her scattered fires recalls,
If with blunt horns she holds the dusky air,
Seamen and swains predict abundant showers.'

On the other hand it may not. But go a stage further to the lunar halo, and, as already explained, the risk of rain is increased considerably. Then, of course, the Moon 'looks with a watery eye,' as

Shakespeare puts it, just as the Sun does at times. Also the light from the Moon can be scattered just as easily as the light from the Sun, with the same result. Hence the free translation of a Roman proverb:

'Pale Moon doth rain;
Red Moon doth blow;
White Moon doth neither rain nor snow.'

For a 'white' Moon shines through clear dry air, whereas a 'pale' one shines through thin stratiform cloud that so often ushers in frontal rain; and since a copious water-vapour content will ensure that the blue rays are absorbed in any scattering which occurs, and this state is also found before a depression, it is quite on the cards that a 'red' Moon will blow—and rain, too, as a 'red' Sun is held to do.

'If the Sun in red should set,
The next day surely will be wet.'

Nor does this clash with the age-old rhyme which tells us:

'A red sky at night
Is the shepherd's delight.
A red sky in the morning
Is the shepherd's warning.'

—because there are two shades of red, that resulting from excessive vapour and that resulting from lack of it and the presence of dust instead. The first circumstance gives the 'angry' red, the second the 'gentle rose,' and it is well to distinguish between the two. The Shepherd of Banbury is correct in saying that 'if the Sun rise red and fiery—wind and rain,' but Shakespeare's reference to—

'A red morn, that ever yet betokened
Wreck to the seaman, tempest to the field,
Sorrow to shepherds, woe unto the birds,
Gusts and foul flaws to herdsmen and to herds.'

—is not strictly true. Nor is the passage in St. Matthew which says: 'When it is evening, ye say, It will be fair weather; for the sky is red. And in the morning, It will be foul weather to-day; for the sky is red and lowering.' The addition of 'lowering' certainly puts the shade of red beyond doubt for the morning Sun, but the evening Sun should also be qualified. The full proverb, if one is wanted, might be stated thus: 'At either sunrise or sunset, a rose-red or pinkish Sun indicates the probability of fine weather for the next few hours, but a fierce angry red indicates the probability of wind and rain.'

The significance of these colours is the same when they are seen in the sky itself. The sky would be nearly black if there were no atmosphere, but as there is, it is normally blue because scattering ensures that the light reaching us is rich in blue rays. Light from that part of the sky near the horizon at sunrise or sunset takes its colour from the scattering brought about by dust and moisture, just as that from the actual Sun. Hence the sky is usually red near the horizon where the absorption of blue is greatest, then orange, yellow, green, and finally back to blue. But, once again, the red can be friendly or hostile.

The 'green flash' that often marks the setting of the Sun on clear evenings is a consequence of this same scattering, for at the moment of the Sun's disappearance only the blue and green rays are refracted sufficiently to reach the observer, and of them the blue is generally absorbed by the atmosphere. The observer thus sees a green light that endures for two or three seconds. The same phenomenon is to be seen in clear weather at sunrise.

At times the beauty of these sky-colours is accentuated by volcanic dust that drifts immense distances in the upper air after an eruption. Indeed, Krakatoa in 1883 and Katmai in 1912 went beyond

Bishop's rings and gorgeous sunsets and produced genuine 'blue' Moons. Turner did not lie in his sky painting, whatever liberties he took with the land.

'I never see your skies in nature, Mr. Turner,' said one critic.

'Then God help you, Madam,' replied Turner. For truly is it written that, for anyone with eyes to see, 'the Heavens declare the Glory of God and the Firmament shows His Handiwork.'

Among that handiwork is, of course, the aurora, but this is an electrical phenomenon, and its colour derives from the clouds of gas that become ionised as the result of solar activity and arrange themselves along paths influenced by the Earth's magnetism. This accounts for the prevalence of the phenomenon in high latitudes. It has, however, been observed at Singapore, which is practically on the equator, but the solar activity must be very strong before the arcs and draperies suspended above the polar regions are sufficiently lofty to decorate tropic skies. It is then accompanied by tremendous magnetic storms.

Cross-observation has revealed that its draperies usually hang at a height between 50 and 200 miles above the ground, but it is also seen at heights between 350 and 630 miles—evidence that the Earth's atmosphere reaches to that level.

The name *aurora*, meaning 'dawn,' was bestowed in 1621 because in the latitudes of Central Europe where the phenomenon was observed with scientific interest, its common manifestation was no more than a glow on the northern horizon resembling dawn. *Borealis* was added to indicate this northern origin, and later, when the discovery was made, its counterpart in south-polar regions was designated *australis*. In these parts, however, the phenomenon is popularly known as 'the northern lights.'

Needless to say, the manufacturers of weather lore

been quick to ascribe prognostics to the aurora, here is nothing to suggest that the changes which times follow its appearance would not, in our climate, have come to pass had there been no ra. 'Aurora weather,' in fact, may be dismissed 'comet wine.'

ey skies at sunrise and sunset can also betoken ame or different weather, though not so ob- ly as red skies. A thin stratiform cloud-sheet will a grey appearance to the sky at any time, and if unset is grey, the cause will probably lie in such oud and indicate an approaching depression. he other hand, radiation cooling at night during clear weather is liable to impart a mistiness to atmosphere and a consequent greyness to the se that indicates fine weather. In summary, the are that a grey sunset will usher in rain, but a dawn may usher in cloudless skies and sunshine. these reservations should be applied to any rbs that proclaim, as this:

If the evening is red and the morning grey,
It is the sign of a bonnie day.
If the evening's grey and the morning red,
The lamb and the ewe will go wet to bed.'

ere is, however, no additional truth in the lunar fication introduced by the proverb:

'Near full Moon, a misty sunrise
Bodes fair weather and cloudless skies.'

at is merely a further sample of the larger y and, incidentally, one that is difficult to cile with another fragment which says:

'Saturday's change and Sunday's full
Never brought good and never wull.'

—for there is no reason why Sunday should be denied a misty sunrise when the Moon is full. Yet the belief that this coincidence is a meteorological calamity occurs in weather lore from one end of Great Britain to the other.

There is, indeed, as much meteorological nonsense attributed to the Moon as there is to the Christian calendar. And not only meteorological nonsense. The ancients believed that you should, in the rhyme of old Tusser:

'Sowe peason and beans in the wane of the Moone;
Who soweth them sooner, he soweth too soone.

And some moderns believe that the surgeon's knife is more dangerous—or, perhaps it were better said, less likely to be attended by success—at full than at change. But the Moon is still there, in conjunction or opposition, whether you can see it or not. These beliefs are therefore tantamount to affirming that a little reflected light from the Sun, utterly negligible in comparison with the amount received from the naked source, is going to make all the difference between life and death for men and vegetables. It is true that the human brain can often delude itself, sometimes with beneficial results, and the sight of a silver disc shining serenely in the night sky is a form of mental trigger-action as good as any other for those who suffer from abnormal lapse-rates. Indeed, an eminent author once told me that he always knew when there was a full Moon because one of his female admirers wrote to him regularly on that date, thirteen times a year, and had been doing so for nearly ten years. But so far we have not seriously claimed that the broad bean and marrowfat pea are susceptible to auto-suggestion, as we should do, to be consistent.

Nor do we take any note of the dog that bays the Moon, other than to dismiss it as a silly animal, and

this fact is remarkable when you consider the opportunities for meteorological prognostication that are being wasted. Perhaps, however, our forefathers—and, indeed, the ancients generally, for, remember, most of the supposed weather signs are at least two thousand years old—thought they had loaded the animal world sufficiently on its own merits. Some of this loading has been referred to already. Grumphie, the goose, the leech, the thirsty flea—they, you might think, revealed the extent of the lesser lunacy. But not so. . . .

In America they have a rhyme which says:

> 'When a cow tries to scratch its ear,
> It means a shower is very near.
> When it thumps its ribs with its tail,
> Look out for thunder, lightning, hail.'

—and, we may add, flies. Then we are invited to believe that rain is sure to come if oxen 'lick themselves against the hair and lie on their right sides' (and even if they don't!). And also, according to Aratus:

> '—when grave rams and lambkins full of play
> Butt at each other's heads in mimic fray.'

It will come, too, when dogs eat grass and cats sneeze and scratch the table legs. Puss, indeed, is a weather-vane as well as a barometer, for 'the cardinal point to which a cat turns and washes her face after rain shows the direction from which the wind will blow.'

But only the spider is credited with a sense of time: always, if the night is going to be calm, he adjusts his web between 6 P.M. and 7 P.M.

The dates on which particular birds and flowers make their appearance have naturally been granted a significance not always suspected by the Phenological Society. The arrival of the martin, for

example, marks the end of winter, and:

'If the oak's before the ash,
Then you'll only get a splash;
But if the ash precedes the oak,
Then you may expect a soak.'

Unfortunately for the reliance we are to place upon this, gentlemen experienced in forestry say that priority in budding depends on the nature of the subsoil. And this opinion is indirectly supported by the contradictory verse:

'If the oak is out before the ash,
'Twill be a summer of wet and splash;
But if the ash is before the oak,
'Twill be a summer of fire and smoke.'

Against this indecision, however, there is the 'pink-eyed pimpernel' that, in Bedfordshire if nowhere else, is known as the ploughman's weather-glass.

'Now, look! Our weather-glass is spread—
The pimpernel, whose flower
Closes its leaves of spotted red
Against a rainy hour.'

A number of other flowers are supposed to do this too, among them the yellow wood anemone, convolvulus, and gentian, and even the humble dandelion, though the brilliance of the dandelion crop on my tennis-court throughout a recent period of almost continuous rain leads me to think that one species, at least, will close for nothing short of a mowing machine.

Again, the leaves and stalks of certain plants are said to 'inflate' on the approach of rain, among them being trefoil and what is so felicitously known as lady's bedstraw.

But most remarkable among plants are those gifted with the ability to forecast over long-ranges. Plenty

of berries, for example, is said to indicate a severe winter, and:

'Onion's skin very thin,
Mild winter coming in.
Onion's skin thick and tough,
Coming winter cold and rough.'

This, in fact, is also said of a bird's bones, above all things, unless the term 'goose bone' has some occult significance unrelated to avian anatomy.

'If the November goose bone be thick,
So will the winter weather be.
If the November goose bone be thin,
So will the winter weather be.'

After which I do not think I can do better than deliberately alter the punctuation of the proverb and say:

'Hark! I hear the asses bray:
"We shall have some rain to-day."'

C. R. BENSTEAD, *The Weather Eye*

FORCING THINGS INTO FORM

WHAT is your idea of chemistry? Probably that it is the smell-making science. Almost everyone in these days has been in a chemical laboratory, the chemist's workroom. If you have, your clearest memory of it will be its smell. There are two sorts of chemistry, 'organic' and 'inorganic,' the quickest guide to them being their smells. 'Inorganic' chemistry has to do with substances made up from 91 different 'elements,' the simple substances which we are unable to get broken up by any chemical processes. But inorganic chemistry seems to have only one smell, that of bad eggs—sulphuretted hydrogen

(H_2S). 'Organic' chemistry, on the other hand, is limited to substances having in them the element carbon, but has the power of producing an unlimited number of smells, some good, others bad, and others again simply strange. It will make for you the substance by which almost any natural smell is caused; and sometimes a little bottle of this substance would be enough to give all London the pleasure of smelling it. Flowers, fruit, dirty tobacco-pipes, bad meat, strong cheese, burning hair; any or all of these smells may be experienced on a walk round an organic lab.

It is clear that this one substance, carbon, is more interesting than all the rest put together—and more trouble. If you are going to make something by inorganic chemistry, the first business is working out the right amount of the necessary substances which will give you the amount of the end-substance you are in need of. They are then cooked up in one of those beautiful thin glass vessels which chemists make use of, and you will probably get about the amount of end-substance you are after. But that is not the way things are done in organic chemistry. In place of getting the full amount you generally only get a part of it—and frequently a very small part. The rest of your substances simply make a dirty mass of no use at all.

The reason is simple. Your glass vessel is the meeting-place for your chemical substances; you put them there in the hope of their joining up happily in the way their normal behaviour makes probable. But not all the carbon atoms do the right thing, taking up other atoms and forming small groups of use to you. Some of them get together in great numbers, pushing out most of the other atoms: 'condensation' is the chemical name for this unkind behaviour. They are a little like those persons who make up

small groups by themselves at a meeting, in place of helping to make it go in the right way. A group like that is a 'condensation product.'

From the earliest times the organic chemists have had this trouble. Sometimes the behaviour of the 'condensation product' was very bad. It made a stiff mass in a beautifully clean vessel, and not even the strongest acids or chemicals were able to get it off—it was cheapest to let the vessel be broken up. One chemist, with more brains than the rest, gave some thought to this question. This substance, on which no acid had any effect, was like a glass but not readily broken—it was, in fact, a sort of 'resin.' Resins are produced by trees, being at first clear, very sticky liquids, but later becoming solid. The substance 'amber,' used as a jewel, is the resin of trees dead millions of years back. It is hard and strong, and has other properties of great value, which would be made use of if it was not so dear.

This bright chemist got to work to make resin, and in a short time had a way of making it very simply, by heating together two common, cheap materials, carbolic acid (C_6H_5COOH) and formalin (CH_3CHO). These are simple 'compounds,' chemically complex substances of carbon with hydrogen (H) and oxygen (O) only. He had a meeting for his carbon atoms at which they were to do as much condensation as possible. So the carbon atoms kept very near together, pushing out most of the rest in a cloud of smoke—or better, steam, because what comes off is water in the form of gas. He then had a clear brown liquid which in the end becomes a solid like amber—you may even be smoking a cigarette through a little pipe of this resin while you are reading these words. It is named 'bakelite' after the man who made it, Baekeland.

But much more complex things may be made of it.

It may be made into a paste with powders of all sorts—wood powder, asbestos, bright colours—and forced into steel vessels of the right form, which are then heated till the mass is solid. Probably the box of your radio is made that way. Such a box, or whatever other thing may be made, comes out of the vessel complete—no polishing is necessary. One minute you have a spade full of powder, and, the second after, a box which it would take a long time to make in wood, and which would have to be coloured and polished by separate processes.

This was the start of one of the greatest developments in industry in living memory: the development of 'plastics'—all sorts of materials soft enough to be forced into any form desired, and needing no more work to make them ready for use. Ten years back, if you had said something about *a* plastic, almost no one would have had any idea what it was, though the word 'plastic' was quite common. A material is plastic when its form may be greatly changed by force, without its cracking or powdering; with the earlier plastic materials not very much force was needed. 'Clay,' the material from which bricks and pots have been made from the earliest times, is the best plastic it is possible to get. When it is in the right condition it may be given any desired form and then made hard, without changing that form, by heating it strongly. But there are a number of things against the substance so produced. The chief of these is that it is readily broken. Another is its weight. A third is that it is not very beautiful in its rough condition. Ornamenting it with coats of smooth glass-like material is not a cheap or simple business. The Chinese were responsible for the development of the highest quality of material of this sort, 'porcelain.' A beautiful bit of ornamented porcelain is an example of some of the best work ever

done by man. He was some thousands of years learning how to do it.

One of the most important discoveries made in the nineteen hundreds was that most metals are plastic if enough force is used on them. From very early times men had been heating iron to a red heat and hammering it into form. But now strong machines for rolling metals and putting them under great pressure have been produced, and these metals have been made to take all sorts of forms by the use of regular pressure in place of blows.

But with the invention of bakelite, we were given a substance with, roughly, all the good qualities of porcelain, not needing the same great heat to make, and not so readily broken. Its weight is much less.

When this surprising substance was produced, it was seen that a new field of industry was now open, and thousands of persons were quickly at work on its development. In a short time a number of other quite different plastics were produced. It became clear that the very same material your silk stockings are made of might, with a little addition, be made soft and forced into any form. Probably your pocket pen is made of it. Then came the discovery that it was possible to make a plastic from the solid part of milk, and in a year or two the very old industry of making buttons and all other sorts of other things from bone came to an end. Your buttons are probably made of this milk plastic, which has a number of special names such as 'galalith,' 'erinoid,' and so on. Then a complete new range of materials was produced by the organic chemists from urea ($NH_2CO.NH_2$) and very probably you have in the house some cups or drinking-vessels made of this substance, and possibly a glass bottle or two with a screw top made of it. But there is a new story about the use of plastics, which is very interesting and

important. To me it is quite a sad story, because from my earliest days I have had a love of ships and boats, and of the art of making and sailing them; and it is possible that the outcome of this story will be to put an end to the old art of boat-building. But there was a time when the first boat made with boards was sent into the water, and the old way of making a boat by hollowing out the stem of a tree became a thing of the past. So when boats made of boards are things of the past we will have no right to make an outcry. In fact, there will be reason to be pleased, because boats made of boards are, in a way, a step back from the boat made of one bit of wood, or the skins of animals or trees: they let the water in if they are kept long out of water. The latest invention in boat-making is the use of wood cut as thin as cardboard and coated with liquid amber made from carbolic acid; these thin bits of wood are placed one on top of the other to make the skin of the boat. There is nothing new in this idea of using some sticky material for building up thick wood boards out of very thin ones; everywhere to-day such 'plywood' is in use. The new development is the use of a sticky material which is unattacked by water, and one becoming very hard and strong. The boat made in this way is given its form by using very great force—one ton to the square inch, in fact. Such a boat is cheaper than a boat made of separate boards nailed together. Even when dry it may be kept out in the sun and all weathers without being in the least damaged. It is not attacked by worms, because the taste of carbolic acid, however changed, is quite as unpleasing to the lower animals as to man. In addition, the business of getting it ready for the water, giving it a new coat of paint, polishing and so on, becomes unnecessary. If I was going in for sailing as an amusement, I would keep to the old sort of

boats, but if I was in need of a boat to take me about on serious business in seas where there is a burning sun and all sorts of other conditions causing the destruction of materials, my selection would be one of the new bakelite boats.

It is almost unnecessary to say that what is good for ships is good for automobiles. Before long automobile bodies will be made of this material which comes complete from the machine, and has no need to be painted, so long as you are pleased with the colours it is possible to get. But every automobile made to-day has a great number of parts made of this plastic; the electric parts, the instrument-board, and so on. It is used in place of metal for toothed wheels, it is not damaged by great heat or cold; oil, petrol, acid, and all sorts of other chemicals have no effect on it. But it is hard to make it as beautiful as it is strong. The public is as much interested in the looks of a material as in its quality, and the newer plastics are more to its taste. They will take any colours, and it is possible to get for a penny or two things which are quite as beautiful as the delicately coloured stone which the old art-workers made use of in the great houses of the past. Every day one sees new, brightly coloured things for use or ornament—pens, cups, plates, tops of bottles, picture-frames, and so on—made of plastics, almost all copying, so far as possible, natural stones and the forms into which these very hard materials were worked in the old days. Invention in industry is going forward quicker than invention in art.

At the present time, great interest is being taken in a new plastic which takes the place of glass, and is less readily broken. Most of us have seen 'celluloid,' the earliest material of this sort, which, however, is turned brown quite quickly by strong light. The new material is not. It is quite surprising to see a great

mass of it so clear and free from colour that it seems like water, because anything as clear as this is generally a little coloured—even ice. This new glass is now being used in almost every airplane because the windows of an airplane get stronger light than automobile windows. Another good thing about it is that it is of very little weight, though at present it is somewhat dear.

Probably no story of present-day invention is more interesting to those living in other countries than this. Housing and transport by automobile and boat are two most important things in the development of countries where the effects of weather are more serious and damaging insects are worse than in Europe. These materials which are not damaged by weather or insects would be cheap at a high price, because no money is needed for upkeep and painting. But they are going to be low-priced. Radio boxes, for example, are much cheaper in these materials than mass-produced wood boxes. The price of the machines for forcing them into form is very high; putting a force of one ton on every square inch of an automobile body, or a small boat, or even a seat or table, has to be done in a machine of very great power; in it are great masses of steel which have to have a special form for every different thing made. But a small house made and fixed up inside with materials which may be used for as long as they are needed is possible at the price of one made of cheap materials which get out of condition in a short time.

H. STAFFORD HATFIELD,
The Inventor and his World

GROWING MORE FOOD

LET us suppose that during the next twenty-five years the population growth in the world becomes halted for good and all, and let us suppose that the West is poised ready with enormous industrial capacity. Then what, we may ask, can be done about the appallingly low standard of life of the great bulk of humanity? First, there is the increase of agricultural productivity that can be gained by better techniques, more fertilisers, specially bred plants. . . . Now, how far can this go? The answer to this query must be to some extent a matter of opinion until the issue has actually been put to the test. As in all issues where opinion is not entirely dictated by the observed situation, the suggestions put forward depend on the emotional temper of the individual concerned. Thus, many who are of a religious turn of mind readily maintain that food production can be increased almost indefinitely. These people, whenever they discuss the matter, are always full of stories of new agricultural methods, entirely new plants . . . that they have heard to be capable of giving fabulously increased yields. To them, the matter does not need any detailed argument; they need only appeal to the following principles: the laws of God forbid any artificial limitation of the birth-rate; hence if this leads to a rise of population it must follow that God is taking the responsibility for providing more food. These people apparently never stop to think that the practice of agriculture is something like ten thousand years old and that modern science has added comparatively little to it: civilised man has not so far succeeded in adding one really major food crop; all

the important plants we now cultivate were known to barbaric societies. It is true that we have managed to improve existing species, but this scarcely warrants an overweening confidence in the astounding new discoveries with which religious opinion seeks to support its views. Indeed, the nearer one approaches those who have the actual job of dealing with these questions, the more sober do the estimates become. I know of no agricultural expert who suggests that, by the methods referred to above, production in the regions at present under agricultural cultivation could be anything like doubled. I think it might be a fair estimate to suggest that with a concerted effort production might be increased 50 per cent, but this unfortunately would not be sufficient to give anything like the required lift to the standard of living of the Eastern peoples.

What more can be done? Our best hope of extending food production in a really significant way is to bring new regions under cultivation. To see where such regions might be located we note that the twin requirements for high productivity are sun and water. Now the parts of the Earth that receive the most telling combination of sun and water are certain parts of the tropics: the Amazon basin, the valley of the Niger, the Congo basin, Malaya, and parts of the East Indies. Only in the last is any significant quantity of food at present being grown. How much could be produced in the other tropical areas is shown by the case of Java, a comparatively small island that grows sufficient to feed, however inadequately, about 50 million people. The vastly greater potentialities of the Congo and Amazon basins have scarcely yet been touched. Should they be developed so as to deliver vegetable growth of direct food value, it is not too much to suppose that the total world food production might be doubled

from this source alone. In this way a solution of the food crisis can probably eventually be found.

It would be easy to dismiss this tropical project as a grandiose ground-nuts scheme, but such a condemnation would be quite misplaced. The British ground-nuts plan was not misconceived in the sense that it attempted to open a new field of production, it was wrong in the way it attempted to do so. At least three important mistakes were made: the scheme should not have been started until it was certain that adequate machinery was available; the crop was decided on too hastily; and, perhaps most important of all, marginal agriculture in the tropics must always be a project of dubious wisdom. By marginal is meant agriculture carried out in regions that fringe the main climatic zone. Changes of climate, either in the sense of an increase or a decrease of rainfall, can easily wreck a scheme that operates in such an area.

Contrast this with the following proposals for implementing the agriculturalisation of the Congo basin. The first step must be to produce adequate machinery for the rapid clearing of heavy vegetation from large tracts of land. It would be well-nigh useless to begin a major project until such machinery was available, for it would be pointless to start by clearing small patches of land only: this would lead to an endless war against an encroaching jungle. Once the clearing is started, it must be quickly completed. That is to say, the project would have to be conceived as a complete clearing of the present vegetation from the whole Congo basin. Since rates of growth in a jungle are large, this would have to be done with great speed. Machinery of a very special type would therefore be required. We need methods that go as far beyond the bull-dozer as the bull-dozer goes beyond the spade. It is by no means impossible to produce

such machinery. In the scheme discussed above, this would be a task that could readily be tackled by the powerful industries of the U.S. and the Commonwealth.

Next we notice that a clearing of the present vegetation from the Congo basin would considerably modify the climate there. The modification would, however, be one of degree, not of kind. In particular, even if the rainfall were reduced by as much as 50 per cent, there would still be abundant rain: this is an important consequence of working in the main climatic zone. In this connection, it is possible that the modification of climate in Central Africa might have the effect of substantially increasing the rainfall in marginal regions that are at present too arid for cultivation, thereby giving a further increase in productivity.

The modification of climate could scarcely reduce the rainfall to the level where tillage of the soil could readily be carried out; the heavy African storms would probably tend to strip off and wash away the top soil. But even if precautions against this were difficult to make, it would still be possible to avoid systematic tillage and instead to grow great quantities of grasses to be used as feeding stuffs. The world is at present extremely short of animal feeding stuffs. Sufficient carbohydrates are being, or could be, grown; the ultimate shortage lies in animal products. Now the number of animals that can be kept is determined by the supply of feeding stuffs. Thus the development of the Congo basin, without any tillage, must show itself in a vast increase in animal products. Similar remarks apply to the other great tropical areas.

Thus it seems that the present problem of world food production can perhaps just be solved, but only by a bare margin; only if the present world popula-

tion is stabilised at its present level, and this can scarcely be achieved except through controlled action. Under uncontrolled conditions the necessarily slow rise of food production would simply result in a corresponding rise of population. There is no hope at all of such an extremely rapid increase of productivity that the population rise would fail to keep step with it. Thus unless the population is forcibly stabilised there can be no possibility whatsoever of an end being put to the miserable conditions that at present exist in the under-privileged countries. For myself, I see the best hope of securing this action from the Russians, not from the West. The West is too riddled by such notions as 'the rise of population is the will of God and must not be interfered with' for it to be able to make an effective contribution in this matter.

Perhaps we should consider an example of the ineffectiveness of Western thinking on this matter. It has for instance been widely argued that if we could increase the standard of life in the backward countries, sharp falls in their present very high birth-rates might be expected to occur automatically. In support of this argument it is claimed that in recent times a marked fall in the birth-rates of the countries of Western Europe has been associated with a rising standard of living. But this is a serious misreading of the facts. It would be more accurate to say that the populations of Western Europe went on increasing until Western Europe was on the verge of general decline—if indeed the decline were not already under way. In so far as changes in birth-rate have been associated with changes of living conditions, experience is perhaps best represented by the precept:

'That when changes of birth-rate occur, the changes are in such a direction as will reduce the rate of change of the living standard.'

In other words notable increases of birth-rate go with rises in the standard of living, and declines of birth-rate go with a falling standard of life. This precept not only fits experience in Western Europe reasonably well, but it is in accordance with present-day conditions in the U.S., where both the living standard and the population are increasing quite sharply. The case of the U.S. is in discordance with the view that a high standard of living implies a low birth-rate.

It is of course the case that while a precept of the sort just announced may fit experience fairly well, it cannot be given the status of a mathematical proposition or of a physical law—this, if only because the concept of the 'standard of living' lacks quantitative definition. How for instance would we measure a social change in which food availability is reduced in some minor degree, but in which television is invented?

FRED HOYLE, *A Decade of Decision*

SCIENCE, THE DESTROYER OR CREATOR

WE all know the story of the sorcerer's apprentice; or *Frankenstein* which Mary Shelley wrote in competition with her husband and Byron; or some other story of the same kind out of the macabre invention of the nineteenth century. In these stories, someone who has special powers over nature conjures or creates a stick or a machine to do his work for him; and then finds that he cannot take back the life he has given it. The mindless monster overwhelms him; and what began as an invention to do the housework ends by destroying the master with the house.

These stories have become the epitome of our own fears. We have been inventing machines at a growing pace now for about three hundred years. This is a

short span even in our recorded history, and it is not a thousandth part of our history as men. In that short moment of time we have found a remarkable insight into the workings of nature. We have used it to make ourselves far more flexible in our adaptation to the outside world than any other animal has ever been. We can survive in climates which even germs find difficult. We can grow our own food and meat. We can travel overland and we can tunnel and swim and fly, all in the one body. More important than any of these, we have come nearest to the dream which Lamarck had, that animals might inherit the skills which their parents learnt. We have discovered the means to record our experience so that others may live it again.

The history of other animal species shows that the most successful in the struggle for survival have been those which were most adaptable to changes in their world. We have made ourselves by means of our tools beyond all measure more adaptable than any other species, living or extinct; and we continue to do so with gathering speed. Yet to-day we are afraid of our own shadow in the nine o'clock news; and we wonder whether we shall survive so over-specialised a creature as the Pekinese.

Everyone likes to blame his sense of defeat on someone else; and for some time scientists have been a favourite scapegoat. I want to look at their responsibility, and for that matter at everybody's, rather more closely. They do have a special responsibility; do not let us argue that out of existence; but it is a complicated one, and it is not the whole responsibility. For example, science obviously is not responsible for the readiness of people, who do not take their private quarrels beyond the stage of insult, to carry their public quarrels to the point of war. Many animals fight for their needs, and some for their

mere greeds, to the point of death. Bucks fight for females, and birds fight for their territories. The fighting habits of man are odd because he displays them only in groups. But they were not supplied by scientists. On the contrary, science has helped to end several kinds of group murder, such as witch hunting and the taboos of the early nineteenth century against disinfecting hospitals.

Neither is science responsible for the existence of groups which believe themselves to be in competition: for the existence above all of nations. And the threat of war to-day is always a national threat. Some bone of contention and competition is identified with a national need: Fiume or the Polish corridor or the dignity of the Austrian Empire; and in the end nations are willing to organise and to invite the death of citizens on both sides in order to reach these collective aims. Science did not create the nations; on the contrary, it has helped to soften those strong national idiosyncrasies which it seems necessary to exploit if war is to be made with enthusiasm. And wars are not made by *any* traditional groups: they are made by highly organised societies, they are made by nations. Most of us have seen Yorkshiremen invade Old Trafford, and a bloody nose or two if the day was thirsty. But no Yorkshireman would have grown pale if he had been told that Lancashire had the atomic bomb.

The sense of doom in us to-day is not a fear of science; it is a fear of war. And the causes of war were not created by science; they do not differ in kind from the known causes of the War of Jenkins' Ear or the Wars of the Roses, which were carried on with only the most modest scientific aids. No, science has not invented war; but it has turned it into a very different thing. The people who distrust it are not wrong. The man in the pub who says 'It'll wipe

out the world,' the woman in the queue who says 'It isn't natural'—they do not express themselves very well; but what they are trying to say does make sense. Science has enlarged the mechanism of war, and it has distorted it. It has done this in at least two ways.

First, science has obviously multiplied the power of the war-makers. The weapons of the moment can kill more people more secretly and more unpleasantly than those of the past. This progress, as for want of another word I must call it—this progress has been going on for some time; and for some time it has been said, of each new weapon, that it is so destructive or so horrible that it will frighten people into their wits, and force the nations to give up war for lack of cannon fodder. This hope has never been fulfilled, and I know no one who takes refuge in it to-day. The acts of men and women are not dictated by such simple compulsions; and they themselves do not stand in any simple relation to the decisions of the nations which they compose. Grapeshot and TNT and gas have not helped to outlaw war; and I see no sign that the hydrogen bomb or a whiff of bacteria will be more successful in making men wise by compulsion.

Secondly, science at the same time has given the nations quite new occasions for falling out. I do not mean such simple objectives as someone else's uranium mine, or a Pacific Island which happens to be knee-deep in organic fertilizer. I do not even mean merely another nation's factories and her skilled population. These are all parts of the surplus above our simple needs which they themselves help to create and which gives our civilisation its character. And war in our world battens on this surplus. This is the object of the greed of nations, and this also gives them the leisure to train and the means to arm

for war. At bottom, we have remained individually too greedy to distribute our surplus, and collectively too stupid to pile it up in any more useful form than the traditional mountains of arms. Science can claim to have created the surplus in our societies, and we know from the working day and the working diet how greatly it has increased it in the last two hundred years. Science has created the surplus. Now put this year's budget beside the budget of 1750, anywhere in the world, and you will see what we are doing with it.

I myself think there is a third dimension which science has added to modern war. It has created war nerves and the war of nerves. I am not thinking about the technical conditions for a war of nerves: the camera man and the radio and the massed display of strength. I am thinking of the climate in which this stage lightning flickers and is made to seem real. The last twenty years have given us a frightening show of these mental states. There is a division in the mind of each of us, that has become plain, between the man and the brute; and the rift can be opened, the man submerged, with a cynical simplicity, with the meanest tools of envy and frustration, which in my boyhood would have been thought inconceivable in a civilised society. I shall come back to this cleavage in our minds, for it is much more than an item in a list of war crimes. But it is an item. It helps to create the conditions for disaster. And I think that science has contributed to it. Science; the fact that science is there, mysterious, powerful; the fact that most people are impressed by it but ignorant and helpless—all this seems to me to have contributed to the division in our minds. And scientists cannot escape the responsibility for this. They have enjoyed acting the mysterious stranger, the powerful voice without emotion, the expert and the

god. They have failed to make themselves comfortable in the talk of people in the street; no one taught them the knack, of course, but they were not keen to learn. And now they find the distance which they enjoyed has turned to distrust, and the awe has turned to fear; and people who are by no means fools really believe that we should be better off without science.

These are the indictments which scientists cannot escape. Of course, they are often badly phrased, so that scientists can side-step them with generalities about the common responsibility, and who voted the credits for atomic research anyway; which are perfectly just, but not at all relevant. That is not the heart of the matter; and the people in queues and pubs are humbly groping for the heart. They are not good at saying things and they do not give model answers to interviewers. But when they say 'We've forgotten what's right,' when they say 'We're not fit to handle such things,' what is in their minds is perfectly true. Science and society are out of joint. Science has given to no one in particular a power which no one in particular knows how to use. Why do not scientists invent something sensible? Wives say it every time they stub their toe on the waste bin, and husbands say it whenever a fuse blows. Why is it the business of no one in particular to stop fitting science for death and to begin fitting it into our lives? We will agree that warlike science is no more than a by-product of a warlike society. Science has merely provided the means, for good or for bad; and society has seized it for bad. But what are we going to do about it?

The first thing to do, it seems to me, is to treat this as a scientific question: by which I mean as a practical and sensible question, which deserves a factual approach and a reasoned answer. Now that

I have apologized on behalf of scientists, and this on a scale which some of them will certainly think too ample, let us cut out what usually happens to the argument at this point, the rush of recriminations. The scientists are conscious of their mistakes; and I do not want to discuss the mistakes of non-scientists—although they have made a great many—except those which we all must begin to make good.

I have said that a scientific answer must be practical as well as sensible. This really rules out at once the panaceas which also tend to run the argument into a blind alley at this stage; the panaceas which say summarily 'Get rid of them.' Naturally, it does not seem to me to be sensible to get rid of scientists; but in any case, it plainly is not practical. And whatever we do with our own scientists, it very plainly is not practical to get rid of the scientists of rival nations; because if there existed the conditions for agreement among nations on this far-reaching scheme, then the conditions for war would already have disappeared. If there existed the conditions for international agreement, say to suspend all scientific research, or to abandon warlike research, or in any other way to forgo science as an instrument of nationalism—if such agreements could be reached, then they would already be superfluous; because the conditions for war would already have disappeared. So, however we might sigh for Samuel Butler's panacea in *Erewhon*, simply to give up all machines, there is no point in talking about it. I believe it would be a disaster for mankind like the coming of the Dark Ages. But there is no point in arguing this. It just is not practical, nationally or internationally.

There are no panaceas at all; and we had better face that. There is nothing that we can do overnight, in a week or a month, which can straighten by a laying on of hands the ancient distortion of our

society. Do not let us fancy that any one of us out of the blue will concoct that stirring letter to *The Times* which will change the black mood of history—and the instructions to diplomats. Putting scientists in the Cabinet will not do that, and women in the War Office will not, nor will bishops in the Privy Council. There are no panaceas. We are the heirs to a tradition which has left science and society out of step. The man in the street is right: we have never learnt to handle such things. Nothing will do but that we learn. But learning is not done in a year. Our ultimate survival is in our own hands. Our survival while we are learning is a much chancier thing. We had better be realistic about that.

Meanwhile we had better settle down to work for our ultimate survival; and we had better start now. We have seen that the diagnosis has turned out to be not very difficult. Science and our social habits are out of step. And the cure is no deeper either. We must learn to match them. And there is no way of learning this unless we learn to understand *both*.

Of the two, of course, the one which is strange is science. I have already blamed the scientist for that. He has been the monk of our age, timid, thwarted, anxious to be asked to help; and with a secret ambition to play the Grey Eminence. Through years of childhood poverty he dreamt of this. Scientific skill was a blue door beckoning to him, which would open into the society of dignitaries of state. But the private motives of scientists are not the trend of science. The trend of science is made by the needs of society: navigation before the eighteenth century, manufacture thereafter; and in our age I believe the liberation of personality. Whatever the part which scientists like to act, or for that matter which painters like to dress, science shares the aims of our society just as art does. The difficulties of understanding either are not

fundamental; they are difficulties only of language. To grow familiar with the large ideas of science calls for patience and an effort of attention; and I hope I have shown that it repays them.

For two hundred years, these ideas have been applied to technical needs; and they have made our world anew, triumphantly, from top to toe. Our shoes are tanned and stitched, our clothes are spun and dyed and woven, we are lighted and carried and doctored by means which were unknown to neat Mr. Pope at Twickenham in 1740. We may not think that is much to put against the eighty thousand dead in Hiroshima, or we may. We may not think it recompenses us for the absence of any Mr. Pope from Twickenham to-day; we may even hold it responsible. It is certainly not a spiritual achievement. But it has not yet tried to be. It has applied its ideas monotonously to shoe-leather and bicycle bells. And it has made a superb job of them. Compare its record in its own field with that of any other ideas of the same age: Burke's ideas of the imagination, or Bentham's on government, or Adam Smith on political economy. If any ideas have a claim to be called creative, because they have created something, then certainly it is the ideas of science.

We may think that all that science has created is comfort; and it certainly has done that—the very word 'comfortable' in the modern sense dates from the Industrial Revolution. But have we always stopped to think what science has done not to our mode of living but to our life? We talk about research for death, the threat of war and the number of civilians who get killed. But have we always weighed this against the increase in our own life span? Let us do a small sum. The number of people killed in Great Britain in six years of war by German bombs, flying bombs, and V2's was sixty thousand. They

were an average lot of people, which means that on an average they lost half their expectation of life. Quite an easy long division shows that the effect of this in our population of fifty million people was to shorten the average span of life by less than one-tenth of one per cent. This is considerably less than a fortnight. Put this on the debit side. And on the credit side, we know that in the last hundred years the average span of life in England has increased by twenty years. That is the price of science, take it or leave it—a fortnight for twenty years of life. And these twenty years have been created by applying to daily life, to clothing and bedding, to hygiene and infection, to birth and death, the simple ideas of science—the fundamental ideas I have been talking about: order, cause, and chance. If any ideas have a claim to be called creative, because they have created life, it is the ideas of science.

We have not neglected these ideas altogether in our social organisation. But, it is a point I have made several times, we have got hopelessly behind with them. The idea of order is now old enough to have reached at least our filing cabinets. The idea of cause and effect has entered our habits, until it has become the new *a priori* in the making of administrative plans. The difficulty is to dislodge it, now that it is hardening into a scholastic formula. For the idea which has given a new vigour to science in our generation is larger than the machinery of cause and effect. It stipulates no special mechanism between the present and the future. It is content to predict the future, without insisting that the computation must follow the steps of causal law. I have called this the idea of chance, because its method is statistical, and because it recognises that every prediction carries with it its own measurable uncertainty. A good prediction is one which defines its area of

uncertainty; a bad prediction ignores it. And at bottom this is no more than the return to the essentially empirical, the experimental nature of science. Science is a great many things, and I have called them a great many names; but in the end they all return to this: science is the acceptance of what works and the rejection of what does not. That needs more courage than we might think.

It needs more courage than we have ever found when we have faced our worldly problems. This is how society has lost touch with science: because it has hesitated to judge itself by the same impersonal code of what works and what does not. We have clung to Adam Smith and Burke, or we have agitated for Plato and Aquinas, through wars and famine, through rising and falling birth-rates, and through libraries of learned argument. And in the end, our eyes have always wandered from the birth-rate to the argument: from the birth-rate to what we have wanted to believe. Here is the crux of what I have been saying. Here is our ultimate hope of saving ourselves from extinction. We must learn to understand that the content of all knowledge is empirical; that its test is whether it works; and we must learn to act on that understanding in the world as well as in the laboratory.

This is the message of science: our ideas must be realistic, flexible, unbigoted—they must be human, they must create their own authority. If any ideas have a claim to be called creative, because they have liberated that creative impulse, it is the ideas of science.

J. BRONOWSKI, *Science, the Destroyer or Creator*

MAN AND THE ARTS

A WRITER AMONG PAINTERS

THERE is no happier relief from the pressure of over-specialisation than to be made free of another man's workshop; but it is necessary to be qualified for this freedom as for all others; one must have knowledge and intuitive sympathy enough to be able to enter into the new workshop, and see it, and feel it, from the inside. Sometimes, and nowadays often, this is impossible. The shop of a nuclear physicist is closed against most of us by our inability to talk his mathematical language, and it is among the tragedies of contemporary life that, in many areas of learning, the great specialists are becoming less and less able to communicate across the boundaries of their specialisations.

The development of humanism has depended always upon men's power to move freely among the compartments of knowledge. By this means, specialisations have been related to one another. Ceasing to be prison-cells, theological, philosophical, or scientific, they have tended to become what Leonardo and Bacon and Aquinas tried to make them: communicating rooms in a house of universal wisdom. To-day, more and more rooms in the house are barred and sealed. Logical positivists may feel that, as philosophers, they are disabled because they are not physicists. The conclusions of Einstein may, with extreme difficulty, be grasped, at least in outline, by laymen, but they must be taken on trust, for his proofs are incommunicable except to a few familiars of his own specialisation.

It is no reassurance to say that the thought of the mystic poets has always been incommunicable except to a few, for the poets are at least using, within its limitations, a common language. If communication breaks down between them and ourselves it is because the power of language is limited and because, in any case, they have used, and we have received it, imperfectly. In this sense, the breakdown between them and us is accidental and remediable; it is not a breakdown in the nature of things. But Einstein is using, and is compelled to use, a cipher which is inaccessible, and must remain inaccessible, except to a few; a cipher which, I venture to think, may, at certain levels, be completely inaccessible to all but himself. If this is true, or even partly true; if it is also true, in the same sense though in a different degree, that the expression of all knowledge is moving towards a condition of cipher, it would appear that Babel has come again, and perhaps for the old reasons of impiety.

But these are high matters. Those of us who are not physicists are off our ground and had better return to it.

Whoever has a special skill, whether it be that of a carpenter or a landscapist, of a farmer or a writer, knows that to have admission to another man's craft is to be refreshed in his own. One whose trade is words turns gladly to arts that are wordless, to music or painting, perhaps. They are rain in those periods of dryness, which all artists know, when thought can harden prematurely into sentences, and even experience, before it can be deployed for imaginative attack, becomes locked in some narrow defile of syntax and cadence, to wither there.

At such times, to escape from words and to penetrate a little way into the mystery of another craft is self-loss and self-renewal. It was once my fortune to live a

few weeks among the vinegrowers of the Charente, and to learn something of their art and the patient craftsmanship of their barrel-makers. At another time, in Lucca, I was made free of a clockmaker's backroom, where, with an artist's equal care for his several employments, he mended clocks or made enchanted toys or, when he could, humbly pursued the art of Cellini with what precious metals he had. But these were rare experiences, not easily to be repeated, nor had I more than a spectator's part in them. The arrow struck deeper when it became my custom, week after week for several years, to go to a painter's studio, and draw, from his private sitters and his models, drawings which would never be exhibited, which had nothing to offer me but their sole selves, and which, therefore, commanded in me an absolute and unanxious devotion. If one day the drawing was bad, it was bad in itself, not in the condemnation of others; if less bad, not by the encouragement of their praises. The painter himself had the charity neither to praise nor blame nor teach me. I owe him a great debt, for he gave me liberty from my own specialisation. I went back to my inkpot, eager and renewed.

A writer, who does not draw, may still have, in the visual arts, renewal in the same kind, provided always that he lose himself in them. When he is invited by painters to see their work, he goes in a dual capacity—as a member of the public and as one who, in a different medium, is himself an exhibitor before the public. Each half of him keeps the other half in order. As a fellow-artist he learns how much painters have to endure and how little right he has to complain. He is able to preserve at least a fond illusion that his book is read quietly by the reader's fireside—read for its own sake, and not skimmed as one of a thousand books all simultaneously demanding the reader's attention. He imagines, too, that the reader's body is at

ease, that he has a tolerable chair, that his consideration is not continually interrupted by the comments of others. And he sees, in contrast, how, at any exhibition of paint on canvas, the world picks and pecks, how one picture is condemned for being inferior to another to which it is unrelated either in purpose or in method, and how casually the world passes on. So, perhaps, if he but knew it, the world condemns his own book or closes it with a casual snap, but he is at least preserved from knowing it. Painters are witnesses of these things.

As a member of the public, instructed by his otherself that practises a different art, he learns to walk warily. In any picture he strives to distinguish the painter's intention and to understand his method; to see the work, if one may put it so, from the point of view of the brush and, still deeper, from that of the originating mind; for, though it is true that a work of art must stand or fall by its effect, it cannot make a just effect unless the spectator is *open* to it, and certainly he is closed, or half-closed, against it until he has grasped what the artist was driving at.

Apart from the pursuit of mere fashion or prestige, the error into which we most easily fall in judging a picture is precisely this—of not sufficiently caring to discover and to feel what the painter was driving at. Instead, to whichever 'school' we belong, we are inclined to demand that a picture be painted within certain degrees of representation, and to condemn it because it is too representational or not representational enough, saying that it is 'old-fashioned' or 'new-fangled,' as if there were in this matter of representation an absolute right and wrong, as if through the whole history of painting there were not a fluctuation of 'likeness' and 'non-likeness.' Another trap lying in wait for judgment is that of praising or condemning, not the picture itself, but its subject. Each of us,

being human, is more easily won by some subjects than by others; each of us, having inherited a convention or rebelled against it, is most at ease at some particular point on the representational scale between extreme 'likeness' (whatever we may take that to mean) and pure design of form and colour; but though these preferences are the best of reasons for deciding whether or not to buy a picture and live with it, they ought not to lead us to say out of hand that a picture is good or bad. Its goodness or badness depends upon the value and nature of the artist's vision and upon his skill in expressing it. Of these two factors we must form our own difficult estimate; and assuredly we cannot do so unless we have first striven to see the work of art with sympathy—that is to say, not against the artist but with him, from the point of view of his mind and brush, caring more to yield to his degree of representation than to stick fast in our own, and caring greatly to discover *his* interest in his subject. Even the dullest mayor and corporation can be exciting for a man with eyes, and we must be within the artist's eyes before we dare to say that his picture is meaningless.

This is how a writer would have his work appreciated, and in a picture-gallery, as he stands before a canvas, he does not allow the 'member of the public' in himself to be hasty or casual or to speak the little empty words of praising or cursing that are too easily spoken. Instead, he either suspends judgment and passes on, or calls upon all the intuition and knowledge he has. There are pictures to which he can discover no response in himself. They seem to have no genuine impulse within them, to be but tired picture-making or, at the opposite extreme, to seek only to astonish groundlings. He is tempted to use of them the two words that are, of all, the most perilous in criticism: 'dishonest,' 'insincere'—words

that are seldom justified, for the great labour of art is not lightly undertaken. It is better to say: 'I do not understand this man yet,' and to pass on without condemning him; or, alternatively: 'This man seems to me too smooth, half-dead, faultily faultless,' and to remember Andrea. To remember, above all, that no art is bad because it is not 'contemporary' or good because it is. A belief that to be 'contemporary' is in itself a virtue arises from the fact that certain artists who do not use a contemporary idiom are plainly imitative of past masters; it seems not to occur to men who fear to be out of fashion that many who employ a contemporary medium are as plainly imitative of present masters, or that those who adhere to an earlier tradition may not be imitative at all, but more deeply original in that they are trying to grow a new branch from the original trunk rather than a new twig from the latest or 'contemporary' branch. As an indication of aesthetic value, 'contemporary' and 'uncontemporary' are uncritical and prejudicial words. The use of them leads, on both sides of controversy, to hardness of heart, and to harden one's heart against a genuine artist is one of those sins which strike at the whole good of the world.

Even in the flurry and jostle of a fashionable exhibition of pictures, a writer feels this continuously and is on his guard. His imagination carries him from the crowded wall to the solitary studio, from the charged to the empty canvas, from the canvas to the hand, from the hand to the mind; and slowly, through fellow-feeling and his own experience of the empty sheet of paper and of the sentences which with such passion and stress and hope and grief are written upon it, he begins to feel the joy, the attainment, the falling-short of the picture before him and to know a little of what it was to have painted it, from the taking up to the laying down of the brush. Even so, his

inescapable prejudices or his too small knowledge of the painter's craft may distort his view of this particular canvas, but at least he will have saved himself from the sin of hardness of heart. He may have failed to understand, but he will have laid himself open to understanding, and no artist, in whatever medium, can demand of the public more than this. He may hope for more, he may expect more, but he cannot demand more. He and Time must do the rest.

That writers have often an intuitive sympathy with the arts of painting and draughtsmanship is presumably among the reasons for there being a long tradition of pleasant and productive friendship between men who write and men who paint. The strength of that tradition is as evident to-day as it was in the early years of the New English or, in Paris, at the café tables of the Nouvelle Athènes, and it may be traced back much farther, through Reynolds's dinner-parties, to the Kit-cat Club and beyond. What writers have to contribute to the association is, on the surface, fairly clear—a desire to understand and to interpret painting as well as it may be interpreted in words; but evidently the painters' contribution to it is not, and cannot be, in the same kind. It is possible for a writer, if not to describe a picture, yet, as MacColl so often proved, to enable others to see it for themselves, to awaken or deepen appreciation of it; but it is not possible for a painter to perform a like service for a book. He can illustrate, but he cannot, in the highest expository sense, criticise it in paint, and it is doubtful whether, in most cases, even were it possible, he would care to do so. Painters are seldom interested in the technical process of writing as writers so often are in the technical process of painting. Moore would discourse for hours, and with passionate interest, on the technical aspect of Steer's work, but if Steer had been

told that Moore, in his old age, once walked four miles to discuss with a friend how a double relative should be removed from a sentence, he might have asked: 'What is a double relative?' but would more probably have gone to sleep.

That there is a patient craftsmanship of writing is often forgotten by all but professional writers and sometimes even by them. It is not surprising. Up to a point, anyone can write. You dip your pen and, as the heathen will have it, you 'say what you have to say.' The difficulties of painting are more obvious. Even the most daring submit to an apprenticeship; there are schools and masters; it is, indeed, generally recognised, even by the heathen who are blind to the architecture of prose, that there is something to be learned in the matter of laying on paint. And a little of what there is to be learned may be taught, may be visually demonstrated, while almost nothing of what is to be learned about writing may be taught in schools. The writer's craft is desperately elusive; even its elements are less seizable than the painter's. Few pause to discuss, because in truth none can say with precision, what uses of syntax lie at the source of Addison's lucidity, whereas it is possible to say with much greater concreteness how Constable produced a particular effect of light. Whatever it is that painters bring to the relationship between writers and themselves, it is certainly not a special eagerness to penetrate and reinterpret the art of writing.

And yet it remains probably true that painters contribute more than they receive. A writer has extraordinary stimulus from their companionship. In the first place, how enviable they are! They can stand back from their work at any stage in the process of composition and see it whole—a thing that no writer can ever do. His work slides away from him page by page as he turns it, sentence by sentence as

he writes it; his uncompleted form must be carried always in his memory; but theirs is ever before them, and what they do in this instant, each actual movement of their brush, is at once seen in its relationship with what they laid upon the same canvas an hour or a month ago. This power of theirs to eliminate the element of time from the construction of their work gives them a freedom which, in their company, is communicated to a writer. Their art delights and refreshes him by its solving of problems related to, and yet wonderfully different from, his own—so nearly related in essence and yet so different in practice that to consider them is often to see in a new and revealing light some difficulty that has hitherto baffled him. He may observe, for example, how often, when a painter is dissatisfied with the passage under his hand and weariness or discouragement settles upon him, he seeks the same remedy. He puts down his brush, comes clear of his easel, withdraws his eye and his mind from the canvas and the problems which have accumulated upon it, and, sitting down quietly, contemplates the model or the landscape. What in fact he has done is to cease altogether to think in terms of treatment and return deliberately to the apprehension of nature. While his brush was in his hand, the model and his painting were, through his mind, in a continuous relationship. Gradually the emphasis of that relationship had fallen more and more upon his painting; the technical problems involved in it had engrossed him; the model had become not the spring of his act of painting but an increasingly remote axis of reference; in brief, he had begun to paint intellectually, out of his head, not out of his visual sense.

Now, withdrawn from his canvas, looking at the model only and his reimagining of the thing seen, he has fallen back upon his visual sense, has returned

to his origins, and is asking, not the removed questions of treatment, but those original questions which, appearing urgently to him, first made him a painter. A writer, aware of this, becomes aware also that, as a painter may be entangled and alienated by a problem of paint, so may he himself be alienated from the natural origins of his art by a problem of words, and he says: 'It is high time that I too should "return to the senses"—not to the visual sense only but to all five'; and, at his desk that night, taking up again the paragraph that has for so long fascinated and baffled him, he finds that what is wrong with it is not, as he had stubbornly supposed, a fault of verbal structure but the plain fact of its having used the names but not the smell of flowers, the words spoken by a woman but not her voice's sound, the gesture of her hand but not its touch. So, like the painter, he stands away from his work, and sees his subject apart from any attempt to describe it.

The parallel is not exact. No art can be spoken of with precision in terms of another, and it is, perhaps, the inexactness of the parallel between the painter's art and his own which makes it valuable to a writer. It enables him again and again to see his own problems through a simplifying glass, to come out from the intricacies of his own medium into what is—or appears to him to be—the greater directness of a painter's. Every art has in it an element of naïveté which is necessary to its health. In the struggle of practice, an artist is always in peril of losing touch with it. But though for a little while he lose it himself, he will still unfailingly recognise it as a virtue, and smile at and learn from it, in arts that he does not practise; so the recollection of what he has lost may return to him and he find it again. In no instance is this truer than in that of a writer who leaves his library for a studio. Feeling that he has grown old in words, he sees in the

art of paint a spontaneity and freshness which delight and encourage him, above all a reliance on nature comparable with the reliances of children and saints. 'Why does a virtuous man take delight in landscapes?' asks Kuo Hsi in his Essay:—

'It is for these reasons: that in a rustic retreat he may nourish his nature; that he may constantly meet in the country fishermen, woodcutters, and hermits, and see the soaring of cranes and hear the crying of monkeys. The din of the dusty world and the locked-in-ness of human habitations are what human nature habitually abhors . . .'

and there are periods in the life of every writer when his heart fails him and his own medium of words presents itself to him as the din of a dusty world. From this sense of 'locked-in-ness' the work and company of painters is an almost miraculous release. Among them, he is like a traveller in a country that is pleasant to him for three reasons: that he loves it, that at least in part he understands it, and that it is not his. Though he may envy, he cannot be jealous of its inhabitants, nor they of him. With their politics, he has no concern. If they suffer a revolution, he is not subverted. Eagerly observant though he may be of their differing individualities, he is yet aware that they have the character of their profession in the sense in which Frenchmen may be said to have the character of their nationality; and this character is one that tests and tempers and revitalises his own. The essences of men are solitary, not social. What a man is, he is alone. The liberty to communicate, and to enter into other men's workshops, enables him to accept with fortitude the isolation of being man. It marks the distinction between a productive solitude and a sterile prison.

CHARLES MORGAN, *Liberties of the Mind*

IMAGINATION

> He who does not imagine in stronger and better lineaments, and in stronger and better light, than his perishing mortal eye can see, does not imagine at all.
>
> BLAKE

IMAGINATION is the supremely creative faculty, a faculty which all men possess in some degree and use at every moment. Without it man would be incapable of creating or enjoying art, unable to conjure up the past or anticipate the future; no speculation about the absent, no day-dreaming or ambition would be possible for him.

The first and most familiar function of the imagination is the pictorial power, the power of creating images of things not actually visible or even existent. Under the sway of imagination we find ourselves in strange situations, commit unfamiliar actions, and meet unknown people; we change our personalities, reshape the past and probe the future. These imaginative experiences may bring us either delight or dismay, for, although we may deliberately invite them, we may also, for example under the influence of fear, be unwillingly subjected to them in their most harrowing forms. Such are the simplest imaginative processes in ordinary men. There is no evidence here of creativeness, but simply of deep-lying desires to change life, to modify personality, to penetrate the unknown. These desires provide the stimulus necessary to the imagination, which in all men is more active under the influence of deep feeling. We are all moved by the contemplation of vast spaces, by loneliness, time, death, and the unbridled forces of nature. All these shake man from his self-sufficiency, his unimaginative acceptance of his life and his environment, and allow him to see himself as an

infinitesimal part of an immeasurable creation. This is an imaginative experience in which a man sees himself from without, in his true proportions. As Thomas Hardy said of Gabriel Oak in the great storm at Weatherbury: 'Love, life, everything human, seemed small and trifling in such close juxtaposition with an infuriated universe.'

Man is not frequently brought face to face with the vast and fearful aspects of creation. But his imagination is constantly stirred by more everyday emotions.

'Fear [said Hazlitt] is poetry, hope is poetry, love is poetry, hatred is poetry; contempt, jealousy, remorse, admiration, wonder, pity, despair or madness, are all poetry.'

Hazlitt was speaking of the stirring of the imagination of poets. But all men under the stimulus of the feelings that he enumerates become poets in some very small degree because it is by these feelings that they are moved to express themselves most imaginatively. This can be seen by the language they use: in a state of excitement they will have recourse to metaphors, similes, personifications and exaggeration. Under the stress of some unfamiliar experience a child will take refuge in complete fantasy in an endeavour to express the intensity of its sensations. An adult in similar circumstances will tend quite unconsciously to use figurative language. The excitement sets the imagination to work and the pictorial power of the imagination in its turn provides the mind with images as a means to express sensations for which the language of every day is inadequate. Our ordinary language is full of familiar, sometimes outworn, figures of speech drawn originally from the everyday life of town or country, office, farm, or factory. 'To weed out,' 'to rake up,' 'to plough back,' and 'to mow down,' 'to gut' and 'a shark,' 'to weld together' and

'to short-circuit,' all indicate different social backgrounds but illustrate the same process. They must all once have been spoken for the first time, and when first spoken were vivid and imaginative. 'Whispering corn,' 'biting wind,' 'flashing eyes' and 'thundering hooves' have sunk by use from the level of poetry to that of popular fiction or speech. But so inevitable is the use of hyperbole and figurative speech to men who feel strongly, that new images and metaphors are constantly being coined and passing into the language. Slang or familiar speech is particularly rich in these inventions which must have originated from the spontaneous expression of lively minds.

If the effect of excitement is so striking on the ordinary man, what will its effect be on the artist? How will his imagination respond to sensations and spectacles that move him? The causes that stir the emotions of ordinary men and women have always spurred the poet to write poetry and the painter to paint. And as the effect of these emotions on the ordinary man is to make him see pictures and speak in images, so it is, with greater intensity, on the artist. This is the simplest effect of excitement on the writer and concerns only the style of his utterance—the speech not the substance. It is not hard to find examples of these modes of speech, imagery, personification, and exaggeration, for these have always been poetic forms of speech, and most imaginative writing abounds in them.

'The sea of faith
Was once, too, at the full, and round earth's shore
Lay like the folds of a bright girdle furl'd.
But now I only hear
Its melancholy, long, withdrawing roar,
Retreating, to the breath
Of the night-wind, down the vast edges drear
And naked shingles of the world.'

The image of the world's dark edge which Arnold uses here in *Dover Beach* and which Tennyson uses in *In Memoriam*,

> 'Be near me when I fade away,
> To point the term of human strife,
> And on the low dark verge of life
> The twilight of eternal day,'

serves both of them to express fear and spiritual loneliness. Stephen Spender, in his poem *In Railway Halls*, uses the drifting flotsam of the shore to symbolise hopelessness and futility:

> 'Time merely drives these lives which do not live
> As tides push rotten stuff along the shore.

Two striking examples may be quoted from Auden and Isherwood, *The Ascent of F.6*:

> 'The frantic washing of the grimy fact.'

And:

> 'The girl imprisoned in the tower of a stammer—'

This pictorial power of the imagination is not confined to poets. It is constantly used by prose writers also. Here is a magnificent example from Ernest Hemingway's novel *For Whom the Bell Tolls*, when Sordo is facing certain death on a hill-top:

'Dying was nothing and he had no picture of it nor fear of it in his mind. But living was a field of grain blowing in the wind on the side of a hill. Living was a hawk in the sky. Living was an earthen jar of water in the dust of the threshing with the grain flailed out and the chaff blowing. Living was a horse between your legs and a carbine under one leg and a hill and a valley and a stream with trees along it and the far side of the valley and the hills beyond.'

And a philosopher, Bertrand Russell, in his *Practice*

and Theory of Bolshevism, describing the World Commune, wrote:

'Rockets climbed the skies and peppered them with a thousand stars.'

It is a power, however, which is possessed in very varying degrees even by poets. Matthew Arnold, for example, was poorly equipped with it. It is most revealing to examine carefully the epithets and rare figures of speech in his poetry. There can be no doubt that his emotion was deep and genuine. He loved Oxford, mourned Thyrsis and feared the ebb of faith. But where a great imaginative writer would have used, to express these feelings, unfamiliar epithets, fresh and vivid figures of speech, Arnold was often almost entirely commonplace. A fine passage from *Dover Beach* is quoted above, and there is the familiar 'Tyrian trader,' but what more pedestrian epithets could be imagined than these from *The Scholar-Gipsy*: white sheep, thick corn, scarlet poppies, green roots, cool bank, cool stream, pensive dream, white anemone, dark bluebells, purple orchises, black-wing'd swallows, and mossy barns? His colours are the colours of a man who thinks that all grass is green and never looks to see. How astonishingly different is Coleridge's use of colour!

'Her beams bemocked the sultry main,
Like April hoar-frost spread;
But where the ship's huge shadow lay,
The charmed water burnt alway
A still and awful red.

Beyond the shadow of the ship,
I watched the water-snakes:
They moved in tracks of shining white,
And when they reared, the elfish light
Fell off in hoary flakes.

Within the shadow of the ship
I watched their rich attire:
Blue, glossy green, and velvet black,
They coiled and swam; and every track
Was a flash of golden fire.'

A hoar sea with red shadows is a vision possible only to a mind both daring and highly endowed with pictorial imagination.

The use of figurative language by imaginative writers to express excitement is accompanied also, as in the case of the ordinary person, by a desire to personify and to exaggerate. Joseph Conrad uses personification in *The Mirror of the Sea* to express his own deep feeling of the enmity of the sea.

'The ocean has the conscienceless temper of a savage autocrat spoiled by much adulation. He cannot brook the slightest appearance of defiance, and has remained the irreconcilable enemy of ships and men ever since ships and men had the unheard-of audacity to go afloat together in the face of his frown. From that day he has gone on swallowing up fleets and men without his resentment being glutted by the number of victims. . . . If not always in the hot mood to smash, he is always stealthily ready for a drowning.'

Burns makes splendid use of exaggeration in his poem *A Red, Red Rose*:

'Till a' the seas gang dry, my dear,
And the rocks melt wi' the sun;
I will luve thee still, my dear,
While the sands o' life shall run.'

This then is one effect of excitement upon the creative artist: it causes his imagination, as it causes that of ordinary men and women, to create pictures.

But excitement affects the artist more fundamentally than that: it makes him want to paint and want to speak. In other words it stirs that truly creative activity of the imagination which ordinary men and women do not possess. The artist may be like other men in his use of figurative speech, but he is most unlike them in his ability to create something out of nothing. Under the influence of excitement his mind will feel an unrest, amounting possibly to a turmoil, in certain cases almost to a frenzy. Then he can regain tranquillity only by self-expression. The cause of his emotion, perhaps, or some circumstance arising out of it, some picture called up by it, will give direction to the creative impulse within him and gradually, after minutes or perhaps only after months, he will become fully conscious of what is burdening his mind. Not until this is expressed will he have peace again. The imagination must be delivered of its offspring. The period necessary for this act of expression will vary. There are great works as there are small ones; some men work rapidly, others slowly and laboriously. But all have the same need to work out of their system the thing which they have imagined and to give it shape that it may exist outside their own minds and be shared by other men.

In this act of creation there is another remarkable activity of the imagination: it produces to the writer or painter all the raw materials stored in the chambers of the memory. Thus it is that childhood's feelings and symbols and all the experiences of adolescence, youth, and manhood, will be at the artist's disposal for the expression of his feeling and thought. That is why wide experience is so important to an artist, so that the recesses of his memory shall be well stored. If a man feels the need to create and if his experience is narrow, then either he must create something limited, within the bounds of his experience, or he

must venture into realms unknown to him where he may well lose his way.

H. CAUDWELL, *The Creative Impulse*

THE APPALLING POPULARITY OF MUSIC

MUSIC has an odd way of reflecting not only the emotional background of an age but also its physical conditions. The present age is one of overproduction. Never has there been so much food and so much starvation, and (as I pointed out before) never has there been so much music-making and so little musical experience of a vital order.

Since the advent of the gramophone, and more particularly the wireless, music of a sort is everywhere and at every time; in the heavens, the lower parts of the earth, the mountains, the forest and every tree therein. It is a Psalmist's nightmare. At one time a cautious glance round the room assured one, through the absence of a piano, that there would at least be no music after dinner. But to-day the chances are that one's host is a gramophone bore, intent on exhibiting his fifty-seven varieties of soundbox, or a wireless fiend intent on obtaining the obscurest stations irrespective of programme. It is to be noticed that the more people use the wireless the less they listen to it. Some business men actually leave the wireless on all day so that the noise will be heard as they come up the garden path, and they will be spared the ghastly hiatus of silence that elapses between the slam of the front door and the first atmospheric.

The people, and they are legion, who play bridge to the accompaniment of a loud speaker cannot be put off their game even by *The Amazing Mandarin* of Béla Bartók. Were the Last Trump to be suddenly

broadcast—and I can think of no event more gratifying to the stern-minded Governors of the B.B.C.—it is doubtful whether it would interfere with the cry of 'No Trumps' from the card table.

What people do in their own homes is fortunately still their own concern, but what takes place in public streets and public-houses concerns us all. The loud speaker is little short of a public menace.

In the neighbourhood where I live, for example, there is a loud speaker every hundred yards or so, and it is only rarely that they are tuned in to different stations. If they are playing the foxtrot I most detest at one corner of the street, I need not think that I can avoid it by walking to the other end. At times there is a certain piquancy in following a tune in two dimensions at once, so to speak—to buy one's cigarettes to the first subject of a symphony, to get scraps of the development as one goes to the newsagent, and to return home to the recapitulation—but the idea of the town as one vast analytical programme, with every paving-stone a bar line, soon palls. It would not matter so much were the music bad music, but, as the B.B.C. can boast with some satisfaction, most of it is good. We board buses to the strains of Beethoven and drink our beer to the accompaniment of Bach. And yet we pride ourselves on the popular appreciation of these masters.

Here is yet another example of the gradual fusion of highbrow and lowbrow to which I drew attention before. Instead of the admirable old distinction between classical and popular which used to hold good—classics for the concert hall or home, popular for the street and café—classical music is vulgarised and diffused through every highway and by-way, and both highbrow and lowbrow are the losers.

The principal objections to music provided by the now almost universal loud speaker are its monotony

and unsuitability. Whereas you can escape from a mechanical piano by going to the next café, you can rarely escape from a B.B.C. gramophone hour by going to the next public-house because they are almost bound to be presenting the same entertainment to their clients. The whole of London, whatever it is doing, and whatever its moods, is made to listen to the choice of a privileged few or even a privileged one. . . .

At one time G. K. Chesterton propounded the amiable and consoling theory that people would cheat the prophets by refusing to do what was laid down in the pseudo-scientific and so-called 'Utopian' books. It would appear, though, that the most jaundiced of imaginative writers can hardly keep pace with the blessings of mechanical progress, that pass in a year or two from a vicious and improbable fancy to a grimly ineluctable fact.

Even worse than the lack of individual choice in loud-speaker music is the almost invariable unsuitability of its style and timbre. Music in the streets, in cafés, and at fairs is an admirable scheme, but a certain gaiety of outline and pungency of timbre is essential. The Catalan coblas are the ideal example of outdoor music, but anything, from a military band playing Sousa to a man playing *Carmen* on the ocarina, is preferable to having the strains of the Air on the G. String, reduced in quality but amplified in quantity, floating out over the noise of traffic. Even the dance music, which on stylistic grounds is to be preferred, in the circumstances, to Beethoven or Bach, has a quality of sickening and genteel refinement not to be found in the exhilarating tintinnabulation of the fast-disappearing mechanical piano. It has actually been suggested that the 'inartistic' confusion of fair music, the dizzy and arbitrary counterpoint of roundabouts, with their whistling organs, should be

supplanted by the uniform blaring of synchronised loud speakers.

It is clear that we are fast losing even the minor stimulus of genuine healthy vulgarity. In the present age it is impossible to escape from Culture, and the wholesale and wholetime diffusion of musical culture will eventually produce in us, when we hear a Bach concerto, the faint nausea felt towards a piece of toffee by a worker in a sweet factory.

The same phenomenal indifference towards what they listen to can be seen as clearly in those who have loud speakers thrust upon them as in those who deliberately foster their use. One might have thought that the sturdy British working man entering a public-house and being greeted with a talk on the Reclamation of the Zuyder Zee, or a string quartet by Alban Berg, would have requested the proprietor, and not entirely without reason, to 'put a sock in it'; but actually he just sits stolidly there, drinking his synthetic bitter to sounds of synthetic sweetness, not caring whether the loud speaker is tuned in to a jazz band, a talk on wild flowers, a Schönberg opera or a reading from *The Land* by the authoress. So long as certain waves are set up in the ether to produce a certain reaction on his tympanum he is content. The most severe complaints about the wireless are indeed from people who indignantly discover that for five minutes during the day the machine is not functioning at all.

Far be it from anyone interested in contemporary music to complain that the B.B.C. have the enterprise to put on such works as the operas of Berg and Schönberg. One's complaint is not with the programmes themselves, which through an independence of advertising interests are of an admirably eclectic nature, but with their intolerably wholesale diffusion through portable sets and loud speakers.

THE APPALLING POPULARITY OF MUSIC

In previous ages, listening to music was a matter of personal choice usually involving either individual skill in joining with other people in singing a madrigal, or at least the concentration, and sacrifice of time and money, required by a cycle of *The Ring*. But now no one can avoid listening to music, whether in town or country, in a motor-car, train or restaurant, perched on a hilltop, or immersed in the river. It is even more trying for the musical than for the non-musical; it is impossible for them to escape from their profession or relaxation, as the case may be.

Another symbol of the present age is thus curiously provided. Those who in the eighteenth century felt like killing their fellow creatures were able to exercise their natural faculties with others of the same bent in a comparatively restricted space. The unbellicose were, save in exceptional circumstances, not affected. But to-day everyone is a potential combatant and will no more be able to escape mechanised death in the next war than at the present moment he can escape mechanised music.

We have at present no idea of what havoc may be wrought in a few years' time by the combined effect of the noise of city life and the noise of city music—an actual atrophy of the aural nerves would seem to be indicated. Already it is to be observed that people are no more thrilled or even aggravated by the most powerful of modern tuttis. The explanation is simple. The noise provided by such adjuncts of modern life as the pneumatic drill, the movietone news reel, and the war film, leaves the most sadistic and orgiastic of composers at the starting-post. When Berlioz wrote the *Symphonie Fantastique* he was providing probably the greatest sonority that anyone, including even those military men present, had ever heard. When George Antheil adds to his score sixteen pianos, an electric buzzer or two, an aeroplane

propeller, and a pneumatic drill he is, after all, providing little more than the average background to a telephone conversation.

Although excessive sonority has lost its thrill, we still demand it as an ever-increasing factor in our lives. It is noticeable, indeed, that those whose business lives are the most surrounded by extraneous noises are those who most insist on the continuous support of gramophone and loud speaker during their leisure hours. We live in an age of tonal debauch where the blunting of the finer edge of pleasure leads only to a more hysterical and frenetic attempt to recapture it. It is obvious that second-rate mechanical music is the most suitable fare for those to whom musical experience is no more than a mere aural tickling.

CONSTANT LAMBERT, *Music Ho!*

ENGINES AND ENGINEERS

IN the year 1755 there happened two things which, slowly at first, deflected the course of Atlantic architecture into channels that must at the time have appeared inconceivable. In England, Horace Walpole started work on the old house at Strawberry Hill whose gloom has since fallen upon a hundred faithful congregations in Europe and in America, but nowhere more heavily than upon those of the British Isles. At the same time, the French architect Soufflot began a building in which the nature of medieval architecture was interpreted in a spirit exactly opposite. Though intended to be used as a Christian place of worship, and originally dedicated to St. Genevieve, this building has since been given the very un-Christian name of Pantheon. Did it occur to anyone at the time that the formal message here

delivered might be rejected with scorn by the Church in all modern countries? Perhaps not. But not very long afterwards the Church did throw itself into that other Gothic Revival whose roots went deep into the lurid imagination of Walpole and Monk Lewis. Just over half a century and the choice was taken; coherence and order counted no more, and what Pugin called 'the accursed light of reason' was as rigorously excluded as the light of the sun. A generation grew up to whom a religious atmosphere meant a gloomy atmosphere, and who held that religious architecture must be harsh and illegible, arousing emotions among which an agreeable fear was chiefly prized. With the spectacle of the twelfth and thirteenth centuries before him, Pugin spoke excitedly about 'the phantasma of that massive darkness,' and into his massive darkness he plunged with many hundreds following.

The first noticeable result of the Revival of Darkness was the break-up of street architecture. A few sham-medieval churches, more or less, could not materially alter the European landscape; but it was unfortunate that just at the moment when streets in England and elsewhere were growing at their fastest, the guiding light of reason should have been withdrawn from them. By the middle of the nineteenth century Ruskin, in a lecture delivered at Edinburgh, was laying down the Three Commandments of medieval law relating to the building of streets. Here is the first: 'The next house you build, insist upon having the pure old Gothic porch, walled in on both sides, with its pointed arch entrance and gable roof above.' The second: 'Resolve that every one of your principal rooms shall have a bow window, either large or small. Sustain the projection of it on a bracket, crown it above with a little peaked roof, and give a massy piece of stone sculpture to the pointed

arch in each of its casements.' The third: 'You will find that the proposal to build windows with pointed arches is met by an objection on the part of your architects, that you cannot fit them with comfortable sashes. I beg leave to tell you that such an objection is utterly futile and ridiculous.' For many years those Commandments rang loud in the ears of house-owners, architects, jerrybuilders, and city councillors throughout the British Isles and beyond. For many years very few houses in England, whatever architects might plead, had the effrontery to come into the world otherwise than equipped with pointed arches, peaked bow windows and at least one 'pure old Gothic porch.' And the Gothic Revival went on giving us streets which were once again 'a broken and confused heap of bodyes, placed in no order to one another.' With an eagerness terrifying to behold, the influence of centuries of civilisation was thrown off, and their finest products were swallowed up in a rapidly mounting tide of vulgarity.

Fortunately the clear and noble lesson written in the structure of Soufflot's church was not to be altogether disregarded. Taken up by the builders working on behalf of the State, it laid the foundations of the truest and finest part of modern industrial building. In his famous *Civil Architecture*, published in 1759, Sir William Chambers speaks warmly of the engineering skill shown by the builders of the medieval churches and cathedrals. 'There is a lightness in their work,' he says, 'an art and boldness of execution to which the ancients never arrived'; Soufflot, however, had read a whole paper on the subject eighteen years before. Nothing could be more natural than that this genuine Gothic Revival, founded largely on an intelligent study of the thirteenth-century cathedrals of France, should have been born in that country. And in the church of the Pantheon its future

i foreshadowed with considerable certainty. At first ight one may wonder where to look for the signs f Gothic inspiration in a building surmounted by great Renaissance dome and with a portico of ighteen classical columns before it. Of the orthodox Gothic forms there is absolutely none. But, glancing own the rows of airy supports inside, one remembers /ith surprise the solid piers and heavily rounded rches of its immediate predecessors. The architect's urpose here is clearly manifest. It is to enclose the reatest possible space with the smallest amount of iaterial, to expand his shell while diminishing its einforcement. In point of fact he carried his iedieval 'art and boldness' a little too far, for his /alls afterwards proved so weak that the windows ad to be built up with solid masonry. The eighteenth-entury church of the Pantheon, which was saved om collapse, is a direct descendant of the thirteenth-entury nave of Beauvais Cathedral, which was not. ut religion had little use for this genuine Gothic evival. Its more fruitful successes during the century f its birth were won for it by Perronet, the greatest ridge-builder Europe has ever had.

With Perronet a new type of person, the *engineer*, ttains a sudden eminence in the world of building. Iitherto an engine had meant a catapult, a battering-am, or a cannon. Towards the middle of the ighteenth century we find the old Westminster ridge, on which work was then going forward, escribed as an engine; but while the word *engine* ever became permanently adopted into the language f building, with its derivative *engineer* it was otherwise. Jnlike the word *engine*, it really stood for something ew. The older workers in the building crafts were alled after the materials they handled according to ell-established rules. Here, on the other hand, was omeone who did not confine himself to any one

material and whose life was spent in transgressing rules which to others were sacred. The word *engineer* is akin to *genius*, and *genius* is the name which the French army still gives to its corps of engineers. It was about the only name which could suitably be applied to people like Soufflot and Perronet, whose connection with the traditional architecture of their time was so remote and whose structural exploits were so magically daring. In the Book of Chronicles we are told of 'engines invented by cunning men.' To his marvelling contemporaries, the engineer was above all else a cunning man.

At first the cunning was not generally noticed. When Arthur Young went to France in 1787 he thought Perronet's bridge at Neuilly 'the most beautiful one I have anywhere seen.' But its beauty consisted for him in the exact similarity of the arches, 'a mode of building incomparably more elegant and more striking than our system of different sized arches.' These words might have been written in the time of Wren, for their chief concern is with the quality of continuity in architecture. The new lightness, the result of the boldness and cunning of the engineers, only became fully manifest to all when cast iron proved itself a possible building material. The erection of the first cast-iron buildings caused medievalists like Ruskin and classical architects like Garnier, designer of the Paris Opera House, to join forces in a campaign of violent opposition. But their efforts were of no avail; the great reading-room of the Bibliothèque Nationale and the Gare d'Orléans established the new material, which found a matchless opportunity in the Great Exhibition of 1851 and later in the Paris Exhibition of 1889, for which the Eiffel Tower was put up. '*Ceci tuera cela*,' says a character in one of Zola's novels, quoting from a more famous work, 'iron will kill stone, and the hour is at hand.'

For over a century iron had been a dangerous servant of architecture, and now it was rapidly becoming a master. Wren knew that iron cramps would, in the course of time, break up his masonry, but both he and his contemporaries were driven to use iron again and again. At this moment it is causing pieces of stone to break off from their buildings almost daily. Iron could never be a good servant, and it now remains to be seen what it will do for us in the new station to which it has been raised. For iron and steel are the materials of which most great buildings are now constructed. Our 'civilisation of luggage' (as a living novelist has named it) finds them better suited to its needs than the materials of the carpenter and the mason. An age that is always in a hurry prizes them for the rapidity with which they can be put together, and, having ever-greater difficulty in making up its mind about anything it does, it prizes them almost as highly for the ease with which they can be taken apart. The Gothic Revival of the engineers is not, it will be seen, so very Gothic after all, for it is the fruit of unsettlement and dissolution, not of a growing stability, of a knitting together of the social fabric. However similar its structural idea, in its subject it is the very opposite of Gothic. The architectural tide may be at a level not very far from that of the thirteenth century, but it is an ebbing tide instead of a flowing one. And yet architecture is not therefore the less alive or the less useful, nor has it lost any of its fascination for those who like to watch its flowering.

This new lightning construction has changed our ideas of architecture in more ways than one, but the most important result it has had is the new meaning now possessed by the old word *architecture*. The need of a word with which to describe the higher brain-work of building was first felt in England, so far as we can tell, towards the middle of the sixteenth

century. About that time a painter called Shute w sent by the Duke of Northumberland to study Italy. When he came back he was an architect. B the word stands for nothing new; there had be architects and architecture enough for centuries pa When we speak of architecture as we would of t law, or when we survey the architecture of a count as we survey its flora, or when we criticise the arcl tecture of a street as we would the set of a mai clothes, the word *architecture* is made to stand for simple and familiar thing that has been in mei minds from time immemorial. Long before the wo itself existed there were the things it signifies. B when a person points to Cannon Street Station a asks, 'Is it architecture?' we are invited to think something which simply did not exist in the minds our great-grandparents. The architecture of Lo bardy or of Fifth Avenue may be seen and identifi readily enough. But what, we may well ask ou selves, is this elusive quality of *architecture* that the architectures may or may not possess?

In its older and more general sense the word *arc tecture* means the whole of the thought that goes the making of a building, and the visible result that thought. In this sense it is impossible for building not to be architecture, for though you m sharpen a pencil or digest a dinner without t exercise of thought, you cannot put up a building the same way. In this newer sense, therefore, t word cannot stand for the whole of the thought; must have a narrower scope, it must stand for sor special part or aspect of it only. A building that not architecture must be a building in which sor particular thing was not thought of. What is tl thing? It is not strength, or efficiency, or convenien or salubrity, for we do not deny the architectu quality in a building because it falls down, or beca

we cannot find our way in its corridors, or speak audibly in its rooms, or breathe in either. On the contrary, we often detect the presence or absence of this quality merely by standing in front of the building. Just as we test the usefulness of a council-house by speaking in it, or the convenience of a dining-room by dining in it, so we test the 'architectural' quality of any building by looking at it. The council-house and the dining-room will be the more useful and convenient the more their architect is aware how they are to be spoken in and dined in. And in just the same manner they will be the more 'architectural' the more he is aware how they must be looked at. If he does not think of the onlookers at all, his works will be completely lacking in that quality, and will themselves appear unconscious of our presence as we confront them. They will be not unlike a lampless motor-car at night: unseeing, they will present nothing for us to see. But, like the motor-car, they may inflict injury, though of another kind; and that is why we dislike and fear them.

Restated in such terms, the question whether or not a given building is architecture shows itself to be quite a simple and ordinary question. A great deal of the mystery which clings about it to this day was manufactured by Ruskin, who has been blamed as much for making a wrong and mischievous answer as he should be praised for being the first to ask it. In the Oxford English Dictionary his *Seven Lamps of Architecture*, published in 1849, provides the first example of this particular use of the word *architecture*. But in the very next sentence Ruskin goes on to say that the bastion and the breastwork of a castle are not architectural elements, but that the moulding round the bastion and the trefoiled openings in the breastwork are. When Lord Carson, practising as an advocate, had got a witness to admit that he drank,

he would often mortify him by asking whether he had any other occupation. Ruskin's tactics were of a similar kind, but it was he himself who became confused as a result of them. For the appreciation of architecture is no more a complete occupation for a human being than is taking liquor; nor is the *being architecture* a complete occupation for any part of a building. A man has other things to do besides look at architecture and drink wine, and the various parts of a building have other things to do than stand and be looked at. Moreover, why should we look at the moulding and refuse to look at the bastion? It is perfectly true that we may tell by looking at it whether or not a building is architecture. But we look at the whole building, not at any special part; we, in fact, look at the building, not at any labels that may have been affixed to it here and there. Nor will the building be required because of our contemplation to do some special thing, as a house, for example, is required to do a special thing if we wish to paint large pictures or give balls in it. And we do not admit the claim of any one part to a monopoly of the architectural virtues, though the claim of the ballroom and the studio to stand for one thing is recognised by all.

What precisely does happen, then, to a building when it is conscious that it is being seen and becomes 'architecture'? Just the same that happens to a hostess sitting at the head of her table, or to a cavalry horse ridden on parade. We do not see a different woman or a different horse, nor any special act, movement, or utterance on the part of either. Their faces and bodies are the same, and they continue to do what they would be doing if no one was about. And yet they do everything differently, they do it better, paying heed to the way it is done. They show that they are aware of other people's presence, and no

doubt they draw a certain stimulus from this awareness. The result is that they tune up their behaviour to a pitch which may be described as that of company manners. But the better they succeed in doing this, the more they will remain themselves, giving us an impression only of vitality, of being at the top of their *form* and able to do things in *style*. And that is the impression we receive from a building in which the quality of architecture is present. It, too, possesses *form* and *style*. The best way to detect this quality is to ask ourselves whether the building has seen us. The best way to describe the lack of it is by saying that the building is *obtuse*. Such a building will have nothing to say to us, nothing to give us. How can it influence our lives when it has no knowledge of us, when there is no connection between it and our minds? To establish such a connection is the very first thing architecture has to do, and it is when it fails in this that we of the twentieth century deny its architectural birthright and speak of it as a 'mere building'.

CHRISTIAN BARMAN, *Architecture*

THE SCIENTIFIC ROMANCES

A CLOUD of dust travels down the flinty road and chokes the glossy Kentish greenery. From the middle of the moving cloud come the ejaculations of an unhandy driver; the clopper of horses' hooves, the rumble of a wagonette or trap. One catches the flash of a top-hat or a boater. One smells horse manure and beer. And one hears that peculiar English spoken by the lower middle class, a language in which the syllable '-ing' either becomes '-ink' or loses its final 'g,' and which is enlivened by cries of 'Crikey' and 'Golly.' The accent is despairing,

narrow-vowelled yet truculent, with something of the cheap-jack and Sunday League in it, and it is broken by a voice, not quite so common, which says things like, 'We're not the finished thing. We're jest one of Nature's experiments, see. We're jest the beginning.' And then—I don't quite know why—there is a crash. Over goes the wagonette, the party inside hit out with their fists, noses bleed, eyes are blackened. Most surprising, a near-by house catches fire. Do not be alarmed. The time is the late 'nineties and you have simply been watching the outing of a group of early H. G. Wells characters who have become suddenly aware that science is radically changing the human environment. No Frenchified or Russianised fiction this, but plain, cheerful, vulgar, stoic, stupid, and hopelessly romantic English. It is as English as the hoardings.

There are always fist-fights and fires in the early Wells. Above all, there are fires. They occur, as far as I remember, in all the scientific romances except *The Island of Dr. Moreau*—a very pessimistic book—and are an ingredient of the Wellsian optimism, an optimism whose other name, I fear, is ruthlessness. I have lately read all those scientific books from *The Time Machine* to *The War in the Air* and it has been a refreshing experience. There was a time, one realises, when science was fun. For the food of the gods is more entertaining than the prosaic efficacy of vitamins; the tripods of the Martians are more engaging than tanks. And then, here you have Wells at his best, eagerly displaying the inventive imagination, first with the news and at play, with an artist's innocence. Here you see his intoxicated response—a response that was lacking in his contemporaries—to the front-page situation of his time, and here you meet his mastery of the art of story-telling, the bounce and resource of it. Above all, in these early books, you

catch Wells in the act, his very characteristic act, of breaking down mean barriers and setting you free. He has burst out himself and he wants everyone else to do the same. 'Why,' cries the engineer in *The Food of the Gods*—the poorest of these books—'Why don't we do what we want to do?'

For that matter, I have never read any book by H. G. Wells, early or late, which did not start off by giving me an exhilarating sense of personal freedom. Every inhibition I ever had faded from me as I read. Of course, after such a high, hard bounce one comes down again. The answer to the engineer's question is that we do not do what we want to do because we want to do opposite things at the same time. Yet that infectious Wellsian sense of freedom was not all anarchy, romantic ebullience or Utopian uplift. That freedom was a new fact in our environment; one pays for everything—that is all. I do not know what date is given to the second scientific revolution, but one has to go back to the great centuries of geographical discovery for a comparable enlargement of our world; and it is a suggestive fact that we have to go back to Swift, the Swift of Lilliput and Laputa, before we find another English novelist going to science for his data and material as Wells has done. (The influence of science, in the 150 years that lie between those two writers, is philosophical, not factual.) Wells's eager recognition of the new environment is one of the sources of the sense of freedom we get from him. I make no comparison of the merits of Wells and Swift—though the Beast-Men of *The Island of Dr. Moreau* are derivatives of the Yahoos and are observed with Swift's care for biological detail—but in his best narratives Wells does go back to the literary traditions of the early eighteenth century, the highest traditions of our narrative literature. The ascendancy of Swift is a question of imaginative

range and style; above all it is due to a humanity which is denied to Wells because he arrived at the beginning, the crude beginning, of a new enlargement, whereas Swift arrived towards the end of one. None of Wells's narrators, whether they are South Kensington scientists or people, like the awful Bert, who appear to be suffering from an emotional and linguistic toothache, is capable of the philosophical simplicity and sanity of Gulliver; for Wells has only just spotted this new world of agitating chemicals, peculiar glands, and obliterating machines. The sense of wonder has not grown far beyond a sense of copy. He is topical and unstable, swept by eagerness yet visited by nauseas sudden and horrifying. Suppose we evolve into futility or revert to the beast from which we have arisen? Such speculations are alien to the orthodox eyes which were set in Swift's mad head; he had no eye to the future; the eighteenth century believed in a static world. The things Swift sees *have happened.* To Wells—and how typical of an expanding age—the things he sees have *not* happened. They are possibilities. In these scientific romances one catches occasionally the humane and settled note: in *The Time Machine*, in *The Island of Dr. Moreau* and in *The War of the Worlds*, which are the most imaginative stories of the group and are free of the comic Edwardian horse-play. The practical experiment has been detached from the practical joke; the idea is untainted by the wheeze. The opening sentence of *The War of the Worlds* suggests a settled view of humanity, besides being an excellent example of Wells's mastery of the art of bouncing us into belief in anything he likes to tell us:

'No one would have believed in the last years of the nineteenth century that human affairs were being watched keenly and closely by intelligences greater than man's and yet as mortal as his own.'

It is not surprising that the passages of low comedy, which elsewhere are Wells's excellence, should be a failure in the scientific romances. Naturally they break the spell of the illusion with their clumsy realism. And if love is born, Wells is Walt Disney at his worst. The love scenes between the giants in *The Food of the Gods* are the most embarrassing in English fiction, and one wonders that the picture of the awful Princess, goggling in enormous close-up and fanning herself with half a chestnut tree, did not destroy the feminist movement. But except for faint squirms of idyllic petting in *The Time Machine*, none of these aberrations misdirects the narratives of the three books I have mentioned. I cannot include *The War in the Air* among the best; it *is* an astonishing piece of short-term prophecy and judgment. One remembers the bombing of battleships and the note on the untroubled minds of those who bomb one another's cities; but the book is below Wells's highest level. So, too, is *The Invisible Man*, which is a good thriller, but it develops jerkily and is held up by horseplay and low comedy. Without question *The Time Machine* is the best piece of writing. It will take its place among the great stories of our language. Like all excellent works it has meanings within its meaning and no one who has read the story will forget the dramatic effect of the change of scene in the middle of the book, when the story alters its key, and the Time Traveller reveals the foundation of slime and horror on which the pretty life of his Arcadians is precariously and fearfully resting. I think it is fair to accuse the later Wells of escaping into a dream world of plans, of using science as a magic staircase out of essential social problems. I think the best Wells is the destructive, ruthless, black-eye-dealing and house-burning Wells who foresaw the violence and not the order of our time. However this

may be, the early Wells of *The Time Machine* did not escape. The Arcadians had become as pretty as flowers in their pursuit of personal happiness. They had dwindled and would be devoured because of that. Their happiness itself was haunted. Here Wells's images of horror are curious. The slimy, the viscous, the foetal reappear; one sees the sticky, shapeless messes of pond life, preposterous in instinct and frighteningly without mind. One would like to hear a psychologist on these shapes which recall certain surrealist paintings; but perhaps the biologist fishing among the algae, and not the unconscious, is responsible for them. In *The Time Machine*—and also in the other two books—Wells is aware of pain. None of his investigators returns without wounds and bruises to the mind as well as the body, and Dr. Moreau is, of course, a sadist. *The Island* is hard on the nerves and displays a horror more definite and calculated than anything in Wells's other books. Where *The Time Machine* relieves us by its poetic social allegory, *The Island of Dr. Moreau* takes us into an abyss of human nature. We are left naked at the end of the shocking report, looking with apprehension at the bodies of our friends, imagining the tell-tale short legs, the eyes that shine green in the dark, the reversion to the wolf, the hyena, the monkey, and the dog. This book is a superb piece of story-telling from our first sight of the unpleasant ship and its stinking, mangy menagerie, to the last malign episode where the narrator is left alone on the island with the Beast-Men. Neither Dr. Moreau nor his drunken assistant is a lay figure and, in that last episode, the Beast-Men become creatures of Swiftian malignance:

'The Monkey Man bored me, however. He assumed, on the strength of his five digits, that he was my equal, and was for ever jabbering at me, jabbering the most arrant nonsense. One thing about him

entertained me a little: he had a fantastic trick of coining new words. He had an idea, I believe, that to gabble about names that meant nothing was the proper use of speech. He called it "big thinks," to distinguish it from "little thinks"—the sane everyday interests of life. If ever I made a remark he did not understand, he would praise it very much, ask me to say it again, learn it by heart, and go off repeating it, with a word wrong here and there, to all the wilder of the Beast People. He thought nothing of what was plain and comprehensible. I invented some very curious "big thinks" for his especial use.'

The description of the gradual break in the morale of the Beast-Men is a wonderful piece of documented guesswork. It is easy enough to be sensational. It is quite another matter to domesticate the sensational. One notices, too, how Wells's idea comes full circle in his best thrillers. There is the optimistic outward journey, there is the chastened return.

It would be interesting to know more about the origins of *The Island of Dr. Moreau*, for they must instruct us on the pessimism and the anarchy which lie at the heart of Wells's ebullient nature. This is the book of a wounded man who has had a sight of sadism and death. The novelist who believed in the cheerful necessity of evolution is halted by the thought of its disasters and losses. Perhaps man is unteachable. It is exciting and emancipating to believe we are one of nature's latest experiments, but what if the experiment is unsuccessful? What if it is unsurmountably unpleasant? Suppose the monkey drives the machine, the gullible, mischievous, riotous, and irresponsible monkey? It is an interesting fact that none of Wells's optimistic contemporaries considered such a possibility. Shaw certainly did not. Evil, in Shaw, is curable. He believes in the Protestant effort. He believes that men *argue* their way along the path

of evolution, and that the life force is always on the side of the cleverest mind and the liveliest conscience. When he reflects on the original monkey, Shaw cannot resist the thought that the monkey was a shrewd animal going up in the world, and Shaw feels a patronising pride in him which the self-made man may feel about the humble ancestor who gave him his start in life. There is certainly no suggestion that he will ever lose his capital, which is civilisation, and revert. There is no thought, in this quintessential Irish Protestant, that the original monkey may be original sin. Nor could there be: the doctrine of original sin is a device of the emotions, and about our emotions Shaw knows absolutely nothing at all. But to the emotional Wells, the possibility of original sin in the form of the original monkey is always present. The price of progress may be perversion and horror, and Wells is honest enough to accept that. Shaw appears to think we can evade all painful issues by a joke, just as Chesterton, the Catholic optimist of his generation, resolved serious questions by a series of puns.

Wells can be wounded. It is one of his virtues. One is reminded of Kipling, another wounded writer —was Wells satirising Kipling in that chapter of *The Island of Dr. Moreau* where the Beast-Men are seen mumbling their pathetic Law?—and Kipling and Wells are obviously divergent branches of the same tree. Wells the Utopian, Kipling the patriot—they represent the day-dreams of the lower middle class which will either turn to socialism or fascism. Opposed in tendency, Wells and Kipling both have the vision of artists; they foresee the conditions of our time. They both foretell the violence with a certain appetite. Crudity appeals to them. They are indifferent or bad-hearted, in human relations. They understand only personal independence which, from

time to time, in their work is swallowed up in mass relationships. In the final count, Kipling—like Wells's man in the sewer in *The War of the Worlds*—falls back on animal cunning. It is the knowing, tricky, crafty animal that survives by lying low and saying nothing. Kipling, for all his admiration of power, believes in the neurotic, the morbid and defeated mind. This strain is in Wells also, but he has more private stoicism than Kipling has, a stoicism which blossoms from time to time into a belief in miracles and huge strokes of luck. Impatient of detail, mysteriously reticent about the immediate practical steps we must take to ensure any of his policies, Wells believes—like Kipling—in magic: a magic induced by impudence or rebellion. Wells and Kipling—these two are light and shadow to each other.

Wells's achievement was that he installed the paraphernalia of our new environment in our imagination; and life does not become visible or tolerable to us until artists have assimilated it. We do not need to read beyond these early scientific works of his to realise what he left out. The recent war, whose conditions he so spryly foresaw, has made that deficiency clear. When we read those prophetic accounts of mechanised warfare and especially of air bombardment, we must be struck by one stupendous misreading of the future. It occurs where we should expect it to occur: in the field of *morale*. Wells imagined cities destroyed and the inhabitants flying in terror. He imagined the soldiers called out to keep order and the conditions of martial law and total anarchy. He imagined mass terror and riot. He did not reckon with the nature, the moral resources, the habits of civilised man. Irresponsible himself, he did not attribute anything but an obstructive value to human responsibility. That is a

serious deficiency, for it indicates an ignorance of the rooted, inner life of men and women, a jejune belief that we live by events and programmes; but how, in the heyday of a great enlargement of the human environment, could he believe otherwise? We turn back to our Swift and there we see a mad world also; but it is a mad world dominated by the sober figure of the great Gulliver, that plain, humane figure. Not a man of exquisite nor adventurous spirituality; not a great soul; not a man straining all his higher faculties to produce some new mutation; not a man trying to blow himself out like the frog of the fable to the importunate dimensions of his programme; but, quite simply, a man. Endowed with curiosity, indeed, but empowered by reserve. Anarchists like Wells, Kipling, Shaw, and the pseudo-orthodox Chesterton, had no conception of such a creature. They were too fascinated by their own bombs.

V. S. PRITCHETT, *The Living Novel*

REALISM AND SUPERREALISM

THESE two extremes of art do not exhaust all the possible forms of plastic expression. There is classical art, for example, which is idealistic; there is naturalistic art and academic art; impressionist art and abstract art. There are all these types of art, and it is possible to find good art and bad art among them all. Nevertheless, I think the distinction between realism and superrealism represents something fundamental. All art is a kind of language—a language of form and colour, instead of words and sentences. To that extent all art is subjective: it expresses what a particular individual—the painter or sculptor—feels and thinks about a particular subject. But there is a broad distinction between feeling and thinking about

an object which we are actually observing with our senses, and feeling and thinking about a subject which only exists in our minds. And that is the fundamental distinction between these two types of art. One type begins with what is immediate and actual in the world—a flower, an animal, or a human being; the other type begins with what is conjured up or imagined in the mind—the image, the phantom, or the dream.

During the nineteenth century—at any rate in this country—there grew up a curious prejudice in favour of a naïve form of realistic art. It was an art, or rather a technique, which we call naturalistic, and we may describe any prejudice in its favour as curious because if you examine the history of art from the earliest times, you will find that this kind of art is extremely rare. It is only at long intervals, and usually in somewhat luxurious and decadent periods, that artists have tried to give in their paintings and sculpture an exact representation of what the eye sees. Now that we have photography—even coloured photography—there is no longer the excuse of recording the appearances of things which was one of the functions of the artist in the past. But in the past that function was always considered a minor one, and the most exact artists, like the Dutch painters of flower-pieces, have never been great artists. Great artists have always had what we rightly regard as a higher aim. They have always desired, not merely to make a record, but to express an idea, even a point of view or judgment, and to do this with the proper materials of their art. Thus the great masters of European art —Giotto, Michelangelo, Rembrandt, Rubens, El Greco—such artists do not give you exact pictures of the natural world—they create a world of their own which is an imaginary world, bearing little or no relation to the appearance of nature.

Modern art is essentially an insistence on that freedom of artistic creation. In that sense it is merely a return to well-established traditions.

That is all very well, it might be said, but there are limits. Liberty is not licence: the old masters, however free in their compositions, did at any rate base their art on realistic elements. However imaginative their scenes and subjects, a man is always recognisably a man, a tree a tree, and so on. In your modern pictures we never know whether we are looking at a man or a tree. . . .

The truth is that art has no limits. Art is anything that can be imagined, and expressed. But living as we do in particular circumstances and with particular desires and experiences, the art of our time is not so indeterminate. It is something determined by our social and economic conditions, and by the ideas and habits we inherit from the past.

Those conditions are continually changing. Just as our social and economic conditions change, so do our habits and ideas. We change our houses and our clothes, our food and our morals. We change our art. But just as there are people who cling on to old fashions in houses and clothes, food and customs, so there are people who want to retain old fashions in painting and sculpture. And if we belong to a younger generation we say of such people that they are old-fashioned or prejudiced.

I would like to suggest that the prevalent misunderstanding of modern art is due, not so much to a lack of sensibility, not even to blank ignorance of the aims of the modern artist, but simply to this sort of prejudice. We go about with a certain preconception of what art ought to be like; it is a narrow conception derived from our environment, from the education we have had, and from the economic limitations imposed on our mode of life. I do not

say this in any kind of snobbish spirit. Indeed, the most limited people may be those who have enjoyed all the privileges of wealth and rank—who are, so to speak, heirs to a particular tradition. They inherit their culture along with the rest of their heirlooms, and it is they who most strenuously resist change and dispossession.

Surely these people, who inherit their culture and preserve it unchanged, are not the true traditionalists. Tradition is not a heritage; it is rather an active principle, a principle we apply to solve particular problems; and since the problems change with every age, so must the solutions. From this point of view, modern art is not fundamentally revolutionary or subversive. It only seems to be revolutionary because it insists on developing the central tradition of art. And it is not only in art that the return to tradition, or the maintenance of a tradition, takes on the outward appearances of a revolution; we might find plenty of examples in the history of religion and science.

That phrase I have used, 'the return to tradition,' indicates another danger. There are many people who revolt against the conventions they have inherited. They dislike the houses they have been brought up in, the pictures and furniture of their parents, and that general air of established righteousness which one generation tries to put across its successor. There are various ways of escape for the younger generation: they can become nihilists—people who do not believe in anything in particular, whose only desire is to uproot and destroy; or they can build anew. But more likely they will just look round for something they like better. Not acting on any principle of creation or destruction, they will accumulate a new set of possessions from the things of the past. They may even adopt a particular period, like Tudor or Georgian; or they make merely

a miscellaneous collection of bric-à-brac from all periods—and by bric-à-brac I do not mean only furniture, prints, and china, but also ideas and attitudes, even a religion. For there are people who choose their mental furniture in the same way that they choose their household furniture.

Such people are apt to consider themselves broad-minded, but actually their attitude is a product, not of reason, but of timidity. It is a 'safety first' policy in matters of taste and criticism. It is characteristic of phases of civilisation that have lost their belief in any central doctrine or universal faith, particularly of periods when this intellectual scepticism is combined with social irresponsibility, when art, along with other worldly goods, becomes a symbol of wealth and power. Such people, for whom we have the name *dilettanti*, possess neither the courage nor the convictions which would enable them to discover and support those works of art which are being produced by their contemporaries. Apart from the fact that such works could not be treated as gilt-edged securities, they would demand an individual exercise of perception. The only real taste is a contemporary taste. I do not say that a real taste will confine itself to contemporary works of art—it will in a certain sense be timeless.

I have said that one kind of artist turns away from the outer world of perceptions to the inner world of imagination and dream. That is obvious if we look at the art of any great period. But if we examine the imaginative creations of great painters like Giorgione or Rembrandt or El Greco, we observe that though they may transcend reality to the point of mystery, they do nevertheless preserve a certain rationality. Their themes may be 'far fetched,' their ideas poetic and even strange, but they use recognisable conventions to express their themes or ideas. That is to

say, they use forms and compositions which are part of the intellectual equipment of an educated man of the time. If they want to express the spiritual or poetic world, there is a whole stock-in-trade of gods and goddesses, nymphs and satyrs, legends and myths ready made. But the kind of imaginative art which we call superrealist, has very little in common with such pictorial charades. It has no ready-made stock-in-trade. It has no tradition and no rules. There are precedents for it, but these are mostly found in the art of people who have no rational culture, and who do not judge things by intellectual standards—so-called savage peoples. This fact suggests one possible explanation of superrealism—that since our age is one of increasing savagery, it is only natural that our artists should revert to a savage type of art. But that is not quite the line of my argument. I would rather say that there is a savage in every human being, and always has been; and that our savage instincts find their sublimation in art. But that too is not an altogether satisfactory argument—it suggests that art is a sort of medicine to make us mentally healthy. That may be one of its functions, but art is something more and something greater. It is the exploration of the heights and depths of the human mind. Just as the physical world is explored by the scientist whose discoveries are then recorded in the laws of nature, so the psychical world is explored by the poet and the painter, and their discoveries are recorded in works of art. This psychical world, this world of our dreams and desires, is just as important, just as much a part of reality, as the world of matter and energy. And in order to make his discoveries in this psychical universe, the artist must conduct experiments. The poems and pictures he offers to us are not to be regarded as complete in themselves; they are facts won from the unknown—records of

experiences which throw some light on the greatest of all mysteries, the human mind.

Therefore accept the fragments of that great mystery in the spirit in which they are offered—humbly, tolerantly, without prejudice. They have something to say to you if only you will look at them with innocent eyes. Picasso is inviting you to a carnival where Pierrot, Harlequin, and Columbine hide their tragedy under gay geometric costumes; Mirò entices you into a playground where the sun is shedding globules of pure colour; Max Ernst leads you into a nocturnal forest bright with lynx-eyes and the phosphorescent gleam of moths' wings; Paul Nash takes you on to the open downs and reanimates the standing stones in the Druids' Shrine . . . these painters restore to art the magic and the wonder which it had lost in that dreary waste of commerce, cash-values and common sense which is our immediate fate and shameful past.

SIR HERBERT READ, *A Coat of Many Colours*

EDWARD ELGAR
1857–1934

ELGAR was one of the last of the composers of our time to keep in touch with the musical public at large—he and Strauss. To-day the composer chooses to remove himself from the mass of reasonably intelligent listeners; he deliberately cultivates a strange language; he is determined not to sound like any other composer; he has a contempt for the familiar style; he would perish rather than write music easy to understand and remember. And on principle he impels his hair to rise on end at the mere mention of romanticism. One of the chief objections directed against Elgar by the more strenuously con-

temporary musicians is that he frequently lapses into the commonplace and was not fastidious enough. Elgar was actually unashamed of his 'Pomp and Circumstance' marches; and the fact that he was not ashamed of them is regarded by his detractors as an added enormity; they could no doubt forgive vulgarity in Elgar had he exploited it cynically. But no, he was frankly proud of 'Land of Hope and Glory'; he once declared with some heat (and no little accuracy) that it was 'a damned fine popular tune.'

To aggravate matters he did not look like an artist and a composer, but more like an English gentleman. Worse still, he wrote a lot of music which obviously is the music of an English gentleman. So what with his 'vulgarity' and his 'respectability,' how possibly could he be classified and reduced to a system or a movement? In a period which like the present regards the creative faculty as self-conscious and rationally directed, Elgar's indifference to an organised aesthetic has aroused the gravest misgivings. He founded and encouraged no school; he was capable of composing a military march one day and music for an oratorio the next. In a lecture delivered from the chair of an English University, Elgar on an occasion stated that most contemporary composers were at heart formalists who addressed themselves too much to their own craft; they were afraid of vulgarity—which, he maintained, 'would have been preferable, for vulgarity might have shown signs of initiative.' He was a direct man and as direct in his music. 'I put the whole of myself into it,' he declared, 'I keep nothing back.' He was wise; the greatest composers sound as they look; I am convinced of this theory. A turn of phrase, a harmonic flavour, a colour of instrumentation, is as revealing as the sound of a voice or a gesture or a movement, as a man talks or

walks. Wagner's music could not have come from the heart and mind of a reticent individual; I see the face of Beethoven in all that he composed. The paradox is that music, the most intensely emotional of the arts, can express not only passionate and full-blooded men but men of reticence; music can burn with Wagner's flame of rhetoric and can freeze with the few rational words of Sibelius. Look at a photograph of Sibelius—it is just like his music, even to the baldness.

Elgar and his music are one and indivisible. The man who wrote 'Gerontius' was the man who wrote the broad and healthy Introduction and Allegro for strings. It was the one and the same Elgar who wrote 'Falstaff' and the 'Nursery' suite. He was a full and human being. And to those who knew him he was great, not only in his largest and loftiest conceptions but in his simple English failings.

Elgar liked to know that ordinary folk enjoyed his music. 'I give them all that is in me.' He well knew that if genius in a full man is tampered with, or drawn on meticulously, if you pick and choose from the largesse given by the gods to you, then you may well miss something good, or stifle at birth an inspiration. You must accept trustfully the full cornucopia of the muses and not look the gift in the mouth. Gusto is the first sign of genius, which nobody can deny; not even the contemporary fashion in good manners, the fashion which prefers the small man and perfect artist to the big man and not so perfect artist. Basil Maine tells how Elgar entertained some friends one night to a gramophone concert in his country house. He put on records of his own 'Falstaff' and during the first interlude—the Dream Picture—he listened absorbedly, then said, 'That is what I call *music*.' I doubt if he made a distinction between his

own music in particular and music and the spirit of music in general. It was his opinion that music is in the air—'music is all around us; the world is full of it, and you simply take as much of it as you require.' In brief, Elgar believed in inspiration; he did not compose according to a preconceived aesthetic or 'system'; he was self-taught and reached middle age before he wrote a mature individual work. Then, in a sudden spate, over a period of only fifteen years, he produced his masterpieces: the 'Enigma' variations, 'Gerontius,' the two symphonies, the Introduction and Allegro for strings, the Violin concerto, and 'Falstaff.' He could not compose at all until he grew as a man—then where, you may well ask, is the notion that he believed in inspiration? Inspiration, you are at liberty to point out, does not wait on time and birthdays and experience. Is it not suspicious, you may ask, that Elgar produced no work of consequence until he had learned the elaborate orchestral technique of his day: in other words, the tricks of his trade? The plain truth is that he *was* obliged to learn his language. Inspiration does not woo the artist who is not a master of technique, waiting in a field rich of soil for a sowing. Music may be 'in the air,' but in the England of Elgar's youth quick ears were needed to catch it and make it one's own. I can think of no greater composer who took his rise from an environment as unpromising to his art as Elgar's when he was a young man. England, in those years, was solemnly and surely 'Das Land ohne Musik.' Elgar lived for long in his formative years in the narrowest of holes and corners of culture—Worcester and the West Country, not amongst the yokels thereof but in the presence, day by day, of the dull middle classes. A sojourn in London relieved the comfortable monotony—a London the art and music of which had about as much to do with the life

and history and the crises of man's imagination as any exhibition at the Royal Academy of the canvases of Leighton, Landseer, Sidney Cooper. Oscar Wilde assured the world that Frith's 'Derby Day' was 'all done by hand'; it can be stated with equal veracity that when Elgar was changing from youth to manhood nearly all English music was composed 'by ear' by men conscientiously educated in the more acceptable of the German classics. I can discover no evidence that in the London of the 'eighties music or painting or the theatre were regarded as necessary to the fulfilment and clarifying of mankind's experience as temporal or immortal beings. Bach was a subject of academic study; and Wagner was a season at Covent Garden. When, in 1908, the A flat symphony of Elgar was played for the first time, those of us who were students were excited to hear at last an English composer addressing us in a spacious way, speaking a language which was European and not provincial. No English symphony existed then, at least not big enough to make a show of comparison with a symphony by Beethoven or Brahms and go in the programme of a concert side by side with the acknowledged masterpieces, and not be dwarfed at once into insignificance. I was present at the Hallé Concert on December 3rd, 1908, when Hans Richter conducted the first performance of the A flat symphony; I can see his huge bulk to this day as he stood, back to the eager audience; he lifted his arms slightly and obtained silence; then the broad tune, with the grave steady tread of the double-basses underneath, came upon our ears. What a long first subject, we said—how original! Then the sudden double-bar pause, then the plunge into a remote key and a forging energy; fountains of string tone, brass instruments in ricochet; no such virtuoso orchestration had been heard by us before in the music of an

Englishman, or of any other composer; for Strauss was not familiar to us in that distant backward and abysm of time. The Elgar string divisions opened our enchanted ears upon new faery seas of tone; the muted brass of the closing cadences of the adagio was revealed magic. Elgar put English music on the map of Europe; we could play a work by him in any programme of symphonic dimensions and pretensions. I cannot hope, at this time of day, to describe the pride taken in Elgar by young English students of that far-away epoch. The irony is that young English musicians who affect to despise Elgar nowadays because of his 'reactionary tendencies,' do so from a point of vantage won for them by Elgar himself.

It is amusing, the tendency at the present time towards nationalism in music once more; Elgar is looked at suspiciously because he employed the technique of the nineteenth-century symphonists of Europe. In *our* young days we were grateful to Elgar for sweeping English music into the main stream, out of the local backwater. Elgar is now attacked on the one hand for his Edwardian mentality; in the next breath he is charged with eclecticism.

. . . . . .

We know his secret who have listened to Elgar during the music festivals held in the cathedral cities of Worcester, Gloucester, and Hereford at the time of ripening summer. Here at the harvest of the year, in country washed by the rivers of the west, we have known music as music everywhere should be; part of the soil, creative, free, serious, life-giving. The thought that an art has grown up from the very ground you are treading and is bearing its fruits all around you is something very different from the feeling that it has been brought to you from a long way. Elgar in his own countryside was, like Bruckner

at Linz, more than a maker of music for concerts; he was an informing spirit, of the air and the environment that made us alive. One mellowing afternoon in September I listened to the A flat symphony in the cathedral at Worcester. Where I was seated, at my side, lay a sculptured knight, arms folded. The light of the living day came through the stained-glass windows; the past and the present mingled in the eternity of the arched roof. I think it was Schlegel who said that architecture is frozen music. On this afternoon it was as though the old stone and the windows and tracery became audible in Elgar's music. And through the symphony's graver strains we heard also the exhilaration of brass bands, sturdy marching rhythms, and sunset cadences; this was a symphony in which an Englishman praised God and praised his country. I am neither patriotic in a political sense nor religious. The same can be said of Bernard Shaw. Yet on this occasion in Worcester Cathedral both Shaw and myself sat and listened to the A flat symphony and were moved to our foundations. Let Kipling's devil ask as much as he likes: 'But was it art?'

Here we are at the truth about Elgar. He was the destined laureate of the burgeoning age of Edward VII. Though he was born in 1857 he would have left no important mark on music had he died at the age of forty in the year of Queen Victoria's Diamond Jubilee. Under Edward VII the inhibitions of Victorianism had given way to some spaciousness; opulence came forth honestly in fine feathers. The Empire and the spirit thereof were as a pageant now, not a chapter in the history of buying in the cheapest market and selling in the dearest. For nine years it was high noon over the seven seas; not a cloud was to be seen on the clear sky of Britain's splendour. Elgar's music emerged from the period as the plant

from the fruitful soil. His works are abstract and by no means brief chronicles of the times. Here is the music of peace and plenty. Pomp and circumstance and Buckingham Palace and the Mall and Westminster, all poised in a crescendo and cadence of fulfilment—*nobilmente*. The flag is unfurled, waving possession not belligerence; the trumpet and drum of satisfied conquest are alternated with the cathedral's thanksgiving for all the good things vouchsafed to his chosen people by the Lord. The terrace and the country house and the major-general and the gaitered bishop and the group of noble dames. . . . So the pageant of Elgar's music passes: Oxford movement and Church militant, the trooping of the colour and evensong, children in Kensington Gardens and Phil May's cockneys; the ripening pippin in Gloucestershire, and the tumult of the Spithead review.

This is the conventional view of Elgar, and some of his critics see no deeper. What of the other Elgar who plays hide-and-seek behind the panoply of ceremonial orchestration and massed choralism; what of the poet who for long is concealed under the robes of the official singer of tribal lays? There was a major-general actually in the Elgar family, on his wife's side; and his music is constantly emitting the explosions of the parade ground. But there is the dreamer in the cloisters, the man with the musing eye, the Englishman when he is alone. We look at Elgar's portrait and admire the patrician nose, the military moustaches; we think superficially that the eye sees what the ear hears from much of his music; then we are reminded of the macabre beginning of 'Gerontius,' and we are reminded, too, of the fresh early morning air of the aubade of the Serenade for strings. 'Falstaff' looms large as life as he walks like a sow overwhelming her litter before other creatures of Elgar's fancy such as the 'Dorabella' variation,

fine-spun gossamer of sound; the swirling Arielesque scherzo of the Second symphony; the cradle-song of the slow movement of the string quartet; the hushed peacefulness of the beginning of the second part of 'Gerontius.'

Elgar was many-sided, after the nature of a genius and great man. Is he complacent in the closing section of the Second symphony? Not more so than he is bodeful in the largo of the same work; here is a profounder 'Recessional' than Kipling's. He is English to an extent that all critics not English are baffled by contradictions of psychology and character of the kind that bewildered Taine. Man of action and private poet and Empire laureate, he is tangible and elusive; he is country squire and major-general and the devotee at prayer. He is austere and vulgar and prosaic and romantic; he is the Catholic whose oratorios are acceptable to the most venerable adherents of the Anglican Church; in short he is English. And in nothing was Elgar more English and of his period than in his shrewd adaptation of the best Continental models; Free Trade in composition. When Richard Strauss and Hans Richter hailed 'Gerontius' and the A flat symphony as masterpieces and welcomed them into the commonwealth of Europe's music, these men probably understood the external shape, the parts of speech, before they heard the essential Englishness. There is a surface allegiance to 'Parsifal' expressed in the prelude of 'Gerontius.' The A flat symphony honours the Continental symphonic procedure, from the adagio of the Ninth symphony of Beethoven to the cyclic method of development of César Franck. None the less, under the skin of everything flows the blood of an Englishman.

NEVILLE CARDUS, *Ten Composers*

THE TENTH MUSE CLIMBS PARNASSUS

LOOKING back over her short life, the tenth Muse could, without immodesty, congratulate herself. Though respectably born in a laboratory, her early life had been spent in the squalid surroundings of flea circus and freak show. Her first advances to her sisters had been greeted with outraged ridicule. She a Muse! She, the unnatural offspring of an unholy liaison contracted between the magic-lantern and the novelette! But she had persevered: she had worked hard at improving herself, and now, at last, her sisters occasionally nodded to her or even smiled if still a little patronisingly. She was not quite one of the circle, but her existence was recognised.

The silent film had, in fact, by this time (1928–9) proved its right to be called a medium, because although it had produced little of permanent artistic value, it had proved its ability to tell stories and express the moods and emotions of its characters in a way peculiar to itself. But the film as a medium suffered from a unique handicap. In every other art the creative urge, the need to say something, forced the artist to enlarge his technique: the thing to be expressed was always in advance of the means of expression. We call works of art 'primitive' when we mean that the artist has not been able to say all that he wants because he has not been able to forge adequate tools for the purpose. Sometimes this conflict between the intensity of the thing to be said and the unyielding stubbornness of the medium gives a work a peculiar force and beauty as in certain primitive sculptures and archaic poetry. Films never passed through this stage: the director was never

faced with a problem which the technicians could not solve in a twinkling—indeed, imaginatively the technicians were far in advance of the producers. No, the conflict was not with a recalcitrant medium, but with the sluggish and timid imagination both on the part of the producers and their audiences. There is, however, another thing to remember: a man who writes a book or paints a picture incurs only the expense of his writing material, his canvas and his paints: a man who makes a film must spend, literally, thousands. Therefore films, unless they are made by the State or quixotic millionaires, must be made by companies. Companies aim at profits for their shareholders, so they cannot be blamed for playing safe—underrating the taste and intelligence of their public. Economically this may be excusable: aesthetically it must be deplorable; and yet is not this the reason why the film is the only example of popular art—art where the unbridgeable chasm between art with a capital A and mere popular entertainment has not been irrevocably dug—where some artists create for the intelligent few while a mass of artisans cater for the unintelligent, undiscriminating many? And this, surely, gives the film immense strength, because whatever it may lose in intellectual quality and even in subtleties which properly belong to it, its gains in vitality are out of all proportion. Its material is the stuff of the imagination of the people, and the director must take advantage of that fact and, if strong enough, master and mould that stuff into a work of art. No body of men catered more indefatigably to the taste of their public than the Elizabethan dramatists. The corpses, the blood, the ghosts, the torrential rhetoric, the tumbling cascade of words which their audiences drank in so thirstily—these they poured out with the utmost lavishness. They did not withdraw to a private garden barred by a gate marked 'Art' where

everything was in perfect taste and only one element was lacking—Life. No, they took all the things they knew their public wanted, and because some of them were men of genius they were able, at their best, to transform these cardboard monsters into Bosola or Iago, these paragons of virtue into Annabella or Desdemona: these turgid outpourings of words into, 'Thou art more lovely than the evening air: Clad in the beauty of a thousand stars,' for ecstasy; or, 'The element of water moistens the Earth: But blood flies upward and bedews the heavens,' for horror.

Like the Elizabethan dramatist, every film director has, in effect, always the same audience, and, like the Elizabethan dramatist, he must realise that this limitation can be a source of strength. No technical difficulties had hitherto hampered the producers; they had only to clap their hands and the technicians produced for them flying carpets or prehistoric monsters: the Red Sea divided itself for the Israelites —and Mr. Cecil B. DeMille—and swallowed up the chariots of the Egyptians. There was no visible wonder their magic could not conjure up; no *visible* wonder, yes, but in one thing they had failed: they had failed to give the Tenth Muse a voice. Forced to do without it she had, none the less, found a way of expressing herself in silent movement clearly and sometimes beautifully, and then the Great Day of Emancipation came. Sponsored by a composite fairy godmother in the corporeal shapes of the brothers Warner, the technicians endowed her with a voice and, in one sickening slide, she found herself back at the bottom of Mount Parnassus. Freedom proved to be an illusion; from being the swiftest, most direct of the Muses, she found herself scarcely able to move. All she had gained was a slow, barely intelligible, sexless croak. But just as at the beginning of the silent film it had been enough, for a time, that

the pictures moved, so now it was enough that the images spoke, and although Miss Garbo proved to have a voice, as one critic put it, 'like a man with adenoids speaking into a leather bottle on a foggy night,' none the less the words, 'Garbo speaks,' drew the town. (In fact, in my opinion, Miss Garbo has one of the most beautiful voices on the screen.) But the wonder wore off: once the worshippers ceased to be astonished that their silent Olympians could actually, or, in some cases, actually not, speak, as in silent films they began to want a little more. But they were not given naïve Wild West stories, or their equivalents, in terms of sound films; the intellectual content was, often, quite sophisticated. The whole process of film producing had, in fact, become laughably simple for the big Hollywood producers. You sent off an expedition into the theatrical 'Big Game' country and, after a time and probably having spent a good deal of dollar ammunition, the intrepid explorers returned with the hit of the New York season complete with cast, and, possibly, the author thrown in as a keepsake. The sets were then erected in the studio, the actors acted the play, the camera photographed it and the microphones recorded it; the whole thing could be done in ten days. Such writers as Maugham, O'Neill, Barrie, Coward were all quickly captured and displayed in the new zoo, but whereas in the early Westerns the style, crude as it was, did spring from the matter and the medium, in these early talkies there was no discoverable indication of the sound film as a medium at all. They were merely stage plays, competently acted, moderately recorded and photographed, cut into convenient lengths and packed into tins. In such films the cinema ceased to be a means of expression and merely became a mode of transport. The more intelligent film directors, notably Hitchcock, René Clair, Mamoulian, Mile-

stone, and some others, rebelled, and each in their different way gave interesting indications of the lines on which sound films could develop, but only Clair succeeded in really mastering the medium in a way that was immediately acceptable to the general public. Hitchcock's early sound films were, with every justification, much talked of and written about, but they were not tremendous box-office hits, while Mamoulian's deeply interesting first film, *Applause*, had to be taken off after three days. Clair's poetry-shot humour and easy, unlaborious fantasy found a way to the public heart, and not even he, let alone his imitators, has equalled the enchanting, touching, wildly funny *Le Million*. But Clair, and many others, in their hatred for the living corpses of the theatre which haunted the screen, tended to an equally dangerous, though infinitely more attractive, fallacy—the fallacy that a sound film should be as much as possible like a silent film, with music, sound effects, and the bare minimum of dialogue. In Art everything which succeeds in practice is legitimate, and as this is a fair description of Clair's masterpieces, it is perhaps foolish to condemn the theory which could produce such magic practice. None the less, when an element so new and so enormous is added to a medium, it is useless to pretend that it is just another technical device. Better face the fact that the sound film is not just the silent film plus sound: it is a completely new medium.

At the beginning of this article it was said that movement was the life-blood of the silent film. Movement is also the life-blood of the sound film, but, whereas in the silent film the movement or rhythm was simple, in the sound film it is duplex. In the silent film we analyse general movement into two particular kinds—the movement of people or objects within the limits of the shot, and the move-

ment produced by the rhythmical relationship of one shot to another. The rhythm of the whole, however complicated in structure and detail, is simple, in that it appeals to one sense only—it is purely visual just as the rhythm of non-theatrical music is purely aural. It is true that the silent film was accompanied by suitable background music, but this was no more necessary to its intelligibility than it is necessary to see the conductor and the orchestra to make a symphony intelligible. The sound film is like ballet. In ballet the rhythm is neither that of the music nor that of the movements of the dancers, but is the relation of these two streams, one visual and the other aural, to each other; so, in the sound film, the movement of images must always be related to the movement of sound, be it music, dialogue, or incidental noises. If these two movements are not related (and I do not mean merely synchronised) or only related in a casual, haphazard way, the resulting film will not be a true sound film. Perhaps the simplest way to illustrate this is to take an obviously rhythmical subject like a scene from a ballet. It would be perfectly possible to set up the camera in, say, the front of the circle and photograph the scene through from beginning to end whilst, at the same time, recording the music. The result could, at best, be a record of the scene, useful possibly to historians, but of no aesthetic interest because it is, in fact, in no medium at all. If the scene is photographed from more than one angle, the first step has been taken, because it is the essence of the film to be able to change the relation of the audience to the action in a fraction of a second, whereas in the theatre the relation of any given part of the audience to the stage is constant throughout. But though you may arrange your visual fragments in the prettiest possible pattern, and though the dancers within the shots are moving

in perfect synchronisation with the recorded music, you still will not have realised the scene in terms of sound film, because only one of the two kinds of movement has been related to the music. The relation of shot to shot, though possibly perfectly satisfying in itself as purely visual rhythm, is not logically connected with the bar or phrase rhythm of the music. For the scene to be completely expressed, it is not enough for the dancers to move in time with the music, the shots themselves must dance, and they will if the visual 'kick' caused by the cut from one camera angle to another is related to the aural 'kick' of a strong beat, either by exact coincidence or calculated antithesis. Ballet was only chosen as an example because it is a clear case of aural and visual rhythms in combination. The underlying principle of the 'kick' on the eye to the 'kick' on the ear remains equally true for the most ordinary dialogue scenes. Speech, though it is not metrical, has just as defined a rhythm as music. For example: two men are quarrelling; they are on opposite sides of a table; one man says: 'No, I tell you! No! No! NO!' As he says the final 'no!' he crashes his fist down on to the table. If, at this moment, we cut to a close-up of the man with the camera on table level so that the fist crashes right down into the lens of the camera, then visual 'kick' and aural 'kick' will coincide, each enhancing the other; and here, be it noticed, the cut is always more effective if it be made to the sound rather than the sense of the dialogue, where the peak of the one does not happen to coincide with the keyword of the other. Now, such cuts are all very well for moments of great emphasis, but would become tedious and jerky in long dialogue scenes. Where every dialogue point is underlined by a cut it would be open to Debussy's criticism of the Wagnerian *leitmotiv*. Wagner's characters, he said, never seemed

able to speak to each other without, at the same time, exchanging visiting cards; but there is another way—the *legato cantabile* way. It is possible for the director, in a dialogue scene, so to arrange the action of his characters and movements of his camera that at any given moment during the scene the visual emphasis and the dramatic point, be it of dialogue or physical expression, would coincide without the jerk of an actual cut. There is all the difference in the world between this and the photographed play technique, although a long scene can be done in one shot: the difference lies in the fact that the relation between the play of images and the sequence of sound has been truly imagined at every point. They are indissoluble marriage partners, not casual, indifferent fellow-travellers. The greater weight of sound from the rhythmical point of view will always be at the visual emphasis, but an image takes infinitely less time to make itself intelligible than a sound. There are therefore a greater number of possible visual perspectives in a scene than aural ones, and for general purposes the three simple categories of long shot, medium shot, and close-up suffice for sound, but, just as in silent films it is possible to identify the eye of the audience with that of one of the characters in the film, so in sound films we can identify the ear, and not only the physical ear but the emotional ear, with the ear of the audience. Alfred Hitchcock did it in his first sound film, *Blackmail*. A girl has killed a man by stabbing him with a knife. No one knows she has done it, and next morning she is laying the table for breakfast in the back parlour of her mother's tobacconist's shop. At this moment a neighbour comes in and begins chattering to the girl's mother about 'this awful murder.' 'Of course, dear, I can understand seeing red, hitting a man over the head with a brick, but a knife, well—I don't

think a knife's nice. Do you, dear? I mean—a knife—well, it's not British, if you know what I mean, etc.' All this time the camera has been concentrated on the girl's face as she listens. The woman's voice begins to go out of focus and becomes a blurred stream of sound. Only the word 'knife' cuts through it with a maddening reiteration. The girl reaches for the bread-knife to put it on the table and, suddenly, she finds she can't touch it. In this scene we have been listening through the ears of the terrified girl, just as in *Doctor Caligari* we looked through the eyes of a madman.

To translate the thoughts of the characters into terms of sound is only one farther step. The present writer was shooting a script in which there was a scene where a mother sees her son off to the front; the audience were never shown the actual scene; the parting was conveyed in the following way: the mother returns to her house from the station and starts on her domestic duties, the commonplace routine of going through her household books. A friend is announced, and while the mother is saying, 'I can't possibly see her,' she comes gushing into the room and sits firmly down on the sofa. After a few perfunctory words of sympathy, 'I always say that it's hardest for those who are left behind, etc., etc.,' she begins a long saga about what Mrs. X. said to Lady Y. at the last committee meeting. During this the camera has been creeping up to the mother's face, excluding the friend, and as the friend's face disappears from the screen so her voice fades out, and instead we hear the sound of marching feet followed by all the characteristic noises of a railway station. Suddenly the friend's face comes into the picture and her voice cuts sharply in, 'Don't you agree, dear?' The mother gives a slight start, pulls herself together, and says: 'Oh yes—yes, entirely.' The woman con-

tinues her tinkling flow of small talk and again her voice fades away, and again the thoughts of the mother go back to the station. We hear the slamming doors, the guard's whistle, and the train going away into the distance. Again the woman's beak pokes itself into the picture: 'What would you have done in my place, dear?' The mother makes another effort: 'I—I——.' But it is too much for her and she faints. Throughout this scene the audience has not only been hearing with the mother's ears but thinking with her thoughts. At the moment of fainting they, also, see with her eyes. A series of shots, each lasting a fraction of a second, of what she sees as she falls flash across the screen—the chandelier, a china dog on the mantelpiece, part of the woman's hat—and with these images was combined the attempt to translate into sound the nauseous buzzing in the ears of a fainting person —a long-held note on the lowest open string of the 'cello with the sharp crescendo and decrescendo, a long-held note on the piccolo, and, at the moment of the fall, a single high pizzicato note on the violin, and simultaneously a major seventh on the piano in the top octave. This is not 'background' music nor realistic sound, but is a kind of sound metaphor, and sound metaphor can be used just as effectively as visual metaphor, and it can be combined with it. For example: it would be possible to take a shot of a *prima donna* singing, 'Caro nome,' and cut in with it shots of a goldfish opening and shutting its mouth. It would then be possible to distort the soprano's voice into the clucking of a hen while preserving the shape of the melody. We should then have the image of a goldfish singing with the voice of a hen, which might be an admirable summing up of that particular *prima donna*. Finally, just as in the silent film at moments of great intensity we saw it was possible to use visual metaphor for dissolving the

particular dramatic emotion into something lyrical and universal, so in the sound film music can be used —not as background music, the pleasant emotional wash which helps the general mood—but as a substitute for speech, where the mood and emotion to be expressed need nothing less intense or less precise. Mendelssohn pointed out in a letter that the emotional content of a piece of music cannot be translated into words, not because music is vaguer and more indefinite, but because it is so exact that it cannot be defined by anything so ambiguous as language. Music in such cases becomes a metaphor of speech.

These seem to me the main lines along which the Tenth Muse has travelled in her search for self-expression. If she rarely achieves it that is the fault of her priests and acolytes. She herself can, with justice, I believe, claim at any rate a foothold on Mount Parnassus.

ANTHONY ASQUITH, *The Penguin Film Review, I*

THE NATURE OF TELEVISION

TELEVISION takes its place beside the great developments of the twentieth century—alongside atomic energy and supersonic flight. The British, as usual, have approached its use with a slow wariness. America, as usual, has rushed at it headlong, and then set her sociologists and psychologists the task of attacking it tooth and nail. Horrifying statistics are produced—that children aged five and six are the most consistent viewers, with an average of four hours a day, and that whole towns have stopped work for days on end to watch televised trials!

I have described television elsewhere as 'seeing by remote control.' Man has always been able to see as far as the horizon, and he increased his immediate

powers of vision with instruments like the microscope and the telescope. Then by means of the recording instrument of the motion picture camera he brought pictures back 'alive' from places beyond his immediate horizon. Now his eyes have conquered space. Through the television camera he can watch the visible world beyond the horizon.

The television camera is not a camera in the proper sense. It does not record and store an image like the motion picture or still picture camera. Rather it reflects an image like a mirror. The image dies the moment it has been seen, just as the broadcast sound dies as soon as it is heard. The broadcasters in sound alone can record their work for subsequent use and study, usually on disc or tape, and the image on the television screen can be recorded on film. These picture records are called telefilms or kinescopes. They can, of course, be retransmitted on television like ordinary films. This enables a television programme to be repeated just as it originally appeared when put over 'live' to the audience.

Television is operating now in about a dozen countries, and preparations for future services are progressing in several others. The high cost of construction and maintenance of television stations hinders its rapid development as a universal public service like sound broadcasting. It requires considerable capital investment to initiate a television service—about ten times as much money is required for capital equipment as compared with sound radio, and three times as much for maintenance. It is obvious that the simplest television programme will require much more work from both artists and technicians than a sound broadcast. The great radio networks in the United States possessed the necessary capital, and from 1946 developed American television at a phenomenal rate, at the same time stampeding the ad-

vertisers into paying for it. Only by 1951 did American television as a whole begin to show a profit. In Britain, the BBC has had to subsidise the slow development of our single national television channel.

Once television is established internationally it will immediately press forward the next stage in the revolution in human communications which is characteristic of the twentieth century. Up to the nineteenth century, virtually all communications were based on *words*, either spoken or written. Words are symbolic noises which mean different things to different people even when they are supposed to speak the same language; they mean only what the experience of speaker and hearer share in common. This is particularly true of abstract words, as everyone recognises. Hence the most crucial of all communications, education, has always suffered from the problem of making the meaning of words even relatively clear, especially as between adult and child, cultured and uncultured.

With the photograph, both still and in motion, the birth of a new age of education and communication through pictures began. It was and still is delayed to a certain extent by sound radio, which made us rely once more upon the resources of words. But television is about to throw into the scales the overwhelming weight of its influence in favour of pictorial communications. While the higher thought of advanced human minds will remain mostly a matter of words and written symbols, the learning process of less developed people will undoubtedly be conducted in future at least as much by pictures as by words. The majority of people absorb knowledge more easily and more quickly by observation than they do by other means, though we must not overlook the fact that to observe something is not the same thing as understanding it. But only those with a special

aptitude for using and enjoying words realise their significance in the hands of poets and great writers.

This immediately brings up the question of the relationship between sound radio and television. It is as foolish to conclude that television will eventually oust sound radio as it would have been to have assumed that fiction films would eventually oust stage drama.

There are, however, many complications in the relationship of sound radio to television. These complications are social, economic, and aesthetic. Among the social factors is the normal demand television makes on the undivided attention of the viewer. Television, therefore, is a means of communication which is only suitable for the less occupied hours of life. A great deal of radio, on the other hand, permits divided attention, and is useful therefore to the housewife, the routine worker in the factory, or the man who wants to do a manual job when he gets home at night. Socially speaking, there is a place for both kinds of broadcasting service in the home, the service which is completely absorbing and the service which is less absorbing, like programmes of light music or discussions and talks to which you can listen whilst you sew or mend the electric kettle.

Among the economic factors which complicate the relationship between sound and television broadcasting, is the comparative cheapness of putting out programmes in sound alone in contrast to television programmes. This means that sound radio can afford to produce a much wider range of programmes catering for all measures and kinds of taste than television will be able to do at any foreseeable stage in the future. In times of emergency or crisis sound radio is the quickest and simplest medium for giving news or instructions to the public. Indeed, if television were permitted entirely to oust sound radio, the loss

would be irreparable. Minority tastes would be the first to suffer. The range of drama would be narrowed; so would talks and discussions, documentary programmes, and outside broadcasts. A great deal of the fine experimental programmes to be found in the schedules of the Third Programme would inevitably be lost to broadcasting. Among the aesthetic factors which affect the two forms of broadcasting is the obvious point that many programmes which people enjoy can be more suitably and conveniently broadcast in sound alone. This is true of many talks, discussions, concerts, news bulletins and announcements, and of many forms of variety and drama which are designed for the ear and not the eye. Sound broadcasting has produced work as unique as Louis MacNeice's poetic play *The Dark Tower* and as *ITMA*, and many other productions which belong to sound and to sound alone.

Television will have to sort out its relations with the film as well as with sound radio. This is not a simple matter, for the film and television are too much alike in many respects to escape a certain amount of overlapping.

. . . . . .

Entertainment televised into people's homes has, like sound broadcasting, special difficulties to overcome. There is no means of conditioning the audience to make them receptive, as they are in the theatre and cinema. There is no mass excitement, no real tension of waiting for the curtain to rise. The show, whatever it is, must conquer the dispersed, unkeyed attention of people at home. It is, of course, quite capable of doing this, but the technique of writing and production must take account of this limitation. The size of the screen also alters the nature of the presentation of the show.

Nevertheless, certain kinds of film made for the

public cinemas are successful on the small screen at home. This is especially true of the more intimate, psychological kind of film, like *Of Mice and Men*, which the BBC has televised more than once. But, broadly, it is recognised that if television is to rely on filmed as distinct from live entertainment (and the tendency is in this direction, especially for drama), then for both artistic and economic reasons it will be necessary to make special kinds of film for television, shot in a form to suit the small screen and presented in a style suitable for the audience at home. Also, in the case of certain kinds of live programme, especially important outside broadcasts, kinescopes made during the transmission will enable repeat transmissions to be given which will retain something of the unpolished freshness characteristic of the direct observation of an unrehearsed event.

The economics of television are one of its greatest problems. Many artists who refuse to take the risk of making an ineffectual appearance in live television or who are normally not available to appear during the peak hours of evening viewing, would be prepared to be recorded on film for television. In fact, the production of films for television is rapidly growing up as an important branch of general film production. The fact that many of the films at present being produced for television are reminiscent of the worst pre-war British quota quickies, should not blind us to certain advantages which are to be gained both by pre-recording television productions on film and producing special films for television, though in doing this we lose one of television's most characteristic qualities, the freshness and the 'immediacy' which belong to the live show.

We must, however, recognise that films made cheaply and quickly will become an increasing part of the television output. It stands to reason that a film

which will be used a limited number of times only on certain television channels will never command a rent comparable with that which comes from world distribution on the cinema circuits. Production costs for a first feature film for the cinemas can normally top a hundred thousand pounds, and many films have cost five and even ten times this amount to produce. Such sums are senseless as far as television is concerned. Simpler methods of production than those developed for cinema films, with much less elaboration in sets, location work and casting and in the range and detail of the action shown, must satisfy the television audience. The central problem of television in every country is to maintain continuous or semi-continuous daily programmes and keep the cost which so much production represents within the income to be derived either from the contributions of sponsors or from viewers' licence fees. More money will become available through the international exchange of kinescopes and special television film productions, but formidable union opposition at present affects the use of kinescopes except within very strict limits. But even allowing for this, the problem of meeting costs will always affect this branch of production, since television must by the nature of the case continuously find new material for its daily screenings at budgets far below those to which even documentary film-makers have been used.

One method of solving the problem of programme costs which is being developed is subscription television. The principle of this system is that a viewer cannot receive a particular programme unless he pays for it on an individual basis. This can be done by requesting it over the telephone, or by other means through which the viewer makes his choice known and so consents to pay his dues. It is claimed by one of the pioneer companies working on subscription

television, Phonevision of Chicago, that film-makers or, for that matter, producers of live shows, could command through a nation-wide system of subscription television as much in rentals for their work as a film could normally be expected to earn through release to the cinemas. That, I believe, would only be the case with a product which had been very well publicised, and a great deal of publicity in show business depends on the momentum of the show's own success as it is repeated night after night in theatre or cinema. Phonevision's big hits would be permitted a restricted number of performances because of the limited number of channels through which they would be made available. There is also the problem that television needs far more good small shows than big entertainment events, because it is a semi-continuous service. Subscription television would by-pass the main work of television, for people would not normally subscribe for small-scale shows. On the other hand, subscription television would be admirable for repeats on television of big films which have made their first impact on the public through the cinemas, and for automatically publicised shows like the major sporting events. It seems, in other words, that subscription television, once it has overcome its considerable technical problems, could assist television to promote the more exceptional kind of entertainment, and to this it adds the advantage of revealing what the public's choice really is by creating a parallel to the cinema's box-office.

All these matters are of interest and possibly of profit to the film-maker, who must eventually make his own decision as to the ratio of production he will undertake for the screens of the cinema and television. But the film producer is not always in a position to do this. His contractual obligations as well as the goodwill behind his relations with the film ex-

hibitors and distributors may not make it worth his while to risk their hostility if he tries to work for the cinema's most formidable competitor. For although cinema attendance in Britain has not been mortally affected by the slow progress of television with a single programme over the country (the drop in attendance is about ten per cent), the rapid expansion of television in the United States has very seriously affected the cinema. Because of this, the cinema industry has refused to co-operate with those responsible for television, although many film producers and film stars who are free to do so have begun to work for television in America. Most films have been withheld from television screens, except those which have no further use at all at the box-office. The Newsreel Association in Britain, after a period of co-operation with the BBC before the war, refused to co-operate afterwards, with the result that the BBC has built up its own newsreel service which both in speed and quality has out-moded the more shallow and conventional of the newsreels produced for the cinemas. The cinema industry cannot hope to put the clock back by refusing its co-operation.

The true relationship of the cinema to television will have to be worked out during the next ten years. The cinemas have deliberately catered for what they regard as the taste of the majority, in spite of the significant success scored by certain films, from *Birth of a Nation* to *The Third Man*, which show a taste in large audiences for the more unusual kinds of film-making. Specialised cinemas showing foreign language films have also had success with films which demanded a quality of response from audiences on a level with that required by the best work in the live theatre. Television, once it is universal or nearly universal in our homes, will give the great majority of people a second form of entertainment based on a

constant change of appeal to their eyes. They will no longer be dependent on the cinema alone for this kind of amusement. They will gradually become more discriminating in their choice of the films for which they must, after all, pay to see. The form of discrimination will not necessarily be for better films, but it will be for films which have qualities of showmanship and drama which are outstanding enough to draw people, especially young people, from the attraction of the free, or virtually free, show going on at home. The cinemas, too, have the advantage of offering people a night out at a relatively cheap rate. It will, in my view, pay both producers and exhibitors to aim at a higher quality of entertainment than they normally have done in the past, for they will now find it necessary to aim at appeal to the whole population, instead of merely to the less educated majority. There are probably ten million adults in Britain who seldom or never go to the cinema. Many of these would go more often if the quality of films shown were generally better than it is at present. The cinemas faced with the competition of television will need the patronage of these extra millions whom they have too often neglected in the past.

The future of television in Britain will see the introduction of alternative programmes, of sponsored programmes, and televised programmes in cinemas. We shall obtain an ever-widening interchange of television between different countries. On the technical side we shall see programmes in colour, sets capable of projecting a larger picture on to a screen which is independent of the set itself, and, of course, the third dimension. Portable television cameras already exist which enable a cameraman to walk about televising what he sees as he moves; this is called in America the creepie-peepie. In fact in

the future we may wear receiving-sets on our wrists and talk to each other on televisual telephones. There seems to be no end to the monotony of our future lives as they become increasingly controlled by the inventive genius of our technicians and engineers.

ROGER MANVELL, *On the Air*

NOTES

What Civilisation is not. From 'Civilisation,' by Clive Bell.

P. 3, l. 11. *Westermarck:* Edward Alexander Westermarck (1862–1939), a distinguished Finnish scientist, Professor of Sociology at London University, 1907–1930. His 'History of Human Marriage,' written in English, was published in 1891.

l. 24. *And many make a practice of eating him:* The idea that the properties of a god are acquired by eating him is widely spread among savage races. It explains sacrificial cannibalism practised in many parts of the world.

P. 4, l. 7. *Andaman Islanders:* the Andamans are a group of islands on the eastern side of the Bay of Bengal. The islanders are pygmy savages, fond of children, and kind to their wives.

Veddahs: the wild Veddahs of Ceylon, though one of the lowest races of mankind, lived in single pairs, building their huts in trees. The family was the basis of their society.

ll. 13–14. *Those notoriously civilised ages of Tang and Sung:* Chinese architecture and all other branches of art reached their greatest heights during the Tang and Sung Dynasties, A.D. 618–1260.

P. 5, l. 5. *Karok:* a Californian tribe which practises monogamy.

l. 10. *Kar Nicobar:* the Nicobars are a group of islands in the Bay of Bengal. The islanders are strictly monogamous.

l. 18. *Igorrotes of Luzon:* Luzon is one of the Philippine Islands.

l. 23. *Plato advocated communism in women:* In the 'Republic,' Plato, the Greek philosopher, would have the State assume the task of distributing the women amongst the men, but at the same time he puts them in a position of perfect equality.

l. 24. *Alcibiades:* (450–404 B.C.) was a celebrated Athenian statesman and soldier, a pupil and friend of the philosopher Socrates.

l. 25. *The court of Hadrian:* Hadrian (A.D. 76–138) succeeded his uncle, Trajan, and was Roman emperor from 117 to 138. He was one of the wisest of Roman rulers, and a great patron of art.

The Medici gardens: The illustrious Medici family were rulers of Florence from 1434, and Grand Dukes of Tuscany from 1569 to 1737. The earlier Medici cultivated and fostered art and literature, and many artists met at the court and in the gardens of Cosimo (1389–1464) and Lorenzo 'the Magnificent' (*c.* 1449–1492).

l. 26. *Voltaire:* François Marie Arouet de Voltaire (1694–1778), one of the foremost French philosophers and writers ; and, in his day, one of the leaders of free thought everywhere.

Helvétius: Claude Arien Helvétius (1715–1771), a French philosopher and writer who insisted upon the importance of culture in national development.

Diderot: Denis Diderot (1713–1784), French philosopher, dramatist, and critic. He is chiefly remembered as one of the founders (with d'Alembert and Helvétius) of the 'Encyclopédie.'

P. 6, l. 4. *Naudowessies:* a tribe of North American Indians.

l. 27. *Panchatantra:* a collection of Hindu fables of the sixth century B.C.

l. 29. *Democritus of Abdera:* a famous Greek philosopher, born at Abdera in Thrace about 460 B.C. He put forward the theory, confirmed and developed by recent scientific discovery, that the world consisted of a collection of atoms.

l. 32. *Cyrenaics:* a school of Greek philosophy, said to be founded about 400 B.C. by Aristippus of Cyrene, a Greek colony in North Africa, who held that pleasure was the highest good in life.

Cynics: a school of Greek philosophy founded by Antisthenes, the pupil of Socrates, in the fourth century B.C. The Cynics held that virtue was the only good.

l. 34. *Stoic cosmopolitanism:* The Stoics were the followers of Zeno, a Greek philosopher of the fourth century B.C. They believed that it was man's duty to accept calmly whatever fate might bring, and to be at home anywhere.

l. 35. *Seneca:* Lucius Annaeus Seneca (*d.* A.D. 65), Roman philosopher, author of nine tragedies, and a famous representative of the Stoic school.

Epictetus: of Hierapolis in Phrygia, a Stoic philoso-

pher of the first century A.D., who taught at Rome the virtues of endurance and abstinence.

Marcus Aurelius: Marcus Aurelius Antoninus (A.D. 121–180), Roman Emperor A.D. 161–180, and religious philosopher ; author of twelve books of 'Meditations' expressing his Stoic philosophy.

ll. 35–37. *'Il est clair qu'un pays ne peut gagner . . . sans faire des malheureux':* 'It is obvious that one country cannot win a war without another country losing it, and it is equally obvious that such a country cannot win a war without making many people wretched.'

P. 8, l. 26. *Professor Ray Lankester:* (1847–1929), British natural historian and biologist.

P. 9, l. 14. *Imperial Institute:* centre for spreading knowledge of the Commonwealth. Erected at South Kensington to commemorate the Jubilee of Queen Victoria, by whom it was opened in 1893.

l. 26. *Mastodon:* large extinct mammal like an elephant.

P. 10, l. 2. *Pismires:* ants.

l. 25. *Russo-Japanese war:* commenced February 8, 1904, concluded September 5, 1905, with Japan victorious.

l. 33. *Fabianism:* the Fabian Society was established in 1883, by British Socialists.

P. 11, l. 33. *Oligarchy:* government by the few.

P. 12, l. 25. *High civility of three different societies:* The three societies Clive Bell refers to are Athens in the time of Pericles ; Italy in the fifteenth and early sixteenth centuries ; and France in the eighteenth century.

British and American Nationalism. By Bertrand Russell.

l. 30. *D-day:* the day the invasion of Normandy began, June 6, 1944.

P. 13, l. 28. *Quasi-biological:* almost a matter of instinct.

P. 14, l. 22. *Lincoln:* Abraham Lincoln (1809–1865) was President of the United States, 1860 to 1865, and political leader of the Northern States in the American Civil War. He is remarkable in expressing the American theory of democracy. The phrase 'dedicated to a proposition' comes from his Gettysburg speech, delivered in 1863.

P. 16, l. 2. *Jefferson:* Thomas Jefferson (1743–1826) was President of the United States, 1801–1809. As a member of the Continental Congresses of 1775–1776, he was largely responsible for the drafting of the Declaration of Independence.

l. 20. *Pilgrim Fathers:* the hundred and one English Puritans, who, after living some years in exile in Holland, sailed to America in 1620 and founded the settlement of Plymouth.

P. 17, l. 24. *Our loss of Singapore:* Singapore surrendered to the Japanese on February 15, 1942.

l. 25. *Their loss of Manila:* Manila surrendered to the Japanese on January 2, 1942.

P. 18, l. 25. *Historicity of the Pentateuch:* The genuineness of the Pentateuch, the first five books of the Old Testament, taken as a connected group and usually ascribed to Moses.

ll. 26–27. *That the Inquisition opposed Galileo:* Galileo Galilei (1564–1642), the Italian astronomer and physicist, made important discoveries which brought him into conflict with the Inquisition (a tribunal of the Roman Catholic Church) ; and in 1633 he was compelled to repudiate the Copernican theory that the earth moves round the sun.

P. 19, l. 3. *Whether Joshua made the sun stand still:* After the death of Moses, Joshua led the Israelites into the Promised Land. The Book of Joshua, chapter 10, verses 12 and 13, describe how Joshua made the sun stand still until the Israelites had defeated the Amorites.

ll. 5–6. *Aristotle's doctrine of the syllogism:* Aristotle (384–322 B.C.), the great Greek philosopher, created Logic, the science of reasoning. The doctrine of the syllogism is a form of reasoning in which from two given propositions (called premises) a third is deduced called the conclusion.

l. 22. *'The Grapes of Wrath':* a novel by John Steinbeck, published in 1939, telling of a family trek from Oklahoma to California, and of labour conditions at that time.

l. 33. *Suppressio veri:* intentional withholding of a material fact.

l. 34. *Suggestio falsi:* making a statement from which, though it is not actually false, the intended inference is a false one.

P. 20, l. 3. *Autonomy:* the right of self-government.

l. 4. *St. Ambrose:* (*c.* A.D. 340–397), a famous bishop of Milan, one of the Fathers of the Church, and a vigorous opponent of anyone who tried to restrict the freedom of the medieval Church.

l. 5. *St. Augustine:* (A.D. 345–430), was converted by the

preaching of Ambrose, bishop of Milan, and became bishop of Hippo. He was skilled in theological argument, wrote numerous works, and set forth in his philosophy the immediate blessings of grace and absolute predestination.

P. 21, ll. 36–37. *Crystallography:* the science of the structure of crystals.

l. 37. *Entomology:* the study of insects.

P. 22, l. 10. *T. S. Eliot:* Thomas Stearns Eliot, O.M. (b. 1888) was born in the U.S.A., and became a naturalised British citizen in 1927. He has been called the poet of disillusionment, and made his name with his poem, 'The Waste Land,' 1922.

P. 23, l. 4. *'Middletown':* a study of a typical American city by R. S. and H. M. Lynd, published in 1929.

l. 24. *Bimetallism:* the system of using both gold and silver as legal tender to any amount at a fixed ratio to each other.

l. 25. *Egyptology:* the study of Egyptian antiquities.

P. 24, l. 27. *Federal Government:* central, as distinct from state, government.

The Queen and the Commonwealth. From 'The Queen's Government,' by Sir Ivor Jennings.

P. 26, l. 26. *The Declaration of Independence:* an Act by which the American Congress, on July 4, 1776, declared the American colonies to be independent of Great Britain.

P. 27, l. 6. *Lord Durham:* John George Lambton, 1st Earl of Durham (1792–1840), went to Canada in 1837 as Governor-General. In 1839 he laid before Parliament his 'Report of the Affairs of British North America', which marks a turning-point in the history of the Empire ; it stated that colonists should govern their country themselves.

l. 29. *Metaphysics:* the science of the mind.

P. 28, l. 23. *Afrikaans:* South African or Cape Dutch.

l. 23. *Urdu:* Hindustani.

Sinhalese: now the usual form of Cingalese, the native language of Ceylon.

l. 24. *Swahili:* the mixture of languages used in East Africa.

l. 27. *Lion of Lanka:* Ceylon was known as Lanka in early times. The lion was the emblem of the Lanka kings.

l. 30. *'Die Stem van Zuid Afrika':* 'The Voice of South Africa,' the National Anthem of South Africa.

l. 30. *'Namo, namo, matha':* 'Mother, I worship thee.' The National Anthem of Ceylon.

P. 29, l. 11. *Joseph Chamberlain:* English statesman (1836–1914). Though he entered Parliament in 1876 as a republican he became an active member of the Liberal-Unionist party ; and was appointed Colonial Secretary in 1895.

P. 30, l. 1. *Amorphous:* shapeless, unorganised.

ll. 6–9. *Queen Victoria had proclaimed herself . . . as Queen-Empress of India:* Queen Victoria was declared Empress of India on January 1st, 1877, when Disraeli was Prime Minister.

P. 31, l. 8. *Pundits:* Hindus learned in Sanskrit and in the philosophy and religion of India ; also learned teachers.

l. 34. *Limehouse:* a parish in Stepney, East London, on the Thames.

l. 35. *Wagga Wagga:* a town in New South Wales, Australia, on the River Murrumbidgee.

P. 32, l. 7. *Facsimile:* an exact copy.

ll. 22–24. *'The King's Service,' said the Duke of Wellington in 1834, 'must be carried on':* Lord Melbourne became Prime Minister on July 14, 1834, and was succeeded by Sir Robert Peel on December 8th. Wellington was Foreign Secretary and acted as Prime Minister while Peel was returning from Rome.

P. 33, l. 35. *Lord Aberdeen:* George Hamilton Gordon, 4th Earl of Aberdeen (1784–1860). He became Prime Minister in 1852 in a coalition government of Conservatives and Liberals. Two years later Britain drifted into the Crimean War.

P. 36, l. 27. *William Ewart Gladstone:* (1809–1898), the great Liberal statesman of the latter part of the nineteenth century. He was Prime Minister four times : 1868–1874, 1880–1885, 1886, and 1892–1894.

ll. 29–30. *Since the age of eighteen:* Victoria (1819–1901) came to the throne in 1837 on the death of her uncle, William IV. She reigned for sixty-four years.

P. 38, l. 2. *Walter Bagehot:* (1826–1877), English economist and journalist. In his important book, 'The English Constitution,' published in 1867, he defines the rights of the monarch.

The Party System. From 'The Intelligent Woman's Guide to Socialism, Capitalism, etc.,' by Bernard Shaw.

P. 39, l. 27. *Labor:* Bernard Shaw favoured this simplified spelling.

P. 40, l. 27. *William the Third:* (1650–1702), while Stadtholder of Holland, married Mary, eldest daughter of the Duke of York (afterwards James II). He led the Dutch against France, and in 1688 when James II had abdicated, William and Mary became joint King and Queen of England. He continued the war against Louis XIV.

l. 33. *Robert Spencer:* 2nd Earl of Sunderland (1640–1702), English Whig politician.

P. 45, ll. 33–34. *Sidney and Beatrice Webb:* Sidney James Webb (1859–1947), an eminent Socialist, one of the founders of the Fabian Society in 1884. He and his wife, Beatrice, were untiring investigators and writers on political and economic affairs.

What is Law? From 'John Citizen and the Law,' by Ronald Rubinstein.

P. 50, l. 3. *'Precedent':* a previous case taken as an example for subsequent cases, or as justification.

P. 54, l. 3. *Litigation:* a contest at law.

P. 55, l. 6. *Utopia:* the imaginary island of Sir Thomas More's ideal state, where life and government were both perfect.

What is Economics about? From 'The Economics of Everyday Life,' by Gertrude Williams.

P. 57, l. 21. *Rayon and plastic clothing:* rayon is artificial silk made from cellulose ; plastic clothing is made from synthetic resins.

l. 31. *Boll weevil:* a small destructive insect which attacks the cotton-plant.

P. 60, l. 27. *Prognosticate:* foretell.

P. 62, l. 21. *Kittle-cattle:* ticklish, difficult creatures.

l. 33. *Free trade:* the principle of trade left to its natural course without customs duties to restrict imports or protect home industries.

l. 34. *Tariffs:* lists of duties or customs to be paid on imports or exports.

History and the Reader. From 'An Autobiography and other Essays,' by G. M. Trevelyan.

P. 65, l. 34. *Housesteads:* a Roman station on the Roman Wall in Northumberland, six miles from Haltwhistle.

P. 68, l. 2. *Hedonistic escapism:* an escape into the belief that pleasure is the chief good in life.

l. 30. *Mutability:* being liable to change.

P. 69, l. 29. *Bismarck's day:* Prince Otto Eduard Leopold von Bismarck (1815–1898), the most prominent and capable of the German statesmen of the nineteenth century. His military ideals and policy of 'blood and iron' achieved much for Prussia.

l. 36. *Tartar and Teuton invasion:* the Tartars were an Asiatic race who overran parts of Europe in the thirteenth century. The Teutons were the Germanic peoples.

P. 70, l. 7. *Mr. Ford:* Henry Ford (1863–1947), founder of the Ford Motor Company, 1903, of which he was President until 1919. He is reported to have said, 'History is bunk,' in the witness-box during his libel suit against the 'Chicago Tribune', July 1919.

P. 71, l. 5. *Hundred Years' War:* a term applied to the almost incessant war between England and France from 1338 to 1453.

l. 21. *Partis pris:* preconceived views, prejudices.

P. 74, l. 9. *Lecky's works:* William Edward Hartpole Lecky (1838–1903), an eminent historian, whose best-known works are the 'The History of European Morals from Augustus to Charlemagne' and 'The History of England in the Eighteenth Century.'

A New Elizabethan Age? From 'An Elizabethan Garland,' by A. L. Rowse.

P. 76, ll. 16–17. *Vasari's 'Lives of the Painters':* Giorgio Vasari (1511–1574), an Italian painter, architect and author, is remembered for his 'Lives of the most excellent Architects, Painters and Sculptors,' dealing with the famous Italians.

l. 20. *Marlowe:* Christopher Marlowe (1564–1593), Elizabethan dramatist, author of 'Tamburlaine the Great,' 'Dr. Faustus,' 'Edward II,' and 'The Jew of Malta.'

Spenser: Edmund Spenser (1552–1599), Elizabethan poet, whose masterpiece was 'The Faerie Queene.'

l. 21. *Donne:* John Donne (1573–1631), poet and divine, a leading figure of the 'Metaphysical School.'

Bacon: Francis Bacon, Lord Verulam (1561–1626), English philosopher, statesman and author.

l. 22. *Ben Jonson:* (1573–1637), a friend of Shakespeare, one of the major poets and dramatists of his age.

ll. 23–24. *Gabriel Harvey:* (1545–1630), author of satirical verses ; he showed his limitations as a critic by condemning 'The Faerie Queene.'

l. 24. *Daniel:* Samuel Daniel (1562–1619), the English poet. His critical work includes the 'Defence of Rhyme,' published in 1602.

l. 24. *Campion:* Thomas Campion (d. 1619), an English lyric poet. In 1602 he published his 'Observations in the Art of English Poesie.'

P. 77, l. 11. *Kipling:* Rudyard Kipling (1865–1936). His fame rests on his superb short stories dealing with India, the sea, the army, and many other subjects ; on his novels ; and on his verse which is variously judged, and as diversified in subject as his tales.

l. 29. *Philip Sidney:* (1554–1586), statesman, poet, courtier and soldier. Author of 'Arcadia' and 'The Defence of Poetry.' He was mortally wounded at Zutphen ; despite his sufferings, he passed a cup of water to another wounded man, saying, 'Thy necessity is greater than mine.'

l. 30. *Alun Lewis:* (1916–1944), poet and prose writer. He enlisted in the army in 1939 and served in England and India. He was accidentally killed.

l. 30. *Edward Thomas:* (1878–1917), poet and author of books on the English countryside. He served in the First World War, and was killed in action at Arras.

Rupert Brooke: (1887–1915), poet whose fame was especially secured by five war sonnets published a few months before his death in the First World War.

l. 31. *Falkland:* Lucius Cary, second Viscount Falkland (1610–1643), patron of literature and scholarship, statesman and soldier. He was killed at the battle of Newbury.

John Hampden: (1594–1643), statesman and soldier. His refusal in 1636 to pay Ship Money made him a national figure. He opposed Charles I in the Civil War, and was killed at the skirmish of Chalgrove Field.

ll. 34–35. *Francis Drake:* (1545–1596), Elizabethan sea-captain. He was the first Englishman to sail round the globe. He showed his daring by the raid on Cadiz in 1587, and by harassing the Armada in 1588.

P. 78 ll. 32–33. *Mere cerebration:* mere working of the brain.

P. 79, l. 13. *Balzac:* Honoré de Balzac (1799–1850), author of the remarkable collection of romances 'La Comédie humaine' in which he tried to represent faithfully and minutely the whole complex system of French society.

l. 13. *Stendhal:* pseudonym of Henri Beyle (1783–1842), author of 'Le Rouge et le noir' and 'La Chartreuse de Parme,' which had a notable influence on the development of the psychological French novel.

l. 14. *Flaubert:* Gustave Flaubert (1821–1880), famous French novelist, author of 'Madame Bovary.'

George Eliot: (1819–1880), the pseudonym of Mary Ann Evans, distinguished novelist, whose works are noted for their accuracy of descriptive detail.

l. 15. *Trollope:* Anthony Trollope (1815–1881), prolific novelist of English clerical and political life.

Brontës: the three novelist sisters : Charlotte (1816–1855), Emily (1818–1848), and Anne (1820–1849).

Hardy: Thomas Hardy (1840–1928), author of the impressive series of 'Wessex Novels' and many memorable poems.

Meredith: George Meredith (1828–1909), English novelist and poet.

l. 16. *Conrad:* Joseph Conrad (1857–1924), a naturalised Pole, who became one of the greatest English novelists of the sea.

Hugo: Victor Hugo (1802–1885), the leading French romantic poet, novelist, and playwright of his day.

Gautier: Théophile Gautier (1811–1872), French critic, novelist and poet.

Goncourts: Edmond Huot de Goncourt (1822–1896), and his brother Jules (1830–1870), French authors.

l. 17. *Daudet:* Alphonse Daudet (1840–1897), French novelist.

Maupassant: Guy de Maupassant (1850–1893), French novelist and short-story writer.

l. 18. *Henry James:* (1843–1916), American novelist who settled in Europe from 1869 onwards, living chiefly in London and at Rye in Sussex. In 1915 he became a naturalised British subject.

Edith Wharton: (1862–1937), American novelist whose work was greatly influenced by her friend, Henry James. She spent a good deal of her life in Europe.

l. 25. *Pushkin:* Alexander Sergievich Pushkin (1799–1837), the first national poet of Russia.

Gogol: Nikolai Vasilievich Gogol (1809–1852), Russian novelist and satirical writer.

Turgeniev: Ivan Sergievich Turgeniev (1818–1883), one of the most pleasing and influential of Russian novelists.

Dostoievsky: Feodor Michaelovich Dostoievsky (1821–1881), Russian novelist of intense dramatic power and insight.

l. 26. *Tolstoy:* Count Leo Nikolaevich Tolstoy (1828–1910), Russian novelist, and one of the great writers of the world.

Chekhov: Anton Pavlovich Chekhov (1860–1904), Russian dramatist and short-story writer.

Alexander Blok: (1880–1921), the foremost Russian symbolist poet.

l. 33. *Father Sergius:* a character in one of Tolstoy's tales.

P. 80, ll. 4–7. '*Come, bombs, and blow to smithereens . . .*' these lines are from John Betjeman's poem 'Slough.'

ll. 9–15. '*In the land of lobelias and tennis flannels . . .*' these lines are spoken by the 2nd Male Voice in the Chorus of T. S. Eliot's poem 'The Rock.'

l. 24. *Cervantes:* Miguel de Cervantes Saavedra (1547–1616), Spanish novelist and dramatist, author of 'Don Quixote.'

l. 25. *Milton:* John Milton (1608–1674), Puritan poet, author of 'Paradise Lost.' Supported Parliament in the Civil War, and in 1649 was appointed Latin secretary to the newly formed Council of State.

l. 33. *Drayton for his 'Polyolbion':* Michael Drayton (1563–1631) completed his most famous poem, 'Polyolbion,' in 1622. It deals with the fame and natural beauties of England.

l. 35. *Samuel Daniel:* (1562–1619), his epic poem, 'Civil Wars between the two Houses of York and Lancaster,' in eight books, was published in 1609, and is marked by a strong patriotism.

Hakluyt's spreading canvas: Richard Hakluyt (1553–1616) lectured on cartography at Oxford, became geographical adviser to the East India Company, and was an original member of the Virginia Company. His chief work is his invaluable compilation, 'The Principal Navigations, Voyages and Discoveries of the English Nation' (1589–1600).

P. 81, l. 3. *Froude:* James Anthony Froude (1818–1894),

Regius Professor of Modern History at Oxford, 1892–1894.

l. 20. *Sir Charles Oman:* (1860–1946), English historian, Chichele Professor of Modern History at Oxford, 1905–1946.

l. 33. *Strachey:* Giles Lytton Strachey (1880–1932), distinguished man of letters ; author of 'Eminent Victorians,' 'Queen Victoria,' and 'Elizabeth and Essex.'

Virginia Woolf: (1882–1941), novelist and critic, author of 'Mrs. Dalloway,' 'To the Lighthouse,' 'The Waves.'

l. 34. *D. H. Lawrence:* (1885–1930), novelist and poet ; among his novels are 'Sons and Lovers,' 'The Rainbow,' and 'Aaron's Rod.'

l. 34. *Eliot:* See previous note (p. 22, l. 10).

P. 82, l. 23. *Turner:* Joseph Mallord William Turner (1775–1851), with Constable, the foremost of English landscape painters. He acquired a high reputation amongst his contemporaries, owing largely to Ruskin's ardent support. Turner is unrivalled as a water-colour artist.

l. 24. *Elgar:* Sir Edward Elgar (1857–1934), English composer, and Master of the King's Musick, 1924–1934.

l. 25. *Delius:* Frederick Delius (1862–1934), one of the finest English composers since Purcell.

Vaughan Williams: Ralph Vaughan Williams (1872), distinguished English composer, noted for his choral works.

Walton: Sir William Turner Walton (1902), English composer whose works include the coronation march, 'Crown Imperial.'

l. 26. *Benjamin Britten:* (1913), composer of a variety of music, including 'Spring Symphony' and the operas 'Peter Grimes,' 'Billy Budd,' and 'Gloriana.'

l. 27. *Purcell:* Henry Purcell (1658–1695), a celebrated organist and composer ; the most famous of a family of notable musicians.

l. 29. *Epstein:* Sir Jacob Epstein (1880), famous sculptor, whose work includes 'Rima' in Hyde Park, 'Genesis,' 'Lazarus,' and the 'Madonna and Child' group.

Henry Moore: (1898), artist and sculptor, famous for his groups of figures.

l. 30. *Proliferation:* rapid growth.

P. 83, ll. 28–33. '*And who in time knows whither we may*

vent . . .' from Samuel Daniel's poem 'Musophilus, or Defence of all Learning.'

Britain's Changing Face. From 'The Times.'

P. 84, l. 16. *Jeremiah:* a doleful prophet, one who denounces the age he lives in.

P. 85, l. 6. *Cobbett:* William Cobbett (1763–1835), farmer, politician, and author. His 'Rural Rides,' collected in 1830, are to-day the most interesting of his writings. The book describes various parts of England, with agriculture and political comments.

l. 7. *Hindhead:* a hilly common near Haslemere in Surrey.

P. 87, l. 5. *St. Michael's Mount:* an island three miles east of Penzance in Cornwall.

l. 10. *Meredith:* See previous note (p. 79, l. 15). In 1867 he settled for life at Flint Cottage, facing Box Hill, a part of the North Downs, near Dorking, in Surrey.

Galileo and Scientific Method. From 'The Scientific Outlook,' by Bertrand Russell.

P. 92, l. 16. *Freudian theory:* Sigmund Freud (1856–1939), the inventor of psychoanalysis, attached great importance to dreams, as is shown in his book 'The Interpretation of Dreams,' published in 1900.

P. 93, l. 13. *Tergiversations of eminent craniologists:* the making of conflicting statements by those who study the structure of the skull.

l. 33. *a priori:* from cause to effect, deductively.

P. 94, l. 17. *Copernican theory:* Nicolaus Copernicus (1473–1543), Polish astronomer, whose theory was that the sun is the centre of our astronomical system, and the planets move round it.

l. 20. *Archimedes:* (287–212 B.C.), a famous mathematician and scientist of Syracuse. He devised for Hieron, King of Syracuse, engines of war which almost terrified the Romans, and which drew out the siege of Syracuse for three years. He also invented a machine for raising water known as Archimedes' screw.

l. 21. *Aristarchus of Samos:* an eminent astronomer and mathematician who lived about 280 B.C.

P. 95, ll. 4–5. *Eratosthenes the Geographer:* a Greek geographer and mathematician, living about 235 B.C., whose map of the ancient world was the first to contain lines of latitude and longitude. His calculation of the earth's circumference has an error of less than two hundred miles.

l. 5. *Stadia:* the plural of stadium, the Greek measure of length, about 202 yards.

l. 9. *Leonardo da Vinci:* (1452–1519), Italian painter, sculptor, architect, musician, scientist, and engineer. He was employed at one time at Milan by Lodovico Sforza as state engineer to design instruments of war.

l. 33. *Statics:* mathematical study concerned with bodies at rest or forces in equilibrium.

P. 96, l. 14. *Alexandria:* This Egyptian port was captured by the Mohammedan Arabs in A.D. 641.

l. 22. *Philosopher's stone:* Alchemists tried to discover this, which was supposed to change the baser metals into gold.

l. 22. *Elixir of life:* a chemical combination that was to prolong existence indefinitely.

l. 27. *Roger Bacon:* (1214–1294), English philosopher, scientist, and Franciscan friar, who may be considered the founder of experimental science. Optics, explosives, engines, and mechanical flight came within the range of his researches.

l. 37. *Montaigne:* Michel Eyquem de Montaigne (1533–1592), French writer and essayist, a man of insatiable intellectual curiosity. He asked the famous question, 'Que sais-je?'

P. 97, l. 3. *Rabelais:* François Rabelais (1494?–1533), the French humanist, satirist and physician. He was a pioneer of enlightenment.

l. 4. *'Fais ce que voudras':* 'Do what you like.'

l. 17. *Kepler:* Johann Kepler (1571–1630), German astronomer. His three laws of planetary motion are: (1) the orbit of each planet is an ellipse with the sun at one of the foci; (2) the radius vector of each planet describes equal areas in equal times; (3) the squares of the periods of the planets are proportional to the cubes of their mean distances from the sun.

l. 26. *Epicycle:* a small circle rolling on the circumference of a larger one.

P. 98, l. 15. *Quantitative laws:* laws dealing with measurement.

l. 25. *Gamin:* Street arab.

P. 99, l. 21. *Einstein:* Albert Einstein (1879–1955), German-Swiss physicist, famous for his theories of Relativity. In 1913 he took up a specially created post as director of the Kaiser Wilhelm Institute for Physics in Berlin.

P. 100, ll. 12–13. *Ptolemaic system:* Claudius Ptolemy

(second century A.D.), astronomer and geographer. The Ptolemaic system, which was not superseded by the Copernican system until 1453, assumed that the earth was the fixed centre of the universe with the sun, moon, planets, and stars moving round it.

l. 31. *Eppur si muove:* 'and yet it [the earth] moves.' Galileo is said to have murmured these words after his recantation in 1633, when the Inquisition compelled him to repudiate the Copernican theory. See previous note (p. 18, ll. 26–27).

P. 101, l. 29. *Syllogism:* See previous note (p. 19, ll. 5-6).

The Duty of Doubt. From 'Possible Worlds,' by J. B. S. Haldane.

P. 103, l. 13. *Sceptic philosophers:* The Sceptics were a sect of philosophers founded by Pyrrho (*c.* 360–275 B.C.), in Greece. Their philosophy was one of dogmatic doubt.

l. 25. *Harvey:* William Harvey (1578–1657) expounded his theory of the circulation of the blood to the College of Physicians in 1616.

l. 32. *Newton:* Sir Isaac Newton (1642–1727), philosopher, mathematician, and scientist.

P. 104, ll. 31–32. *Homogeneous moral tradition:* a uniform moral tradition.

P. 107, ll. 2–3. *Conduction in nerves:* transmission of sensations through the nerves.

P. 108, l. 30. *Kaiser:* German Emperor, William II (1859–1941).

l. 31. *Ku Klux Klan:* a secret political organisation in the Southern States of America active against the negroes after the Civil War.

P. 109, l. 37. *Athanasian Creed:* one of the three ancient creeds of the Christian Church: a statement of the doctrine of the Trinity and the Incarnation. It is named after St. Athanasius.

P. 110, ll. 12–13. *Christian Science:* the interpretation of the Christian religion by Mary Baker Eddy. The prevention and cure of disease by faith-healing play a large part in the practice of Christian Science.

l. 13. *Therapeutically:* by means of the healing art.

l. 32. *Robespierre:* Isidore Maximilien de Robespierre (1758–1794), a prominent figure in the French Revolution, and one of the promoters of the Reign of Terror. Carlyle in his 'French Revolution' called him the 'Sea-green Incorruptible.'

l. 33. *W. J. Bryan:* William Jennings Bryan (1860–1925), American politician who worked for international peace and social reform, and was a brilliant orator.

P. 112, l. 23. *Plato:* (428–347 B.C.), the great Greek philosopher. He embodied his views in the 'Dialogues' in which Socrates appears, conducting the discussions.

P. 113, l. 5. *Dante:* Dante Alighieri (1265–1321), Italy's first national poet, author of 'The Divine Comedy,' the most sublime epic poem of the Age of Faith.

Phidias: the greatest of Greek sculptors, flourished from about 500 to 432 B.C. He constructed the Propylaea and the Parthenon, and the huge statue of Zeus at Olympia. The enemies of his patron, Pericles, brought about his downfall, and he died in prison.

l. 20. *Pragmatism:* the doctrine in philosophy that judges everything by its practical application to human interests.

l. 23. *James:* William James (1842–1910), American philosopher ; he rejected the idealistic school of Kant and Hegel, and as a pragmatist maintained that abstract ideas are true if 'they work,' and fit in with our other experience.

P. 114, l. 9. *Royal Society:* received its charter as the Royal Society in 1662.

Life in the Universe. From 'Man is a Microcosm,' by J. A. V. Butler.

P. 114, l. 26. *Galaxy:* an immense cluster of stars.

P. 115, l. 1. *Jeans:* Sir James Hopwood Jeans (1877–1946), a brilliant mathematician and astronomer, author of many books including 'The Universe Around Us,' 'The Mysterious Universe.'

l. 30. *Hoyle:* Fred Hoyle (1915), university lecturer in mathematics at Cambridge, author of 'The Nature of the Universe.'

l. 31. *Lyttleton:* Raymond Arthur Lyttleton (1911), university lecturer in mathematics at Cambridge.

P. 116, l. 36. *Robert Hooke:* (1635–1703), English experimental physicist, curator of the Royal Society from 1663 to 1703.

l. 36. *A. van Leeuwenhoek:* Anthony van Leeuwenhoek (1632–1723), Dutch anatomist and pioneer microscopist. He studied the minute structure of organisms by means of the microscope.

P. 117, l. 1. *John Ray:* (1627–1705), English botanist. He

toured England and the Continent and published his 'Methodus plantarum' in 1682. He is the father of natural history as a scientific study.

l. 29. *Empedocles:* (*c.* 490–430 B.C.), Greek philosopher and scientist, is famous for his analysis of the universe into the four elements — fire, air, earth, and water.

P. 118, ll. 12–13. *'Doth suffer a sea-change . . .':* from Ariel's song 'Full fathom five thy father lies,' in 'The Tempest,' Act I, Scene II.

l. 31. *Lavoisier:* Antoine Laurent Lavoisier (1743–1794), French scientist, often called the 'father of modern chemistry'; he was the first to establish the fact that combustion is a form of chemical action.

l. 32. *Dalton:* John Dalton (1766–1844), English chemist and physicist. He is remembered for formulating the atomic theory of chemical composition published in his 'Absorption of Gases,' in 1803, with a list of atomic weights, and certain 'laws' of chemistry.

P. 119, l. 19. *Wöhler:* Friedrich Wöhler (1800–1882), German chemist.

l. 19. *Urea:* a soluble colourless crystalline compound contained especially in the urine of mammals.

P. 120, l. 34. *Cosmology:* the science of the universe.

P. 121, ll. 3–5. *'Over the fish and fowl of sea and air . . .':* from 'Paradise Lost,' Book VIII, lines 521 to 523.

l. 7. *Newton:* See previous note (p. 103, l. 32).

l. 10. *Darwin's theory:* Charles Robert Darwin (1809–1882), the distinguished scientist, whose 'Origin of Species,' which appeared in 1859, first clearly formulated and elaborated the theory of evolution.

P. 122, l. 21. *Rossum's Universal Robots:* the title of a play, 'R.U.R.', by the Czech dramatist, Karel Capek (1890–1938), produced in 1921. The mechanical creations of the scientists rebel against their masters.

l. 27. *Automaton:* a self-moving machine.

P. 123, l. 26. *Eddington:* Sir Arthur Stanley Eddington (1882–1944), English astronomer and physicist. One of the leading exponents of Einstein's relativity theory. Author of 'The Nature of the Physical World,' 'The Expanding Universe,' and many scientific works.

Life in Other Worlds. From 'Worlds Without End,' by Sir Harold Spencer Jones.

P. 125, l. 28. *Archean:* in geology, the earliest system of rocks.

P. 126, l. 20. *Temperature of molten zinc:* Zinc melts at a temperature of 420° Centigrade.

l. 27. *Marsh-gas:* Methane or marsh-gas (CH_4) is the simplest hydro-carbon of the paraffin series. The gas rises in marshy districts from the decomposition of vegetable matter in stagnant water. It is also the explosive 'fire damp' in coal mines.

P. 127, l. 30. *Spectroscopic observations:* A spectroscope is an instrument for forming and analysing the spectra of rays.

P. 130, l. 29. *Professor Lowell:* Percival Lowell (1855–1916), American astronomer. In 1894 he founded the Lowell Observatory at Flagstaff, Arizona. Concentrating on the planets, he published 'Mars and its Canals' and 'Mars as the Abode of Life,' developing the theory that Mars was inhabited.

l. 35. *Schiaparelli:* Giovanni Virginio Schiaparelli (1835–1910), famous Italian astronomer, Director of the Milan Observatory, 1862–1900. He is best known for his discovery of so-called canals on Mars.

P. 132, l. 13. *Professor Barnard:* Edward Emerson Barnard (1857–1923), American astronomer, Professor of Practical Astronomy at Chicago University.

P. 133, ll. 9–10. *Spiral nebulae:* luminous patches in the shape of spirals made by the cluster of distant stars or by gaseous or stellar matter outside the solar system.

l. 10. *Lord Rosse:* William Parsons, third Earl of Rosse (1800–1867), a notable astronomer, who erected in his Irish park at Birr Castle, King's County, the largest telescope that had yet been constructed. With it he discovered and defined the spiral nebulae.

P. 135, l. 5. *Cosmos:* the universe as an ordered whole.

Is Man a Machine? From 'Unsolved Problems of Science,' by A. W. Haslett.

P. 137, l. 26. *Mechanist:* in philosophy, one who holds that all natural phenomena admit of mechanical explanation.

l. 26. *Vitalist:* the opposite of a mechanist; one who believes that life originates in a vital principle, distinct from chemical and other physical forces.

P. 138, l. 22. *Mendel:* Gregor Johann Mendel (1822–1884), abbot of Brünn, Austrian botanist who worked out his theory of heredity from his experiments on the cross-fertilisation of garden peas. His findings were published in 1866, but no attention was given to them until 1900.

P. 141, ll. 20–21. *Professor T. H. Morgan:* Thomas Hunt Morgan (1866–1945), American biologist who originated the theory of paired elements within the chromosomes which govern heredity.

P. 144, ll. 31–32. *'Item, two lips, indifferent red . . .':* from 'Twelfth Night,' Act I, Scene v.

P. 145, l. 5. *Professor Spemann:* Hans Spemann (1869), German zoologist.

l. 15. *Cerberus:* the three-headed dog which kept watch at the gates of Hades.

The Larger Lunacy. From 'The Weather Eye,' by C. R. Benstead.

P. 148, l. 13. *Theophrastus:* (*c.* 372–287 B.C.), a Greek philosopher, pupil of Aristotle, author of two botanical works, and a book of 'Characters,' descriptions of various types of human failings.

l. 15. *Virgil:* Publius Vergilius Maro (70–19 B.C.), the Roman poet whose chief works were the 'Aeneid,' the 'Georgics,' and the 'Eclogues.'

l. 19. *Pliny:* Pliny the Elder, Gaius Plinius Secundus, (A.D. 23–79), a naturalist of repute, author of the 'Historia Naturalis.'

l. 21. *Aratus:* of Soli in Cilicia, a Greek poet, born about 315 B.C. He wrote 'Diosēmeia' (on weather signs), drawn chiefly from Theophrastus.

l. 31. *Bacon:* Roger Bacon (1214–1294). See previous note (p. 96, l. 27).

P. 149, l. 27. *Southey:* Robert Southey (1774–1843), English poet and prose writer. In 1803 he went to live at Keswick to be near Coleridge, and he resided in the Lake District until his death.

P. 150, l. 4. *Sort your thack:* put your thatch in good order.

ll. 11–12. *'The governess of floods':* from Titania's speech in 'A Midsummer Night's Dream,' Act II, Scene I.

l. 12. *The Shepherd of Banbury:* the signature adopted by the author of 'The Shepherd of Banbury's Rules to Judge of the Changes of Weather,' published in 1744. Supposed to be Dr. John Campbell.

l. 15. *Luke Howard:* (1772–1864), one of the founders of the science of meteorology. His 'Barometographia' was published in 1847.

P. 151, l. 18. *Cynthia's varying face:* the moon or Diana, who was born on Mount Cynthus, in Delos.

l. 30. *When Luna first:* from a translation of the 'Georgics' (Book I, l. 427).

l. 36. *The Moon 'looks with a watery eye':* from 'A Midsummer Night's Dream,' Act II, Scene 1, line 162.

P. 152, ll. 32–35. *'A red morn, that ever yet betokened':* from Shakespeare's 'Venus and Adonis,' lines 453 to 456.

P. 153, ll. 1–2. *The passage in St. Matthew:* xvi, 2, 3.

l. 37. *Krakatoa:* a volcanic island in the Strait of Sunda, Indonesia ; the greater part was destroyed by the eruption in 1883.

Katmai: a volcano of the Alaska peninsula. Erupted in 1912, creating the Valley of Ten Thousand Smokes.

P. 154, l. 1. *Bishop's rings:* George Bishop (1785–1861), English astronomer. Erected an observatory at South Villa, Regent's Park, London.

P. 155, l. 1. *Prognostics:* forecasts, predictions.

l. 6. *'Comet wine':* a term of praise to signify wine of superior quality. A notion prevailed that the grapes in comet years were better in flavour than in other years, either because the weather was warmer and ripened them better, or because the comets themselves exercised some chemical influence on them.

P. 156, ll. 7–8. *Christian calendar:* a list of canonised saints registered in the 'calendar' or almanac.

l. 10. *Tusser:* Thomas Tusser (*c.* 1524–1580), agricultural writer and poet, who settled in Suffolk as a farmer and wrote his 'Hundreth good pointes of husbandrie,' in 1557, a collection of instructions on farming and gardening, composed in verse.

P. 157, l. 8. *Grumphie:* a made-up name for the pig.

'Wi' his mouth fu' o' strae,
He to his den will gae ;
Grumphie is a prophet,
Wat weather we will hae.'

ll. 34–35. *Phenological Society:* a Society which studies the sequence of seasonal changes in such things as flowering, harvest and bird migration.

P. 159, l. 8. *Goose-bone:* The bone of a goose was used to foretell the weather.

l. 9. *Avian anatomy:* the bone structure of birds.

Forcing Things into Form. From 'The Inventor and his World,' by H. Stafford Hatfield. The unusual phraseology is due to its being written in Basic English.

P. 161, l. 36. *Baekeland:* Leo Hendrik Baekeland (1863–

1944), American chemist. His researches covered the fields of plastics, electro-chemistry, organic chemistry, synthetic resins, and electrical insulation. He invented bakelite.

Growing More Food. From 'A Decade of Decision,' by Fred Hoyle.

P. 169, l. 4. *Grandiose ground-nuts scheme:* This scheme for East Africa was devised by the Labour Government, 1946–1950.

Science, the Destroyer or Creator. From 'The Common Sense of Sciences,' by J. Bronowski.

P. 173, l. 12. *Lamarck:* Jean Baptiste, *Chevalier de* Lamarck (1744–1829), French biologist and botanist. He believed that the higher and more complex forms of life were derived from lower forms ; that acquired characteristics could be transmitted to descendants.

P. 174, l. 14. *Fiume:* The Italian poet d' Annunzio seized this port after the 1914–18 war and tried to hold it for Italy. It now belongs to Yugoslavia.

The Polish Corridor: after the First World War this was a strip of territory connecting Poland with the Baltic and separating East Prussia from the rest of Germany.

l. 32. *War of Jenkins' Ear:* an allusion to a political incident of 1738 when Robert Jenkins, a master mariner, declared that his ear had been cut off by a Spanish captain who was searching his ship. This precipitated the war with Spain of 1739, though it was, in fact, a pirate captain who had cut off the ear.

l. 33. *Wars of the Roses:* the prolonged struggle between the houses of York and Lancaster whose badges were respectively a white and a red rose. The wars began in 1455 and ended with the death of Richard III at Bosworth in 1485. Henry VII married Elizabeth of York, uniting the two lines.

P. 175, l. 21. *T.N.T.:* the high explosive trinitrotoluene.

P. 178, l. 12. *Panaceas:* universal remedies.

l. 28. *Samuel Butler's 'Erewhon':* Samuel Butler (1835–1902) published 'Erewhon' in 1872. The descriptions of the different customs which he finds in the land of Erewhon (an anagram of 'nowhere') give opportunity for vigorous satire. In Erewhon, machinery had to be completely abolished lest it should gain control of the inhabitants.

P. 179, l. 26. *Grey Eminence:* Father Joseph (François Leclerc du Tremblay, 1577–1638). A French Capuchin monk and statesman, who became the confidant of Richelieu and enjoyed the power he obtained. He was popularly known as His Grey Eminence.

P. 180, l. 11. *Mr. Pope:* Alexander Pope (1688–1744), famous English poet, master of the heroic couplet. In 1719 he bought a house at Twickenham, where he spent the remainder of his life.

l. 13. *Hiroshima:* On August 5, 1945, the atomic bomb was first used against Japan when Hiroshima was laid waste and eighty thousand people killed.

l. 21. *Burke's ideas of the imagination:* Edmund Burke (1729–1797), distinguished statesman and author. In 1756 he published 'A Philosophical Enquiry into the Origin of our Ideas of the Sublime and Beautiful' which contains his ideas of the imagination.

ll. 21–22. *Bentham's [ideas] on government:* Jeremy Bentham (1748–1832), the founder of a school of political philosophy. In 1776 he published his 'Fragment on Government,' in which he first sketches his theory of government : the greatest happiness of the greatest number.

l. 22. *Adam Smith on political economy:* Adam Smith (1723–1790) published in 1776 his 'Enquiry into the Nature and Causes of the Wealth of Nations' which revolutionised the economic theories of the day.

l. 29. *Industrial Revolution:* the term applied to the economic developments which during 1760–1830 transformed Britain from a country primarily agricultural to one primarily industrial.

P. 181, l. 25. *a priori:* from cause to effect.

P. 182, l. 3. *Empirical:* based on observation and experiment.

l. 15. *Plato:* See previous note (p. 122, l. 23).

Aquinas: St. Thomas Aquinas (*c.* 1225–1274), Italian philosopher and Dominican monk. His famous work 'Summa Totius Philosophiae' expressed medieval philosophy, and the harmony of faith and reason.

A Writer among Painters. From 'Liberties of the Mind,' by Charles Morgan.

P. 185, l. 21. *Leonardo:* See previous note (p. 95, l. 9).

l. 21. *Bacon:* See previous note (p. 96, l. 27).

Aquinas: See previous note (p. 182, l. 15).

l. 24. *Logical positivists:* a school of modern philosophers whose method is logical analysis, and many of whom maintain that only observable phenomena are real.

P. 186, l. 19. *Babel:* the Tower of Babel, described in Genesis, chapter 10, verse 9, the erection of which led to the confusion of tongues.

P. 187, l. 1. *Charente:* a department of Western France.

l. 4. *Lucca:* a city in Tuscany, Italy.

l. 8. *Cellini:* Benvenuto Cellini (1500–1571), Italian sculptor and goldsmith.

P. 190, l. 6. *Andrea:* Andrea del Sarto (1486–1531), Italian painter. He was called 'The Faultless Painter.'

P. 191, l. 16. *New English:* the New English Art Club in Albemarle Street, London.

l. 17. *Nouvelle Athènes:* a café in Montmartre, Paris : famous in the seventies and eighties of the last century as a meeting-place for painters and poets.

l. 18. *Reynolds's dinner-parties:* Sir Joshua Reynolds (1723–1792) the great portrait-painter, and friend of Johnson, Burke, and Goldsmith. His Thursday evening dinner-parties assembled many of the most gifted and celebrated people of his time.

l. 19. *Kit-cat Club:* an eighteenth-century club, which met at the shop of a pastry-cook called Christopher Cat. His excellent mutton pies were known as kit-cats.

l. 25. *MacColl:* Dugald Sutherland MacColl (1859–1948), painter and art critic.

l. 34. *Moore:* George Moore (1852–1933), distinguished Irish author.

l. 35. *Steer:* Philip Wilson Steer (1860–1942), a famous English painter.

P. 192, l. 2. *Double relative: e.g.* This is the house that Jack built that fell down.

l. 24. *Addison's lucidity:* Joseph Addison (1672–1719), English essayist, renowned for the grace and clarity of his prose, especially as seen in his essays for the 'Spectator.'

l. 25. *Constable:* John Constable (1776–1837), brilliant English landscape painter.

P. 195, l. 5. *Kuo Hsi:* Chinese painter, born 1020, author of 'An Essay on Landscape Painting,' translated by Shio Sakanishi.

Imagination. From 'The Creative Impulse,' by H. Caudwell.

P. 197, l. 4. *Gabriel Oak:* a character in Thomas Hardy's

novel, 'Far from the Madding Crowd,' published in 1874.

l. 11. *Hazlitt:* William Hazlitt (1778–1830), English essayist and critic.

P. 199, l. 1. *Arnold:* Matthew Arnold (1822–1888), English poet and critic.

l. 2. *Tennyson:* Alfred Lord Tennyson (1809–1892), English poet. He published 'In Memoriam' in 1850.

l. 9. *Stephen Spender:* (b. 1909), poet, critic, and novelist.

l. 14. *Auden:* W. H. Auden (b. 1907), poet and playwright.

l. 15. *Isherwood:* Christopher Isherwood (b. 1904) has written novels, travel books, and several plays.

l. 21. *Ernest Hemingway:* (b. 1898), American novelist. 'For Whom the Bell Tolls' was published in 1940.

l. 22. *Sordo:* El Sordo is the guerrilla leader of the Loyalists against the Fascists during the Spanish Civil War in Hemingway's novel.

l. 33. *Bertrand Russell:* (b. 1872), philosopher and mathematician, published his 'Practice and Theory of Bolshevism,' in 1920.

P. 200, l. 17. *'Tyrian trader':* from Arnold's poem 'The Scholar Gipsy,' line 232.

ll. 26–35. *'Her beams bemocked . . .':* from 'The Ancient Mariner,' Part IV, stanzas eleven to thirteen.

P. 201, l. 12. *Joseph Conrad:* See previous note (p. 79, l. 16).

l. 13. *'The Mirror of the Sea':* a collection of memories and impressions, published in 1906.

l. 26. *Burns:* Robert Burns (1759–1796), Scottish national poet.

The Appalling Popularity of Music. From 'Music Ho!' by Constant Lambert.

P. 203, l. 31. *Béla Bartók:* (1881–1945), Hungarian composer. 'The Amazing Mandarin' is remarkable for dissonance.

P. 204, l. 21. *Bar line:* vertical line showing the beginning or end of a bar of music.'

l. 24. *Beethoven:* Ludwig van Beethoven (1770–1827), German composer.

l. 26. *Bach:* Johann Sebastian Bach (1685–1750), German composer.

P. 205, l. 10. *G. K. Chesterton:* Gilbert Keith Chesterton (1874–1936), author and wit, renowned for his verbal dexterity and frequent use of paradox.

ll. 13–14. *'Utopian' books:* books describing an ideally perfect place.

l. 24. *Catalan coblas:* dances of Catalonia in Spain.

l. 26. *Sousa:* John Philip Sousa (1854–1932), American composer.

Carmen: an opera by Georges Bizet, the French composer, first produced in 1875.

l. 27. *Ocarina:* a small egg-shaped musical wind-instrument.

ll. 26–27. *Air on the G String:* composition by Johann Sebastian Bach.

P. 206, ll. 16–17. *Alban Berg:* (1885–1935), Austrian composer.

l. 22. *Schönberg:* Professor Arnold Schönberg (1874–1951), Austrian composer.

l. 23. *'The Land':* a poem, published in 1927, by Victoria Sackville-West.

l. 25. *Tympanum:* ear-drum.

P. 207, l. 5. *The Ring:* 'The Ring of the Nibelung,' a cycle of operas by Richard Wagner (1813–1883), first produced in 1876.

l. 25. *Atrophy of the aural nerves:* wasting away of the sense of hearing.

l. 28. *Tuttis:* all playing together.

l. 33. *Berlioz:* Hector Berlioz (1803–1869), French composer.

l. 36. *George Antheil:* (b. 1900), American composer. His mechanical music is shown in the 'Ballet mécanique.'

P. 208, l. 12. *Frenetic:* frantic.

Engines and Engineers. From 'Architecture,' by Christian Barman.

P. 208, l. 20. *Horace Walpole:* (1717–1797), author of the 'gothic' novel, 'The Castle of Otranto,' published in 1764. In 1747 he settled at Strawberry Hill, Twickenham, which he made into 'a little Gothic castle.'

l. 25. *Soufflot:* Jacques Germain Soufflot (1709–1780), French architect. Designed the Pantheon, which had a classical influence on the nineteenth century.

ll. 29–30. *St. Geneviève:* (d. 512), patron saint of Paris.

l. 31. *Pantheon:* term applied originally to a temple to all the gods.

P. 209, l. 5. *Monk Lewis:* Matthew Gregory Lewis (1775–1818), English author, remembered for his novel, 'The Monk.'

l. 8. *Pugin:* Augustus Pugin (1762–1832), English writer on medieval architecture.

l. 27. *Ruskin:* John Ruskin (1819–1900), English author and critic. He wrote on gothic architecture in his 'Seven Lamps of Architecture,' and 'Stones of Venice.' In 1853 he lectured at Edinburgh on 'Architecture and Painting.'

P. 211, l. 19. *Beauvais Cathedral:* Beauvais is forty-nine miles north of Paris ; the cathedral (1227–1558) is one of the noblest in France.

l. 22. *Perronet:* Jean Rodolphe Perronet (1708–1794), French engineer.

P. 212, l. 10. *'Engines invented by cunning men':* II Chronicles, chapter 26, verse 15.

l. 14. *Arthur Young:* (1741–1820), English writer, famous for his 'Travels in France,' (1787–1790).

l. 15. *Neuilly:* Neuilly-sur-Seine, suburb west of Paris.

l. 21. *Wren:* Sir Christopher Wren (1632–1723), the most celebrated English architect of his time.

l. 28. *Garnier:* Jean Louis Charles Garnier (1825–1898), French architect. He built the Opéra in Paris.

l. 31. *Bibliothéque Nationale:* national library of France, erected in Paris (1854–1875) by Henri Labrouste.

Gare d'Orléans: a terminal railway station in Paris, on the south bank of the River Seine.

l. 35. *'Ceci tuera cela':* 'One will kill the other.' This is the title of chapter II in Book V of Victor Hugo's 'Notre-Dame de Paris.' Hence the reference to 'a more famous work.'

P. 214, l. 1. *Shute:* John Shute (*fl.* 1550–1570), architect and painter. Published his 'First and Chief Groundes of Architecture' in 1563.

l. 14. *Cannon Street Station:* opened in 1866, on the old South-Eastern Railway.

l. 36. *Salubrity:* health.

P. 215, l. 5. *Council-house:* here, a house where councillors meet.

l. 36. *Lord Carson:* Lord Carson of Duncairn (1854–1935), distinguished lawyer and politician.

The Scientific Romances. From 'The Living Novel,' by V. S. Pritchett.

P. 218, l. 2. *Sunday League:* National Sunday League founded in 1883 'to preserve the Sabbath.'

l. 12. *H. G. Wells:* Herbert George Wells (1866–1946),

distinguished English novelist whose work, whether in social comedies such as 'Kipps' or 'The History of Mr. Polly,' or scientific as 'The Time Machine' or 'The War in the Air,' gained him a world-wide reputation.

P. 219, l. 23. *Swift:* Jonathan Swift (1667–1745), great prose satirist. His 'Gulliver's Travels,' published in 1726, is in four parts ; Lilliput is the first, and Laputa, the flying island, is the third.

l. 32. *Yahoos:* In the fourth book of 'Gulliver's Travels' the simplicity and reasonableness of the Houyhnhnms, the horses, are contrasted with the brutality of the Yahoos, beasts in the shape of men.

P. 221, l. 5. *Disney:* Walter Elias ('Walt') Disney (b. 1901), American cartoonist and producer of motion pictures from 'animated' drawings.

P. 222, l. 12. *Algae:* seaweed.

P. 223, l. 35. *Shaw:* George Bernard Shaw (1856–1950), brilliant Irish dramatist and critic.

P. 224, l. 10. *Quintessential:* in its purest form.

l. 20. *Chesterton:* See previous note (p. 205, l. 10).

Realism and Superrealism. From 'A Coat of Many Colours,' by Sir Herbert Read.

P. 226, l. 20. *Superrealism:* or surrealism, a movement led, in art, by the Spanish painter, Juan Mirò (1893), which gives weird distorted forms to objects of the imagination.

l. 24. *Impressionist art:* a method of painting to give general effect without detail.

l. 25. *Abstract art:* art which discards the object itself, even as a starting-point, and pursues purely formal ends.

P. 227, l. 33. *Giotto:* Giotto di Bondone (1266–1337), Italian artist, regarded as the founder of modern painting.

l. 33. *Michelangelo:* Michelangelo Buonarroti (1475–1564), the renowned Italian sculptor, painter, and architect.

Rembrandt: Harmens van Rijn Rembrandt (1606–1669), the greatest of the Dutch school of painters.

Rubens: Sir Peter Paul Rubens (1577–1640), one of the most famous of Flemish painters.

l. 34. *El Greco:* Domenico Theotocopuli (1545 ?–1614), painter, born in Crete, settled in Spain about 1577. He excelled in portraits and religious subjects.

P. 230, l. 31. *Giorgione:* (1478–1511), the name by which the Venetian artist Giorgio of Castelfranco is known.

P. 232, l. 7. *Picasso:* Pablo Picasso (1881), a Spanish painter who has worked in many different styles, is held to be the originator of Cubism.

l. 9. *Mirò:* See above (note on p. 226, l. 20).

l. 11. *Max Ernst:* (1891), German surrealist painter.

l. 13. *Paul Nash:* (1889–1946), English painter.

Edward Elgar. From ' Ten Composers,' by Neville Cardus.

P. 232, l. 25. *Strauss:* Richard Strauss (1864–1949), German composer. He wrote symphonic tone poems, operas, and songs.

P. 234, l. 1. *Wagner:* Richard Wagner (1813–1883), German composer.

l. 8. *Sibelius:* Jean Christian Sibelius (1865–1957), Finnish composer, one of the greatest of his time.

l. 22. *Meticulously:* with over-scrupulous regard for small details.

l. 25. *Cornucopia:* a horn of plenty ; an overflowing store.

l. 31. *Basil Maine:* Rev. Basil Stephen Maine (1894), music critic and lecturer. Published his ' Life of Elgar ' in 1933.

P. 236, l. 3. *Leighton:* Frederick, Lord Leighton (1830–1896), English academic painter.

l. 3. *Landseer:* Sir Edwin Henry Landseer (1802–1873), English painter, known for his sentimental studies of animals.

Sidney Cooper: (1803–1902), English painter, best known for his pictures of cattle.

Oscar Wilde: (1854–1900), Irish writer, dramatist, and wit.

l. 4. *Frith's 'Derby Day':* William Powell Frith (1819–1909), English painter. His 'Derby Day,' painted in 1858, is over seven feet long and contains hundreds of carefully drawn figures.

l. 22. *Brahms:* Johannes Brahms (1833–1897), German composer.

ll. 25–26. *Hallé Concert:* in 1857 Sir Charles Hallé, pianist and conductor, went to Manchester and founded the Hallé Orchestra.

l. 26. *Hans Richter:* (1843–1916), German musician. From 1897 to 1911 conductor of the Hallé Orchestra.

P. 237, l. 24. *Eclecticism:* borrowing freely from various sources.

l. 36. *Bruckner:* Anton Bruckner (1824–1896), Austrian composer, known for his symphonies.

P. 238, l. 9. *Schlegel:* August Wilhelm von Schlegel (1767–1845), German romantic author.

P. 239, ll. 1–2. *Abstract . . . chronicles:* an allusion to 'Hamlet,' Act II, Scene II, line 548.

l. 6. *'Nobilmente':* musical directive meaning 'nobly,' peculiar to Elgar.

ll. 15–16. *Phil May:* (1864–1903), comic artist. Joined the staff of 'Punch' in 1896.

l. 17. *Spithead review:* naval review in the roadstead between Portsmouth and the Isle of Wight.

l. 36. *Like a sow overwhelming her litter:* said by Falstaff of himself, 'Henry IV,' Part II, Act I, Scene II.

P. 240, l. 13. *Taine:* Hippolyte Taine (1828–1893), French historian and critic, author of a 'History of English Literature.'

l. 33. *César Franck:* (1822–1890), Belgian composer, among the greatest of nineteenth-century musicians.

The Tenth Muse climbs Parnassus, by Anthony Asquith.

P. 243, l. 5. *Bosola:* a character in Webster's 'The Duchess of Malfi.'

l. 6. *Iago:* a character in Shakespeare's 'Othello.'

Annabella: a character in John Ford's tragedy, ''Tis Pity she's a Whore,' published in 1633.

l. 7. *Desdemona:* a character in Shakespeare's 'Othello.'

ll. 8–9. *'Thou art more lovely . . .':* from Marlowe's 'Dr. Faustus.' Spoken by Faust to Helen.

ll. 10–11. *'The element of water . . .':* from Webster's 'The Duchess of Malfi,' Act IV, Scene II. Spoken by Bosola to Ferdinand.

l. 20. *Mr. Cecil B. DeMille:* (1881), American film director, notable for his lavish productions such as 'The Sign of the Cross.'

l. 30. *Brothers Warner:* Harry Morris Warner (1881), American film director, one of three brothers, is president of Warner Brothers Pictures.

l. 32. *Mount Parnassus:* north of Delphi, in Greece, seat of the nine Muses.

P. 244, l. 2. *Miss Garbo:* Greta Garbo (1905), Swedish film actress.

l. 26. *Maugham:* William Somerset Maugham (1874), English novelist and playwright.

O'Neill: Eugene Gladstone O'Neill (1888–1953), American playwright.

Barry: Philip Barry (1896), American playwright.

Coward: Noel Coward (1899), English actor, playwright, composer, and producer.

l. 37. *Hitchcock:* Alfred Hitchcock (1900), British film director, famous for his direction of thrillers.

René Clair: (1898), French film director.

Mamoulian: Rouben Mamoulian (1898), Russian stage and screen director.

Milestone: Lewis Milestone, American film director. 'All Quiet on the Western Front' (1940), 'Front Page' (1931), and 'Of Mice and Men' (1940) are some of his films.

P. 245, l. 34. *Duplex:* of two parts, twofold.

P. 247, l. 36. *Debussy:* Claude Achille Debussy (1862–1918), French composer.

l. 36. *Wagner:* See previous note (p. 234, l. 1).

ll. 36–37. *Leit-motiv:* theme associated throughout a musical composition with some person, situation, or sentiment.

P. 248, l. 3. *Legato cantabile:* smoothly, without breaks, in a song-like manner.

P. 249, l. 11. *Doctor Caligari:* A German film, 'The Cabinet of Doctor Caligari,' directed by R. Wiene in 1919.

P. 250, l. 28. *'Caro nome':* an aria from Verdi's opera, 'Rigoletto.'

P. 251, l. 7. *Mendelssohn:* Felix Mendelssohn-Bartholdy (1809–1847), celebrated German composer.

l. 16. *Acolytes:* attendants on the priest at church services.

The Nature of Television. From 'On the Air,' by Roger Manvell.

P. 255, l. 16. *Louis MacNeice:* (1907), poet and critic. In 1941 he joined the B.B.C. as a feature-writer. He has written many notable radio-plays in addition to 'The Dark Tower,' 1946.

l. 17. *ITMA:* 'It's That Man Again,' the variety series in which the comedian Tommy Handley won nation-wide popularity.

P. 256, l. 3. *'Of Mice and Men':* a novel by John Steinbeck, published in 1937. The film version was directed by Milestone in 1940.

l. 28. *Quota quickies:* films quickly made to supply a

fixed number of British films in the year, required by the Quota Act of 1927.

P. 259, ll. 28–29. *'Birth of a Nation':* D. W. Griffith (1875–1948), the American film director, made his name with this spectacular film in 1915.

l. 29. *'The Third Man':* Carol Reed's film made from Graham Greene's story in 1949.

ESSAY QUESTIONS

1. *What Civilisation is not.* What do you consider to be the distinguishing features of a civilised society ?

2. *British and American Nationalism.* What are the outstanding differences between British and American nationalism ? How can they be reconciled ?

3. *The Queen and the Commonwealth.* What is the function of the Queen in a Commonwealth of independent nations?

4. *The Party System.* What are the advantages and disadvantages of a two-party parliamentary system ?

5. *What is Law ?* 'A strong and impartial judicial system is the first essential in any country which makes claim to be recognised as a civilised community.' Discuss.

6. *What is Economics about ?* Why should the study of economics be particularly important in the modern world ?

7. *History and the Reader.* What arguments would you use to convince a friend that the study of history is a good thing ?

8. *A New Elizabethan Age ?* Do you consider that life in Elizabethan times had any advantages over life at the present time ? Give reasons for your answer.

9. *Britain's Changing Face.* 'Planning is a good thing if by planning we also mean preserving.' What do you consider most worth preserving in Great Britain ?

10. *Galileo and Scientific Method.* What do you understand by 'scientific method' ? How has it influenced man's outlook from the time of Galileo ?

11. *The Duty of Doubt.* 'Science has owed its wonderful progress very largely to the habit of doubting all theories, even those on which one's action is founded.' Discuss.

12. *Life in the Universe.* What do you consider to be the most important aspects of the work of the chemist ?

13. *Life in Other Worlds.* What are the possibilities of life existing in other worlds ?

14. *Is Man a Machine ?* Explain carefully the scientific basis of heredity. Do you consider heredity more important than environment in deciding character ?

15. *The Larger Lunacy.* Write a short account of modern

methods used to forecast the weather, and mention any recent advances that have been made.

16. *Forcing Things into Form.* What changes in the design of things in everyday use have followed the introduction of plastics? Do you think the standards of design could be improved?

17. *Growing more Food.* What can scientists do to grow more food for a rapidly increasing world population?

18. *Science, the Destroyer or Creator.* Do you consider that science has been a blessing to mankind or not?

19. *A Writer among Painters.* Write an appreciation of a modern author or painter whose work you enjoy.

20. *Imagination.* In what ways may we be said to enjoy a tragedy, or a film with an unhappy ending?

21. *The Appalling Popularity of Music.* 'In previous ages listening to music was a matter of personal choice.' What music do you enjoy most? Give reasons for your choice.

22. *Engines and Engineers.* Discuss the significance of the terms 'classical' and 'gothic' as applied to architecture.

23. *The Scientific Romances.* Write a short essay on the literature of one of the following: space travel, mountaineering, warfare, sport.

24. *Realism and Superrealism.* 'All art is a kind of language.' Choose the work of one painter, and show how it speaks the language of the age he lived in.

25. *Edward Elgar.* How far is knowledge of the life of a musician, poet, or painter necessary for an appreciation of his work?

26. *The Tenth Muse Climbs Parnassus.* Discuss the particular problems of turning a novel or a play into a film.

27. *The Nature of Television.* 'There seems to be no end to the monotony of our future lives as they become increasingly controlled by the inventive genius of technicians and engineers.' Discuss this comment upon the future of television.

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