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HISTORY

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THE SCEPTICAL BIOLOGIST
THE GREAT AMPHIBIUM
ORDER AND LIFE
TIME: THE REFRESHING RIVER

HISTORY

is on our
side

A Contribution to
Political Religion
and
Scientific Faith

by
Joseph Needham
F.R.S.

London

George Allen and Unwin Limited

First published in 1946

to

CLARA D. RACKHAM

*Labour Councillor of the Borough of Cambridge,
tireless builder of the heavenly city
of human freedom*



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WOKING

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I

THE TWO FACES OF CHRISTIANITY

*(in its original form a contribution to the Spectator, 1936;
reprinted under the title "Common Ground" in the book of
essays Christianity and Communism, 1937)*

Our attitude to the problem of the position of christianity in the modern world will be to a large extent conditioned by the emphasis which we lay upon the two great historic elements in the christian religion. These may be called Greek Neo-Platonism, and Hebrew Apocalypticism.

Of all the relevant philosophical concepts, the valuation of Time is the most important. If Time is illusory, unimportant or evil, the trend of other-worldliness in christianity becomes fundamental, earthly affairs lose their significance, and the kingdom of heaven is interpreted as a realm of mystical experience unconnected with concrete human relationships. From this point of view, all progress is an absurdity; the world, it holds, was always only a hard school of chastisement for souls, and so will always be. It ends in a Manichaeism¹ which denies value to material things even as symbols, and concentrates its interest on an imaginary blessedness after death.

I suspect that this strain is really Indian in origin and

¹ The religion of the prophet Mani, now long extinct, once disputed with christianity and Mithraism for the mastery of the Roman world and spread from Spain to Central Asia. Its distinguishing doctrines were that matter is fundamentally evil in itself, and that the aim of religion is the disengagement of spiritual elements embedded in it. This violent dualism, of which several christian heresies also partook, probably originated from Persian Zoroastrianism (since Mani was himself a Persian under Indian influence).

allied to Buddhist philosophy. Religions by which men regulated their lives, theologies in which they formulated their thought, have always been mainly differentiated by their valuation of this world. There have been those who, like the ancient Chinese, wringing from the earth a practicable livelihood, and schooled by the effort to bend it to their will, became convinced that it is in the long run amenable, plastic, beneficent; that human endeavour can achieve tangible results, that human society can embody justice and love, that progress, even if slow, is a reality, and the final perfection of earthly life a legitimate hope. Others, like the ancient Indians, worn out by excessive effort, exhausted by the struggle for existence, those for whom the fight against the jungle with primitive techniques was almost hopeless, felt an insufficiency in all human action, an impossibility in all human dreams and demands; and they proclaimed that only in complete renunciation, only as he emancipates himself from the wheel of things, only as he relinquishes all reliance upon, and all hope for, this world, can he attain lasting satisfaction. The Chinese, on the one hand, remained faithful throughout the long history of their philosophy to the belief that man is not to be distinguished from social man, nor social man separated from nature, and that the very foundations of nature contain something congruent with, and favourable to, human social order. The Indians, on the other hand, tended always to a pessimistic view of human possibilities, seeking salvation in solitary meditation outside society, and yearning for a deliverance which would take them, were it possible, outside nature also. So, in theology, in the one case, God becomes the embodiment of justice and comradeship; the impersonation of the age-long purpose of his creatures, their élan vital, their indwelling spirit. In the other, he is our supernatural refuge, the antithesis of this world of striving and illusion, the seemingly solid Being behind the seemingly meaningless Becoming, the remote, the impassible, the

wholly-other, whose earth has arisen by mistake or rebellion, and being made out of nothing has in any case no inherent value and no significance. Such is the contrast between this-worldliness and other worldliness in religion.¹

Now Confucian this-worldliness had no influence on western ideas until the eighteenth century,² but the current of thought represented by Plato, Plotinus, the Manichees, the Brahmins and the Buddhists, infected christianity from the first few centuries onwards, contending for the mastery, and not unsuccessfully, against the profound this-worldliness of the Hebrew prophetic tradition and its climax in the Gospels.

It seems probable, indeed, that christianity and buddhism had a mutual influence on each other. We know³ of buddhist missionaries in the near east from Asoka Maurya's time onwards, and they may have helped to divert christian thought from its primitive intention to redeem this world into its later ascetic despair and hieratic resignation. So also the transition from Hinayana to Mahayana buddhism, in which a world-denying philosophy is superseded or overlaid by a system of devotion to a personal saviour, may have been assisted by the example of the great neighbouring religion of the west. In any case, the Neo-Platonists, and the initiators of the main tradition of christian mysticism, certainly acknowledged their Indian inspiration.⁴

Since, as has been suggested above, the hopeless, pessimistic, world-denying type of religion drew its origin from failures of human techniques in the struggle against nature, while the optimistic this-worldly type had a connection with corresponding successes, it need hardly be said that the latter has been justified by the event. For social evolution

¹ I owe certain phrases in this paragraph to an excellent passage by the Master of Christ's College, C. E. Raven, which, however, I was not able to quote directly, as our interpretations follow a different twist.

² See *Time, the Refreshing River*, London, 1943, p. 139.

³ V. A. Smith, *History of India*, Oxford, 1941, pp. 98, 134.

⁴ Cf. p. 41.

is an unescapable fact, taking its place, together with cosmic development and biological evolution, in that great rise in level of organisation which we may call the world-process.¹ Thus the prophets of life more abundant, and not the life-denying ascetics, have been justified by all that we know of nature.

It is always in the valuation of Time that the clash within christianity between Hebrew thought, apocalyptically occupied with the future, and Graeco-Indian mysticism, engaged in escaping from the present, can best be seen. Through the christian centuries there has firmly persisted a conviction that Time is important, real, and not evil. The world, human behaviour, the conditions of human life, *were* different in the past, and *will* be different, given repentance, amendment, and action, better, in the future. The Kingdom of God is no unearthly conceptual realm, but a just and happy social order, a "Magnetic Mountain," existing already in seminal form, and to exist in time to come in all its fulness, drawing towards it to work for its realisation men and women of the most diverse types from all the peoples of the world.

"Somewhere beyond the railheads
Of reason, south or north,
Lies a magnetic mountain
Riveting sky to earth."²

This is in the tradition of Hebrew prophecy.

Associated with such beliefs is the sacramental principle. The eucharistic common meal outwardly and visibly symbolises the distribution of the world's goods in the coming society of free and equal comradeship, and the sacrifice of all who have perished that the Kingdom might come. Moreover, in christianity, however convenient the spirit of world-denying pessimism might be to successive ruling classes, whose interests were deeply engaged against any ideas so inconvenient as the coming of a Kingdom of God

¹ See p. 23 ff.

² C. Day Lewis,

on earth, it was never possible to denude christian theology of the Time-principle, since the Incarnation occurred at a definite point in Time. Hence the significance of the Gnostic heresies and the christological controversies; though to-day they may seem to lack all interest and actuality, they record the struggles of christian thinkers against the Platonising tendencies of those who sought to distil from the flesh-and-blood materialism of the Gospels an innocuous and sapid mysticism free from Fact and Event, from Time past, Time present, and Time to come.¹

Thus it is because these two widely divergent trends, Graeco-Indian and Hebrew, have lain side by side in an uneasy union in the christian religion since the first few centuries, that the following two propositions may both be true: "christianity is the opium of the people," and "communism is the heir of the christian tradition."

"Apocalyptic" means pertaining to revelation, but specifically those convictions about the future which Isaiah and all the prophets treated as revelations, and for which they found such fiery words. Though John the Theologian described the future of the world in incomprehensible poetry, others among the early christians stated their beliefs about the latter days in much more definite terms, and this was called "millenniarism" or "chiliasm" since God's Kingdom on Earth, for which Jesus prayed, was thought likely to last for a thousand years after the Messiah's return.² But

¹ The distinction between the two great trends in christianity has already been made, of course, by many thinkers; recently, for instance, by my old friend, John Macmurray, in his book *The Clue to History* (London, 1938), the first chapter in which is entitled "The Ambiguity of christianity." But he makes traditional orthodox christianity identical with the Jewish elements only, which I could wish were true, but fear is not.

² It need, of course, hardly be said that those misguided persons who even to-day are still fishing in the canonical books such as Daniel or Revelations, with the aid of a primitive number-mysticism, for detailed predictions, have nothing in common with modern chiliastic christians

as the christian organisation came to compromise more and more with the ruling classes and the civil powers, as christians saw

“Their early *agape* decline
To a late lunch with Constantine,”¹

so the chiliasts who longed for the world to be changed and believed that it could and would be changed became more and more of a nuisance to growing orthodoxy. Cerinthus the Ebionite, for example, believed, in the first century, that “the kingdom of Christ would be set up *on earth*, that the flesh would be subject to desires and pleasures, eating and drinking and marrying and festivals”; a this-worldly view which horrified the ascetic and pious Eusebius. Asceticism, pietism, and acquiescence in the governance of the world by the existing powers,² became, in spite of the protests of such men as Jovinian³ and Vigilantius, more and more the marks of the devitalized Church. But throughout the centuries, sometimes within the fold of orthodoxy in east or west but more often taking the form of heresies and schisms, the primitive this-worldly chiliasm of the early christians persisted, until in our times it presided at the birth of socialism and found itself able to fuse with the logical consequences of the evolutionary view of the world developed by modern science.

That there are fairly clear lines of demarcation between civilisations and cultures may be assumed for the present argument. Many feel today that we are standing at a turning-point of history analogous to the first century of our era.

who look for the coming of the Kingdom of love, justice, and comradeship, and do all that they can to hasten its coming.

¹ Auden's *New Year Letter*. ‘

² Cf. N. Berdyacv's *The Fate of Man in the Modern World*, 1935, where he remarks on “the relentless severity of christianity in matters of love, and its unusual leniency towards property, which it has sanctioned in its most evil forms.”

³ Cf. N. D. Emerson, *Evang. Quart.* 1937, 9, 147.

Many of us, like Symmachus,¹ are attracted both by the old dispensation and by the new. But those who cry out for a revivification of the old forms in contradistinction to the new and the recognition of the achievements and possibilities of the new seem to be like Julian and Sallustius,² who attempted the completely hopeless task of trying to combine christianity and paganism under the forms of paganism. There was obviously at that time, as always in such historic periods, a combination, but it was made by the Fathers, who combined christianity and paganism under the forms of christianity.

To a man of goodwill in the first century who was well acquainted with his Euripides and his Aeschylus, it must surely have seemed that the christians had discovered how to do what the teachers of the past had ineffectively wanted and foreshadowed. The legends of the sibyls bear sufficient witness to the conviction of the early christians that history was on their side, and, too, the beatification of Virgil.³ There are very many christians today who feel that by its materialist philosophy and its realistic sociological analysis communism has discovered how to do what christianity (in its "Hebrew" form) always powerlessly wished to do.

In the middle ages theologians could curb merchants and even barons or princes, but when during the Reformation period the Church surrendered all control of economic affairs, in catholic no less than in protestant countries, its last association with social justice was lost. With the growth of science and technology the theologians showed themselves more and more incapable of applying the christian doctrine of love of our fellow-men to the real world of business and industry.

¹ See T. R. Glover's *Life and Letters in the Fourth Century*, Cambridge, 1901, p. 148.

² See A. D. Nock, *Sallustius*, Cambridge, 1926.

³ Cf. R. S. Conway, "The Messianic Idea in Virgil," *Hibbert Journal*, 1907, 5, 309.

England, indeed, can boast a fine record of eighteenth-century religious hypocrisy on these issues. The clergy who persecuted the Dorset martyrs well knew where Deism would lead to. Yet it was convincingly argued in the book of essays, *Christianity and the Social Revolution*, that communism has always been an integral, perhaps the essential, element in christianity.¹ The economic significance of the "heresies" has never been explored, but it is likely that many besides the Donatists were as Red as the Church of Jerusalem.² Through-

¹ In the published discussions of the symposium in which this article first appeared, Edwyn Bevan, a scholar who holds different views of the nature of the early Church, took me to task as follows:—

"It seems odd that when he so much dislikes what christianity stands for, he should still seemingly be concerned to get for his view some kind of additional sanction from the old christian tradition and bring in a fictitious primitive christianity to provide a 'common ground' between christianity and communism."

Everything, of course, depends on just what you think the best elements in christianity are. In this and other essays I have tried to do justice to what I think they are. Communism needs no sanction from the past; I only attempt to reveal what I believe to be the revolutionary kernel in traditional christianity, a religion in which, by the accident of my birth, I happened, like so many others, to be brought up. I could have done the same if I had happened to have been brought up a Confucian, but hardly if I had been bred in Buddhism. One must reveal this kernel in order to liberate men of good-will from the conventionality which might otherwise keep them in bondage to the pietistic beliefs of their past teachers, so useful to the ruling class. One must show them that communism, in a sense, completes and extends christianity, just as christianity, in a sense, completed and extended the civilisation of Mediterranean paganism.

² Cf. A. D. Nock, *Conversion*, Oxford, 1933, p. 246. There is opportunity for a great book elucidating both the economic background and the social doctrines of all the principal "heretical" sects, and when we come to the period of the Albigenians, who may be regarded either as the last of the "heresies" or the first of the mediaeval and post-mediaeval revolutionary movements (Lollards, Hussites, Taborites, Anabaptists, Independents, Levellers, Diggers), we see that there is perhaps a continuous tradition. If so, it represents the primitive christian millennialism which the official Church failed to maintain.

out the middle ages there were the movements which culminated in the christian communism of the Hussites and Taborites (1420), the Bundschuh League (1500) and Thomas Münzer's Anabaptists (1520),¹ or here in England the followers of John Ball (1380).² In the seventeenth century, with the awakening of the bourgeois class and its rise to power, there were already good christians who saw perfectly clearly that political without economic equality could not approach the standard of the Gospels. May it be long before the names of Gerrard Winstanley and John Lilburne, the leaders of the Levellers, are forgotten by Englishmen; or rather, may they soon be remembered, for of the noblest calls to social justice nothing is said in the history books of our schools, designed as they are to support the existing order and to glorify national sovereignty. Then a century later came Jean Meslier, the catholic priest who foreshadowed the communist movement of Baboeuf and others in the French revolution; and Daniel Shays, whose relation to Washington in 1787 was rather like that of Lilburne to Cromwell in 1648. The christian religion, in fact, has always contained communist elements implicit within it, but this life of active apocalyptic has always been smothered by the dead weight of mystical Neo-Platonism so convenient to the possessing class.³

Now communism today says clearly that the love of our comrade is meaningless in a world dominated by the spiritual wickedness of class-distinctions and all that that implies of inequality in the distribution of life's good things; agreeable work, happy leisure, health-giving activity of mind and body. In a world constructed on the principle of the exploitation

¹ See R. Pascal, *The Social Basis of the German Reformation*, London, 1933. A good little book, though old, is F. Seebohm's *The Era of the Protestant Revolution*, London, 1875.

² See H. Fagan, *The Nine Days that Shook England*, London, 1938, and also M. Schlauch, *Science and Society*, 1940, 4, 414.

³ In the short-lived socialist Bavaria of Kurt Eisner a significant book was published, *Communism as a Doctrine of the Millennium*, by Fritz Gerlich.

of man by man there is no room for the development of that natural dignity (so movingly discussed by André Malraux in *La Condition Humaine*),¹ which savages often have, and which we should wish our comrades all to have. Christianity, at least theoretically, always set a high value on individual human life, but while capitalism considers such lives simply as "hands," accepting no responsibility for what contacts they may have with machine-technique, fascism thinks of them only as cannon-fodder, man's highest end being a military death on behalf of his tribal state (as for example in Ludendorff's book *The Nation at War*). Only communism confirms and extends this christian valuation, spreading comradeship and dignity, culture and happiness in the widest possible circles to all working people, citizens some day of the World Union of Socialist Soviet Republics, where each friend will contribute all that is in him and receive all he desires. All save one thing, the domination over other friends. This the Kingdom will not permit, and its education will see to it that the desire does not arise.

In the meantime we live under the shadow of the class-war, in which it is often said that the christian as such can take no part. But the class-war is not so much a doctrine as a simple fact of observation. Neutrality in it is impossible, for inactivity directly aids the existing order, heavily favoured as it already is by the inertia of social systems. The relation, "He that is not with us is against us," is therefore asymmetric.

On the subject of state power, coercion and "totalitarianism" we hear a great deal of nonsense. "An enforced ideal," says Ernest Barker,¹ in a phrase rightly singled out for criticism by another writer later,² "is a thing utterly opposed to christianity." Yet few theologians oppose the compulsory enforcement of the ideal that "a citizen should be able to go about his lawful occasions without being knocked on the head," or that every child should receive

¹ Paris, 1933.

² In the symposium in which this paper first appeared.

education. Communism cannot be differentiated from christianity on such tenuous grounds. All ideals must, if dominant, rest ultimately on some form of coercion, whether mental or physical, until such time as they have become so embedded in the natural instincts of the people that their externality is lost. The worship of the God-State, says W. R. Inge,¹ former Dean of St. Paul's (oddly omitting any reference to fascism and nazism), is pure satanism. Yet it would seem logical that the more righteousness, justice, truth, and love are built into the State structure, the less need remains for an independent Church to witness against it. When that which is perfect (the just social order) is come, that which is imperfect (the ecclesiastical institution) shall be done away. Other writers delight in classifying communism with fascism and nazism as totalitarian dictatorships of the same type. From this absurdity Canon Barry is free, however. "My own conviction is," he wrote,² "that of two evils fascism is the far greater danger to us, and more starkly opposed to christianity, however much it may use religious language, than the communism which calls itself atheistic. We should be too wary to fall into that trap. Moreover, communism does stand for the well-being of the individual—even if a wholly material well-being—and is therefore redeemable by christianity. But a creed which makes of the State a moral absolute, i.e. which erects into the place of God the *de facto* majority in a human group, cannot by any logical finesse be reconciled with christian philosophy." And the point has been well put by Aurel Kolnai,³ when he says:—

"There have always been attempts to expropriate reason and ethics, falsifying them into the will of princes, the aims of nations, the particularism of narrow provinces, or the ecstatic totalitarianism of sects. . . .

¹ In the symposium in which this paper first appeared.

² In *Christianity and Communism*, Blackwell, Oxford, 1937.

³ In *The War against the West*, London, 1938.

Thus in our own time, bolshevism declared that whatever furthers the class-struggle is 'good'; and similarly, in the eyes of nazism, everything is 'good' that agrees with the attainment of a powerful and racially constituted German Empire. But the similarity is only partial. . . . The 'proletarian class struggle' refers to the general structure of society, and *can* be translated, though not without a certain extension of meaning, into terms of humanitarian morals, such as 'justice,' 'equality,' 'emancipation,' 'rationalised production,' 'acquisition of control over economic processes by those most subject to their effects,' etc., etc. But a 'German Fascist state of pure blood' is in its very essence, beyond all mere tactics and technicalities, an ideal of irrational particularity and indissoluble concreteness;—it is *absolutely impossible* to state it in terms of humanity."

The common ground lies between communism and the spirit of christianity, not its letter. Of the churches as institutions we may have the most melancholy expectations. Dean Inge rejects communism as a movement "based on hatred";¹ no doubt he regards the scourging of the money-changers in the Temple as a passing lapse of good taste. In another lecture² he explicitly welcomed Italian fascism as the most christian social order yet devised by man; thus allying himself with the Pope whose melancholy encyclical *Quadragesimo Anno* committed Roman Catholics to the same view.³ The Secretary of the World Evangelical Alliance toured Poland to warn the people of the perils of communism,⁴ which he described as "godless" without further examination of the questions of immanence and transcendence. F. Buchman (head of the Group Movement) said, "Thank God for

¹ Spectator, October 9, 1936.

² *Liberty and Natural Rights*, Herbert Spencer Lecture, Oxford University, 1934.

³ *Quadragesimo Anno*, C.T.S., London, 1931.

⁴ Times, September 16, 1936.

Hitler," who is keeping Bolshevism out of Europe.¹ The editors of all Roman Catholic periodicals, whether the *Universe* or *Blackfriars*, fulminated against the People's Front in Spain.² In the Dominican magazine, it is true, André Toledano is quoted.³ "The choice," he said, "is between honest-to-God anti-God, and the not so honest exploitation of God as the State's Big Policeman plus the safeguarding of clerical life and limb and the material possessions of the Church. If the Left will not *have* God, it does not follow that He *is* on the Right." The union of the churches, it has also been said, is likely to take place in the last ditch of opposition to world-communism.

The narcotic principle of Time-denying other-worldliness was recognised by that great but too little known prophetic thinker, Gerrard Winstanley, who in the midst of the English Civil War, led the civilian wing of the Leveller movement, organised co-operative farming, and meditated on the relations of religion and politics. Although himself a profoundly religious man, he called theology "divining doctrine" and castigated the clergy for their acquiescence in the class-structure of society. In *The True Leveller's Standard Advanced* (1649) he wrote, "Every day poor people are forced to work for fourpence a day, though corn is dear. And yet the tithing priest stops their mouth and tells them that 'inward satisfaction of mind' was meant by the declaration 'the poor shall inherit the earth.' I tell you, the Scripture is to be really and materially fulfilled. You jeer at the name 'Leveller'; I tell you Jesus Christ is the Head Leveller."

Or again, he says, "This divining doctrine which you call 'spiritual and heavenly things' is the thief and the robber that comes to spoil the vineyard of man's peace, and does

¹ New Statesman, October 10, 1936.

² I include references such as these only with reluctance. I long ago took to heart the advice the Abbé Huvelin gave to von Hugel—"Ne lisez jamais les journaux religieux; ils vous feront infiniment de mal."

³ *Blackfriars*, 1936, 17, 708.

not enter at the door, but climbs up another way. They who preach this divining doctrine are the murderers of many a poor heart, who is bashful and simple, and cannot speak for himself, but keeps his thoughts to himself. This divining spiritual doctrine is a cheat; for while men are gazing up into heaven, imagining after a happiness, or fearing a hell, after they are dead, their eyes are put out, and they see not what is to be done by them here on earth and while they are yet living. This is the filthy dreamer¹ and the cloud without rain.² And indeed the subtle clergy do know that if they can but charm the people by their divining doctrine to look for heavenly riches and glory after they are dead, then shall they easily be the inheritors of the earth, and have the deceived people to be their servants."

Marx and Lenin would, it seems, have been quite at home in seventeenth-century England. But Winstanley's words were swallowed up as if in a void, and more than a century later Edmund Burke could write:—

"Good order is the foundation of all good things. To be enabled to acquire, the people, without being servile, must be tractable and obedient. The magistrate must have his reverence, the laws their authority. The body of the people must not find the principles of natural subordination, by art rooted out of their minds. They must respect that property of which they cannot partake. They must labour to obtain what by labour can be obtained; and when they find, as they commonly do, the success disproportionate to the endeavour, they must be taught their consolation in the final proportions of eternal justice."³

Divining doctrine, a spiritual cheat indeed; the opium of the people.

¹ Jude, 8.

² Jude, 12.

³ *Reflections on the French Revolution*, 1790, p. 359.

The conclusion of the whole matter is that what we think of christianity and its prospects depends on what aspect of it we have in mind. If we mean by it the "divining doctrine" of neo-platonist, pietist, "eternalist," other-worldly mysticism, it has no future. If we mean by it the chiliastic social hope of prophetic, temporal, flesh-and-blood religion, it will go over into communist social emotion without essential loss. "The Church must die," as John Lewis wrote, and be born again as the holy spirit of a righteous social order." "Christianity must perish," said Leonhard Ragaz, "so that Christ may live."

Final Revision

Lanchow, Kansu

Oct. 1943

HISTORY IS ON OUR SIDE

*(An address to the Modern Churchmen's Conference,
1937; printed in Modern Churchman for that year)*

The subject of our conference to-day is Collectivism and Christian Thought, and there are evidently more ways than one in which it could be introduced. For example, we might discuss the "essence" of christianity and contrast it with the "essence" of collectivism, but this would have the disadvantage that we might not find ourselves in general agreement even about the essence of christianity. What is sometimes called the revolutionary interpretation of the Gospels, an interpretation which I should tend to take if I adopted this course, would perhaps not commend itself to all members of our conference.

I propose therefore to take an altogether different way, a way more in keeping with such qualifications as I have as a scientific worker, and to leave out of account for the moment specifically christian concepts in drawing a picture of the history of our world. From the broad outlines of this picture we can, I believe, draw certain conclusions which bear very strongly upon the problem in hand. It relieves us also of any tendency to concentrate on minor difficulties and controversies. We must, in short, trace the history of the earth from its origin as a ball of incandescent gas to the state in which we know it today, and if we do this we shall realise more clearly that the state in which we know it today is not, to a very high degree of probability, its final state. If, moreover, we can detect any principle existing among the mighty changes which have been passed through, we shall

be able to gain some idea of the direction which future change is most likely to take.

This principle may be expressed, I believe, as the presence in our world's development of a progressive increase in the level of organisation. Possibly I may explain it best by taking first of all the transition from the lifeless to the living. Biologists and physicists are now in general agreement that what distinguishes the living organism from a mere mixture of its chemical components is the form of organisation exhibited by protoplasm while alive. There are, of course, plenty of inferior forms of order, for example, the order of homogeneous gases or liquids, or the more complicated conditions existing in colloidal liquids, or the very highly complicated structure of the "liquid crystals." In these forms of organisation we find rigidity not in all three dimensions of space, as in ordinary crystals, but in two or only in one. Such combined rigidity and flexibility is reminiscent of the living organism itself, and indeed we now have excellent grounds for believing that a good deal of the organisation of living beings is built upon the liquid crystalline condition, existing actually in the protoplasm. In the transition from lifeless to living, therefore, we have a fundamental step up in level of organisation.

It is needless to say that a wonderful organisation exists at the level of "inorganic" matter itself, namely in the arrangements of electrons, protons, and other particles to form the eighty-three known chemical elements. Furthermore, the capacity of certain of these elements such as silicon and especially carbon, to unite with themselves forming atomic chains, rings, lattices, etc., gives rise to another increase in level of organisation as the system of macromolecules known to "organic" chemistry comes into existence.

When once the living cell is given as a datum, however, we pass into the realm of comparative morphology, beginning with the simplest aggregations of single cells into multi-celled organisms. Here we have a field which has been reduced to

order by generations of zoologists and botanists, a field where the guiding principle is again no other than level of organisation. At one time the limits of what can be done at a given level of organisation are reached, at another these limits are transcended by further increases in effector devices and the means of controlling them. Side by side with such developments goes the perfecting of the various receptor mechanisms. It may be noted that the conception of maximum level of organisation is a relative one; it depends on how free of its environment the organism proposes to be and what exactly it proposes to do. Thus the famous tapeworm, which always enters into these discussions, is very well adapted to its mode of life, but at the same time remarkably unenterprising. In general there is no reasonable possibility of denying that the higher mammals represent a peak of organisational level, superior to all earlier and simpler forms. That is to say, the number of parts in the whole is maximal, as is the complexity of their structure and interrelations; the centralisation and efficiency of the humoral and neural means of control of the periphery is maximal; the flexibility and versatility of actions on the environment is maximal, and finally, independence of the environment is maximal.¹

Moreover, we must think of sociological development as continuous with biological. History is a continuation of Natural History. Just as the first free-living single cells had to give up their "freedom," such as it was, in uniting together to form the metazoan organisms, so the beginnings of social organisation required the first glimmerings of "altruism," the first renunciations of dominant impulses. From the first ape-like families, in which the leaders were in turn killed off by younger males, through all the gamut of savagery, the stages of which we can reconstruct to some extent by observation of still existing primitive societies, to the first stable settled communities, from the

¹ See on this subject the address of J. S. Huxley, *Ann. Rep. Brit. Assoc.*, 1936.

desert to the sown, we see a rise in the level of organisation. The first attainment of efficient agriculture, the first invention of crude engineering and chemical devices, the first segregation of classes, such as warriors, peasants, merchants and governors; all these steps were steps towards that high level of organisation which we mean by the term "civilised."

As Auden writes (it is Nature speaking):—

"But joy is mine, not yours—to have come so far,
Whose cleverest invention was lately fur;
Lizards my best once who took years to breed,
Could not control the temperature of blood.
To reach that shape for your face to assume,
Pleasure to many and despair to some,
I shifted ranges, lived epochs handicapped
By climate, wars, or what the young men kept,
Modified theories on the types of dress,
Altered desire and history of dress."

All this, you may say, is agreed to, we accept it. No doubt after many years of struggle the fundamentals of evolution are not seriously questioned. But there follows a conclusion which many seem to find less agreeable, namely that if wisdom was not born with us, it will certainly not die with us. Can we have the presumption to suppose that we ourselves are the crown of the evolutionary process, the highest production of which nature is capable? On the contrary, the present is but one term in a succession of terms. And if we look back upon the past as a chaos compared with our own high level of organisation, it is extremely probable that men of the future will look back upon our own age as an age of chaos. At that time, they will say, the world was divided up into a rather large number of states and nations, none of which in practice recognised any superior moral law restricting their sovereignty. The world's natural resources were the property of private men, who from their chance ownership derived personal benefit, only allowing others access to these

resources on their own terms. Similarly the machinery of production, in factory or mill, was private property, so that the vast majority of men owned no tools but their hands, for the use of which they were paid the barest minimum by the owners of the machines. This state of affairs did not conduce to any kind of comradeship or happiness in social intercourse, whether christian or otherwise. And lastly, in the exchange of commodities, the system of almost unregulated profit-seeking by the individual prevailed. What a contrast, they will say, to our own level of organisation. The U.S.S.R. (a fine old term, full of historical associations), now unites the habitable globe into a whole, the peoples of which retain as much as possible of their ancient customs, languages, poetry and art, but severally possess no economic independence or national sovereignty. World planning of economics and population naturally followed the acquisition by humanity collectively of all the world's natural resources and productive machinery. The abolition of economic privilege led naturally to the classless state. We are, in short, to use the ancient term, communists.

But, they would add, it was not without the centuries of struggle. It is here that we find the difference between the views now described and what used to be known as "Victorian optimism." The conception of Progress, as it used to be held, was unsatisfactory on two main counts; it mistook its units on the time-scale, and it tended to confuse organisation with complexity or mere numerical size. Its optimism, which was certainly doomed to disappointment, lay in the fact that while willing to think in terms of geological time where biological evolution was concerned it wished to think in terms of ten-year periods for sociological evolution. The confusion of its thought arose from an absurd simplification of the idea of organisation. Numerical complexity may enter into an organisational level, but it need not do so, and sometimes increase in organisational level may even involve a decrease in numerical complexity. For example, the fusion

of the English railway systems led to a standardisation of locomotive parts, so that now very large areas of the country can be immediately supplied from store with any spare in the event of a locomotive breakdown, whereas previously there were hundreds of different designs, each with different spare parts. Only one further step is desirable, the fusion of all the systems into one, under public ownership. The question of numerical complexity is of much interest in connection with a point already mentioned, the classless state. At first sight, it might seem as if a society with two, three, or four classes must be more complicated and hence more highly organised, than a classless one. But an obvious biological analogy provides the answer. We might as well assert that an annelid worm with twenty or thirty ganglia down the length of its body was more highly organised than a mammal with a single highly-developed brain. But the contrary is the case. The analogy repays thought. Similarly, it is obvious that until the multiplicity of amoral national sovereignties has been utterly abolished, no lasting peace will be possible for the world. The conception of the utmost cultural autonomy for different peoples, side by side with economic union, is a grand one, and we owe it largely to the genius of no other than Joseph Vissarionovitch Stalin, the present secretary of the Russian Communist Party, under whom it is largely being put into practice in that country and its dependencies.¹ Such a reunion as that of the International Folk-dance Congress a year or two ago in London was a living demonstration of the cultural possibilities which exist in the future; the good as opposed to the evil in the idea of the "national."

The view of the world's history which has thus been outlined is one of only moderate optimism. In the end, in the words of Julian of Norwich, all shall be well, but not in our time, nor for long to come.² Nevertheless that great force, if

¹ See e.g. his *Marxism and the National Question*.

² "There is a deed which the Blessedful Trinity shall do in the last

so we may consider it, which has brought about the evolutionary development of our earth, and of the life upon it, is beyond reasonable doubt still at work, and in this sense, collectivism is inevitable. Life itself is essentially order and organisation; man in his societies cannot be untrue to it. History is on his side. In W. H. Auden's poem "Spain" we find —

"And the poor in their fireless lodgings, dropping the sheets
Of the evening paper: Our day is our loss, O show us
History the operator, the
Organiser, Time the refreshing river.

And the nations combine each cry, invoking the life
That shapes the individual belly and orders

The private nocturnal terror:
'Did you not found the city state of the sponge,

Raise the vast military empires of the shark
And the tiger, establish the robin's plucky canton?

Intervene. O descend as a dove or
A furious papa or a mild engineer, but descend.' "

For us, therefore, time is a refreshing river, no stagnant pool; it brings higher organisational levels, and from our very nature, we gain refreshment from them. What, then, is the meaning of all this for the christian? After all, for him the vast evolutionary development which we have been describing is the manner in which God's creativity has been at work. He cannot forget the second of the two books

day; as to my sight, and what the deed shall be, and how it shall be done, it is unknown of all creatures, and shall be till when it shall be done. This is the great deed ordained of our Lord God, by which deed he shall make all things well; for right as the Blessed Trinity made all things of naught, right so shall the Blessed Trinity make well all that is not well." (Julian of Norwich.) From the point of view of evolution, this deed is a process in the midst of which we are.

from which Sir Thomas Browne collected his divinity; "that open and publick manuscript which lies expans'd unto the eyes of all." He will not wish to lag behind the heathen in his understanding of nature. And so we come to the important conclusion, that the christian *must* take collectivism seriously. Theologians in the past have placed too much emphasis on the individualism of christianity, perhaps because they have tended to pay too much attention to the first great commandment at the expense of the second. That this should have been so during the history of the Church is no matter for surprise. The Church has existed, not in a vacuum, but in an economic world where exploitation, whether in feudal or capitalist forms, was always going on. Since theologians and clergy are not much less weak nor more clear-sighted than other men, it was natural that the other-worldly elements in christianity should be emphasised. Hence the value of the Church in the eyes of the feudal lord and the capitalist employer. To this trend there have been, of course, noteworthy exceptions. But it was always amply sufficient to deserve the bitter accusations of hypocrisy which such men as Marx levelled at it, and the irony of the situation is that these accusations might have come with equal force from the Apostles themselves.

The christian *must* take collectivism seriously. He will find that his own ethos is perfectly congruent with it, as witness the communism of the Church of Jerusalem; a factor which might be expected to be particularly attractive to Anglicans, enamoured of the pure and primitive, but for reasons at which we may guess, not strikingly so in practice. But now some may attempt to persuade him that the proper collectivism for him is not communism, but fascism. Under fascism, they will say, the institutional framework of the Church is (or will be) maintained perfectly intact; the administration of the rites and sacraments will be fully safeguarded (by police action if necessary), and all that will be asked of you, as an ecclesiastic, is not to poke your nose

into what does not concern you, namely business, on the one hand; and on the other to convince your people from time to time that the nation to which they belong is particularly favoured of God and particularly ill-treated by other nations. I wish to suggest to you that this invitation strikes the authentic diabolic note, and to warn you that you are being asked in such a case to sell the whole of the spirit of christianity in return for the letter.¹

In the first place, fascism is not collectivism at all. Fascism is the forcible (not to say violent) stabilisation of the existing economic organisation, the process of making the world safe for the profit-making motive. Nevertheless it uses collectivist "emotion" for its own purposes, as in the Nazi slogan "Gemeinnutz vor Eigennutz," and it extends a varying measure of government control over business operations much as in the British Defence of the Realm Act during the first world war, when there was a temporary nationalisation of the mercantile marine. The socialism of "National Socialism" reduces in the end to organised charities such as the "Winterhilfe" and minor concessions such as the "Kraft durch Freude" movement or the Italian "Dopolavoro." These paradoxes arise from the fact that the most civilised masses of humanity have today reached a level at which collectivism is the only possible next step, and hence any appeal to them has to be made in appropriate terms. This is why a false appeal, such as that of fascism, will inevitably recoil upon its makers. The disillusioned masses will never return to liberal individualism, but may very well pass to true collectivism; hence the frantic enmity with which the fascist leaders pursue the spectre of bolshevism. To retain the essentials of the capitalist economic organisation, it has been necessary to make wide and far-reaching modifications of the non-essentials. Thus it has been necessary to abolish all civil liberties, such as the right of free speech, free association,

¹ Cf. the fine but too little known satire of Robert Nichols, "Golgotha & Co.," in his *Fantastica*, London and New York, 1923.

and the like. These civil liberties grew up with capitalism, for without them capitalism, or freedom of financial and economic exploitation, could never have struggled loose from the petrified mediaeval organisation. In the English Civil War and the French Revolution they won their decisive victories. But now when the time has come for a fresh change, capitalism in its turn has become the strait waistcoat which must, and will, be broken. Today we have only two alternatives, capitalism or civil liberties, for as fascism demonstrates, we cannot have both.

It is here that many christian social thinkers make a fundamental mistake, namely that of throwing all communist and fascist states together under the term "totalitarian" and of objecting to all equally under the aegis of that ancient dualism which regards the spiritual order as existing within, but absolutely independent of, the temporal order. Pope and Emperor are held to be concepts eternally applicable. Such thinkers have not sufficiently acquainted themselves with the theoretical structure of communism and fascism respectively. The fascist theory of dictatorship rests upon a psychological valuation of humanity which divides men fundamentally into the leaders and the led. On this "Führerprinzip" those naturally gifted with powers of command must be entrusted with leadership which they must utilise for the aggrandisement of the race to which they belong, at the expense of other, inferior, races. This hierarchy of dictators is something permanent, a natural organisation of men, the lot of the majority of whom must ever be to obey without question the decisions of their superiors. The communist theory of dictatorship, on the other hand, as cannot be too much emphasised, is that it is transient, not permanent. The "dictatorship of the proletariat" means that during the years immediately succeeding the taking over of power by the representatives of the working-class, the class which is pledged to abolish classes, there will be endless efforts at wrecking by the representatives of those who have been

dispossessed of their privilege, wealth and authority, and therefore a period of "authoritarian" rule will be necessary. As this generation dies out, however, and as new generations arise, imbued from birth with the ideals of service to their brothers in the workers' state, this dictatorship becomes unnecessary and will "wither away." Under a properly-designed education, each man will be his own dictator; "every cook will learn to rule the state." It need not be pointed out that such self-government is a christian ideal. Nor is it necessary to say that leadership is a real quality also for the communist. The difference between fascist and communist conceptions of leadership essentially resides in this, that the former is leadership from above, while the latter is leadership from within. Which of these two is in agreement with the comradeship of the apostolic circle, I leave it to you to decide.

On three counts fascism stands condemned if its representatives seek to come before you presenting it as that true collectivism indicated as the law of nature by a scientific study of the development of the open and public manuscript of the world. First, its attitude to internationalism demonstrates that it fiercely opposes any union of the peoples.¹ From the further increase of predatory imperialism we have nothing but misery to expect, and we have only to look at the events in Abyssinia, Spain and China, now proceeding during this very conference, to see proof of it. Secondly, its theoretical justification of war sets it on the side of death as against life. "War," Mussolini has said, "is to man what childbirth is to woman." Fascist foreign policy is based on the inevitability of war. Such an attitude can only be called christian if christianity is interpreted in its most utterly pessimistic form, if the natural world is regarded as evil and irredeemable, having as its only function the preparation of

¹ Cf. "Anti-christian Nationalism becomes conscious of its own 'religious' nature as Fascism." J. M. Murry, *The Price of Leadership*, London, 1939. p. 80.

the soul by grievous trials for the life eternal and elsewhere. This, however, I believe to be manichaeism, not christianity. I am far from denying that war provides opportunities for the display of the most heroic christian virtues, but I believe it is nonsense to pretend that the day-to-day conflict of man with nature does not provide equal opportunities, only overlooked because they are so universal. Here there is a great lesson to be learnt from the essay of William James on the "moral equivalent" of war, and one of the very few attractive things about the Nazi regime in Germany is its "Arbeitspflicht" for the young, though this has been done in a far larger and better though less spectacular and less military way in the Soviet Union.¹ Thirdly, fascism is largely built upon a biologically false conception of race, which not only, as Hitler boasted on attaining power, destroys all the principles of the French Revolution, but also destroys the doctrine that God "hath made of one blood all the peoples upon earth."

As against these facts, communism seeks the unification of all peoples, not as the wage-earning masses of capitalism but as free men and women who own collectively the tools with which they work. Communism seeks the abolition of war, recognising however that so long as economic rivalries and armament profits coexist with national sovereignties, war will continue. Communism accepts all races and peoples in fraternal equality. These things are surely of the spirit of christianity. An American friend recounted to me the other day an observation made to him in all seriousness by a Philadelphia business man, who was strongly anti-religious. "If it hadn't been for all this christianity," he said, "we should never have had all this socialism." He was perfectly right. Communism has been called the heir of the christian tradition. Whether you think this statement justified or no, the struggle will go on, and the issue is inevitable; how soon or how late indeed depends upon such choices and such

¹ See p. 106.

decisions. The question is not whether communism will come or no; the question is how much culture can you save from fascist barbarism, how many martyrdoms can you prevent. For we may remember the proud revolutionary saying, that all the battles of the working-class are defeats, except the last.

Final Revision

Shuangshihpu, Shensi

Aug. 1943

FATHER ALDOUS' TREATISE ON POLITIQUE POWER

(from University Forward, 1941)

To keep thinkers out of politics is the perennial interest of possessing classes. Scientists today are warned that they must keep their science "pure" and unrelated to the daily life of humanity, just as in former ages theologians and religious mystics were warned to confine themselves to the "spiritual" realm. For those who are willing to accept such warnings, one of the most telling arguments is that when the religious or social idealist enters upon political action, politics will drag him down to the low moral level of the political struggle. It is therefore necessary to expose these arguments wherever they appear.

In Aldous Huxley's *Grey Eminence*,¹ we have recently been given a brilliant description of a personage from whose life, it is suggested, important lessons can be drawn. Cardinal Richelieu's collaborator and inspirer in foreign policy, the Franciscan, Father Joseph du Tremblay, combined in one life christian mysticism and what are known as "power politics," though it is not obvious in what respect they differ from ordinary politics. As Richelieu's chief of staff for foreign affairs, he urged forward, by every means, fair or foul, the interests of the French monarchy, yet he was at the same time an aspirant to sainthood, a practical mystic and the spiritual director of the Calvarian order of nuns. How

¹ *Grey Eminence; a Study in Religion and Politics*, by Aldous Huxley, Chatto & Windus, London, 1941.

many paradoxes does his life really raise, and do any of them resist close inspection?

We must first glance briefly at the events of his career. Born of a wealthy and well-to-do family in 1577, he completed his education by a Grand Tour in 1594 and acquired considerable experience of life both at court and in the field before entering the Franciscan order as a Capuchin in 1600. François Leclerc du Tremblay,¹ Baron de Maffliers, thus became, and remained till the end of his life, Father Joseph. It was in 1610, while engaged on the reformation of the ancient abbey of Fontevrault, that he first met Richelieu, and seven years later, at the age of about forty, he founded his Calvarian order of nuns. In 1615 his first political work was done, the arrangement of the peace of Loudun, one of the episodes in the struggle between the Catholics and the Huguenots. Around this period Father Joseph was mainly occupied in trying to arrange for a Crusade to recover Palestine from the Moslems; to this end he journeyed to Rome and Madrid, and wrote a remarkable epic poem called the "Turciad"; but all was in vain, and by 1625 he had to give up the idea as an immediate practical proposition. From 1624 till the time of his death in 1638, he was Richelieu's indefatigable minister for foreign affairs, and for the last four years of this period, was designated Richelieu's successor. But he lived to enjoy neither the vast power which in such a position he would have had, nor the cardinal's hat which was granted him just too late.

Aldous Huxley has no difficulty in showing that throughout Father Joseph's life he regarded France as the instrument of divine Providence; in the famous phrase "*Gesta Dei per Francos*." Hence his policy was one with Richelieu's; France

¹ One wonders whether he had any relationship to that much more attractive personality in the following century, the Abbé Trembley, to whose eighteenth-century researches we owe the foundation of our knowledge of biological regeneration phenomena.

must be made the strongest power in Europe. For this purpose three things were necessary; (*a*) France must be united, (*b*) therefore, the power of the nobility and of the Huguenots must be broken, and (*c*) the Thirty Years' War, which broke out in 1618 with the revolt of the Protestant Czechs against the Hapsburg Emperor, must be prolonged as far as possible in order to weaken France's rivals, the Catholic powers of Austria and Spain. The policy thus involved the fomenting of a double war of religion, a civil war against the Protestants within France, and an international war in central Europe in which Catholic France would, and did, aid Protestant Sweden to attack the Imperial Austrian lands and armies. The indescribable miseries of these wars are described by Aldous Huxley in some detail, using the illustrations of the French Goya, Jacques Callot, but this adds little to our knowledge of the seventeenth century. The tremendous misery of the 'Thirty Years' War and such anti-Huguenot operations as the siege of La Rochelle, may be taken for granted.

We are thus presented with the paradox of a man who was personally ascetic and saintly doing his utmost to prolong a state of affairs which condemned thousands, even millions, of his fellow-Europeans to death in battle, torture, and starvation. "Father Joseph's hope," concludes Aldous Huxley,¹ "of leading a whole national community along a political short-cut into the Kingdom of Heaven on earth is illusory, so long as the human instruments and material of political action remain untransformed."

But this conclusion is little short of a piece of intellectual dishonesty. The Kingdom of God on earth was at no time Father Joseph's hope. Wherever the phrase occurs in earlier parts of the book,² it is always in a pietistic-mystical sense, and there can be no doubt, from the evidence we have of Father Joseph's religious position, that such was the sense

¹ Loc. cit., p. 255.

² Loc. cit., pp. 15, 48, 150, 239.

in which he took it. Father Joseph's fundamental aim was the recovery of Palestine from the Moslems, and there is nothing to show that he had the slightest interest in those basic social reforms of European civilisation which would have brought it, and were in due time to bring it, further towards the Kingdom of God on earth. Huxley's double entendre is therefore weighty against progressive social policies only until it is closely examined; it is then seen to have no point at all.

In actual historical fact, both Cardinal Richelieu and Father Joseph were important instruments in the universal process then going on, the rise of bourgeois capitalist nationalism and imperialism. The memorandum of 1626 on colonisation and sea-power was the work of Father Joseph,¹ who knew (in Aldous Huxley's words) "that trade follows the cross, and that an evangelist can be very useful in representing the interests of the nation to which he belongs. Inevitably, his French Capuchins preached the gospel of the Bourbons as well as that of Christ." To say that the Cardinal and the Franciscan were important in this universal process is, of course, no criticism of them, since the process was on the whole a beneficent one, raising immeasurably the standard of life of the people, and in their day, fundamentally progressive.

Let us now look a little further at some of the lessons which Aldous Huxley wishes us to derive from this strange life of apparently divided allegiances.

First he wishes to urge that throughout history the dark forces of secular domination for the sake of the pleasure of power, and civil coercion for the sake of armed supremacy, always take precedence of ideas. It seems that when Father Joseph attended the Diet of Ratisbon in 1630, the apparent paradox of his career was appreciated by his contemporary opponents, who wrote in their pamphlets:—

¹ Loc. cit., p. 146.

"Sacriliga sunt arma quae sacra tractantur manu.
Miles mitrae imperat cum mitra militibus imperat."¹

which might be freely translated: "When the religious man or the social idealist takes to political action, politics always drags him down to its own low moral level, and he will find himself doing all kinds of evil that good may come." There is a grain of truth in this, but in spite of everything, social evolution *does* go on. It will always remain a personal question how far any man can bring himself to go in the pursuance of political aims which, while themselves demonstrably correct, may involve much immediate suffering. Statesmen, however good, have always been, and will always be, the surgeons of society. But in fact, ideas and ideals, themselves the products of concrete social and economic situations, have been the symbols under which human civilisation has again and again been transformed. History has been many things besides the search for domination on the part of power-loving groups.

This leads to the second characteristic of Aldous Huxley's argument, namely a complete scepticism of the value of any social plan, and an utter failure to appreciate the fact of social evolution. "The results of any plan of action," he writes,² "are always unknown and unknowable; the plan must be pursued for its own sake, as an end in itself. This is the bald truth about politics; but how few politicians have ever had the perspicacity to see it, or the courage, if they have seen it, to tell the disquieting truth." But it is not the bald truth about politics. We *can*, in fact, succeed in finding a guiding thread running, not only through social evolution, but through that biological evolution which preceded it in time and set the stage for it. There is a rise in

¹ "Sacriligious are the arms wielded by a sacred hand. When the mitre commands the soldier, it is the soldier who is obeyed by the mitre." Loc. cit., p. 176.

² Loc. cit., p. 113.

level of organisation. And it is not so very difficult to point, in our own state of society, to those forces which are favourable to a rise in the level of organisation of the human community, and those which are fighting against it. "Society," says Huxley,¹ "can never be greatly improved until such time as most of its members choose to become theocentric saints." If Cro-Magnon man had argued in this way, we should still perhaps be living at an aboriginal stage of culture.

What, we may ask, does Aldous Huxley mean by the term "theocentric saints"? This raises the third feature of his book, an enthusiastic account of that long line of christian religious mystics, including such names as the early, shadowy, Dionysius the Areopagite, and his even more mysterious master, Hierotheus; the mediaeval Julian of Norwich, Angela of Foligno, and Master Eckhardt; the counter-reformation St. Juan of the Cross and St. Teresa. Father Joseph was of this line. Mystical contemplation is, in contrast with its name, a clear and definite tradition, embodying a recognisable variety of individual psychological experiences; the dark night of the soul, the union of the spirit with God, and so on; the very extreme of other-worldliness and therefore suspect to those who are, as I think, rightly, concerned primarily with human life in this world. As Sir Thomas Browne put it:—

"And if any have been so happy as truly to understand christian annihilation, extasis, exolution, liquefaction, transformation, the kisse of the Spouse, gustation of God, and ingression into the divine shadow, they have already had an handsome anticipation of heaven; the glory of the world is surely over, and the earth in ashes unto them." (*Hydriotaphia*, ch. 5.)

Exactly so. But it is not in ashes to those who desire above all the well-being of their fellow-men in human society and

¹ Loc. cit., p. 248.

hence the advancement of human civilisation. It is really no paradox at all that Father Joseph should have played the sinister part he did as the great Cardinal's power behind the throne. One might almost say that his social aims were so limited precisely because of the mystical quality of his religion. His courses of action were not the only ones possible in his historical period. Contrast him with the great Czech bishop, Comenius.¹ One could say that the better course at that time was neither to retire into mystical contemplation leaving politics to the politicians, nor on the other hand to swallow, lock, stock and barrel, the aggrandisement of the French monarchy as the means towards a renewal of the Crusades; but to work, as Comenius did all through the Thirty Years' War, for the improvement of education, for the advancement of natural knowledge, for the application of science to government, and for the unification of humanity in that world-state to which we have not even yet attained. Or, in a more adventurous life, did not the Parliament's revolutionary army have its chaplains, a Hugh Peters and a William Dell?

It is extremely interesting that Aldous Huxley admires the tradition of christian religious mysticism, not because it is christian, but precisely because it is not. He traces it correctly to its ancient Indian origin,² whence it entered Buddhism as well as Christianity, a conclusion which the standard works on mysticism seem to find unwelcome, though they cannot overlook it.³ It seems to have appeared first in the Upanishads, said to date from the eighth century, B.C., and the line into christian thought by way of Plotinus and the Neo-Platonists is pretty clear. More interesting still, Huxley welcomes this mystical tradition as a possible basis for a world-religion. There do indeed appear to have been two fundamental

¹ See p. 215.

² Loc. cit., pp. 47, 49.

³ Cf., e.g., *Mysticism* by E. Underhill (London, 1911), pp. 186, 543, and W. R. Inge, *Christian Mysticism* (London, 1921), pp. 101, 112, 118, 147.

strains in the history of religions, one which we may call the other-worldly strain (Indian-Buddhist-neo-Platonic-mystical christianity) and a second which we may call the this-worldly strain (Confucian-Hebrew-prophetic-social-revolutionary christianity). The first of these, worked out in political terms, tends towards caste¹ and fascism; the second, worked out in the same way, tends towards democracy and communism. In all ages men have had to choose between them. The existence of this second strain explains why it has been possible for progressive social movements at various times in history to have a christian form.

Hence also in the history of christian theology, the two interpretations of the Kingdom of God. Though Hebrew realism might prophetically place it on earth and in the future, Graeco-Indian mysticism spiritualised it out of existence. In a world of hard economic facts, with a possessing class determined to brook no challenge to its authority, it was inevitable that the mystical interpretation would win. As a great Cambridge theologian has said: "The putting off to another life in another world of the Kingdom and the realisation of its conditions, is perhaps the greatest apostasy that the history of religions can disclose."² And in one of the letters of Thomas Arnold of Rugby we have an Early Victorian expression of the same idea. Writing to a friend in 1827 about his projected book on christian politics, he said it would "embrace also an historical sketch of the pretended conversion of the kingdoms of the world to the kingdom of Christ in the fourth and fifth centuries, which I look upon as one of the greatest *tours d'adresse* that Satan ever played. I mean that by inducing kings and nations to conform nominally to christianity, and thus to get into their hands the direction of Christian society, he has in a great measure succeeded in keeping out the peculiar principles

¹ The expected reference to social castes appears on p. 250 of *Grey Eminence*.

² J. F. Bethune-Baker, *The Faith of the Apostles' Creed*, p. 52.

of that society from any extended sphere of operation, and in ensuring the ascendancy of his own."¹

But to-day we find that there is a marked affinity between the old hopes for the coming literal kingdom of social justice which have been handed down to us, and the new certainty of the future triumphs of human civilisation based on the facts revealed by biology and sociology. With a new meaning we can echo the Diatyposis of the Council of Nicaea²:—

“We look for new heavens and a new earth, when there shall have shone the appearing and kingdom of the great God and our saviour Jesus Christ; and the saints of the Most High shall take the Kingdom. And the earth shall be pure and holy, the earth of the living and not of the dead, and the feet of the poor shall tread it.”

In the seventeenth century this faith would have been acceptable alike in Cromwell's army council and in Comenius' study, but not in the bureau of Richelieu and Father Joseph.

The likelihood of the pseudo-paradoxes of Aldous Huxley finding as wide an understanding as they will doubtless find a wide circle of readers, is small. There are few who appreciate the technicalities of mystical psychology. But the message will reach those for whom it is intended surely enough by way of the popularising pulpits and microphones. Aspire to sainthood, they will say, and always remember that saints, like scientists, must *keep out of politics*. It is true that the message has some inconsistencies. Everything, it says, is already as well-ordered as it can possibly be until you have all become Boddhisattvas, but at the same time if you try to change anything, you will find yourselves dragged

¹ Stanley's *Life of Thomas Arnold*, London, 1901, p. 46.

² Cited in Blunt's *Dictionary of Doctrinal and Historical Theology*, p. 472.

down to that despicable moral level on which, strangely enough, everything is ordered so well. The fact is that the message is nicely calculated to arouse alarm and despondency in the minds of men and women of good-will who would otherwise give their practical aid and support to progressive social politics, and it therefore requires a decisive exposure.

RELIGION AND POLITICS

(In its original form a lay sermon in Clare College Chapel, 1935)

Some time ago the Dean of my College called a meeting of undergraduates to consider together their responsibilities and privileges as christians and members of the English Church. This meeting I too was invited to attend, and my contribution to it was, though perhaps a little unexpected, something that I was very glad indeed to give. I propose to try this evening to follow up the line of thought I then suggested. It would be a good thing, said the Dean, if we learned better what prayer means; if we became more deeply attached to the central action of the Church, the Holy Eucharist; if we spent a certain amount of time on the study of the history of religion and of that majestic form of it into which we, as Western Europeans, happen to have been made members by the accident of our birth. To all this I added yet another recommendation, supported by the strongest emphasis I could muster, namely that we should more consciously devote ourselves to the study of the social and political movements of our time, in order to try and ascertain which of them are obstacles to what we believe to be the will of Christ and which of them we can accept as agreeable to that will. We pray daily, "Thy Kingdom come, Thy will be done, on *earth* as it is in heaven," but do we really take the trouble to understand what is going on around us? Do we really bother to consider whether these things that are going on are steps towards the Kingdom or steps away from it? Presently we will consider further the concept of the Kingdom; first of all it will be worth

while to give attention to a fundamental lie that stands in our way.

If christianity does not exist in a sort of social vacuum, but should be something running through the whole of our practical life, we should, as has been suggested, be deeply concerned to examine the philosophy underlying social doctrines. Communism, fascism, nazism, nationalism, internationalism, rooseveltism; which of these doctrines is most in accord with the teaching of the Gospels? And here at the outset we come to what I just now described as the fundamental lie, namely, that the Church must not concern itself with politics. Religion, it is held, is a private and personal matter, concerned only with the spiritual well-being of the individual. With men in general it has nothing to do. This is, I profoundly believe, an appalling distortion of the christian faith. Such a point of view may sometimes be put persuasively, but when we hear a maxim such as "Religion is one thing, Business another," we see it in its true colours and hear the authentic diabolic note. Let me quote to you a charming passage that I found the other day in Mr. John Ligon's *True and Exact History of the Island of Barbadoes*, published in 1657.

"When I came home," he said, "I spoke to the Master of the Plantation, and told him that poor Sambo desired much to be a Christian. But his answer was that the people of that Island were governed by the lawes of England, and by those lawes we could not make a Christian a Slave. I told him my request was far different from that, for I desired to make a Slave a Christian. His answer was that it was true, there was a great difference in that: But, being once a Christian, he could no more account him a Slave, and so lose the hold they had of them as Slaves, by making them Christians; and that by that means should open such a gap, as all the Planters in the Island should curse him. So I was struck dumb,

and poor Sambo kept out of the Church; as ingenious, as honest, and as good-natur'd a poor soul as ever wore black, or ate green."

Compare with this what the Bishop of London said in 1727:—

"Christianity and the embracing of the Gospel does not make the least alteration in Civil Property, or in any of the duties which belong to civil relations; but in all these respects it continues Persons just in the same State as it found them. The Freedom which Christianity gives is Freedom from the Bondage of Sin and Satan, and from the dominion of Men's Lusts and Passions and inordinate Desires; but as to their outward Condition, whatever that was before, whether bond or free, their being baptised and becoming Christians, makes no manner of change in them."

He was writing to the masters of the plantations in the Southern States. So a way had been found (in such matters the ingenious theologians always eventually found a way) of reconciling the Church and the slave trade.

That was in the Barbadoes more than two centuries ago, but do not comfort yourselves with the belief that everything is different now. The seventeenth-century style only masks a parable, just as applicable today as it was on the day it was written. Our firmly-held theological equality in the eyes of God, our more dubious equality in the eyes of the law, have never yet gone hand in hand with equality in the relations between man and man.

Now since we have mentioned theology, let us give a good theological reason why the restriction of christianity to the world of theory is a fundamental lie. Such a restriction is a flagrant contradiction of the sacramental principle. Other great world-religions we need not consider here, but of christianity it is assuredly true to say that christians must be

to a large extent materialists psychologically if not philosophically. Many thinkers believe that the whole tendency in philosophy to make allies of metaphysical idealism and theism or christian theology since the time of Berkeley was a tendency in the wrong direction. Certainly from the psychological point of view there is much materialism in christianity. "Christ," wrote John Seeley¹ "did not depreciate the body. On the contrary, he showed, through his whole career, a tenderness of the bodily well-being of men, such as no philosophical school except the Epicureans had shown, and such as the Epicureans themselves had not surpassed. He spent the greater part of his short life in healing sick people, and of the comforts which he restored to others he did not disdain himself to partake. He was to be met with at weddings; many of his discourses were suggested by the incidents of feasts at which he was present; and so marked was the absence of asceticism both in his own life and in that which he prescribed for his disciples, that his enemies called him a glutton and a wine-bibber." We *are* concerned, then, about the bodily well-being of our friends and comrades, we *do* take an interest in the satisfaction of their material needs, we *must* refuse to be content with vague hopes and pious aspirations for their well-being in some other world. Here and Now is the eternal life, the life of love and comradeship. Heaven is where there is Fellowship.

I confess this christian materialism has always deeply appealed to me as a physiologist. "'Tis highly dishonourable for a reasonable Soul to live in so divinely built a Mansion as the Body she resides in, altogether unacquainted with the exquisite structure thereof," said Robert Boyle, and one can understand that those who spend many years in an intimate scientific contact with flesh and blood may acquire a certain peculiar respect and affection for this strange machinery, a kind of special sympathy for it, much more christian in my belief than the exaggerated dislike for the body and all its

¹ *Ecce Homo*, 1865, p. 93.

functions which many of the saints uncritically inherited from Indian asceticism.¹ From this point of view the central communal activity of the christians acquires a richer meaning. The Blessed Sacrament of the Mass, the Holy Eucharist, the Ever-Glorious Divine Liturgy, by whatever name you call it, is full of materialism; we take real bread and real wine, the ancient symbols of Melchisedek, charged with tremendous, ancient and yet simple significance, and we celebrate and make before God the holy mysteries, which represent at one and the same time the happy meals of friends and the sacrifice in flesh and blood of those who give their lives for the coming of the Kingdom.² But I am insisting that all this is nothing but the purest poison if it exists in our minds unrelated to anything else. To derive from the Mass some special spiritual thrill without connecting it with any action on our part is to become an addict of spiritual cocktail drinking, cocktails in which the opium of the people is one of the main ingredients.

There comes into my mind another illustration of christian materialism.³ In the gospel for today there is the passage about the feeding of the five thousand. So many people so far from food-supplies was a difficult proposition. Surely what happened then has a special significance for our understanding of christianity. Obviously there were two things Jesus did not do. First, he did *not* take advantage of the scarcity of loaves and fishes to form a limited company with

¹ Here I would particularly refer the reader to Havelock Ellis' *Affirmations*, 1898, pp. 164 and 206 ff.

² Cf. *Ecce Homo*, p. 139 "The christian communion is a club-dinner; but the club is the New Jerusalem; God and Christ are members of it; death makes no vacancy in its lists, but at its banquet-table the perfected spirits of just men, with an innumerable company of angels, sit down beside those who have not yet surrendered their bodies to the grave."

³ Cf. "A christianity which, dominated by fear, dismisses the marxist insight as mere materialism, will only alienate imaginative youth and leave it eventually a prey to secular mationalism and totalitarianism, into which an anti-christian socialism must finally be transformed and which a timorous christianity will be compelled to sanctify." J. M. Murry, *The Price of Leadership*, p. 148.

the apostles in order to exploit the substantial excess of demand over supply. No doubt many of the public sitting on the ground had money on them, and many would doubtless have been prepared to pay a good stiff price for even a piece of a loaf and the tail of a fish. Moreover, with the miraculous productive methods that seem to have been available on that occasion, the apostles could have made their fortunes in one afternoon and retired to Capri on the proceeds. However, other counsels prevailed. Or again, it might have been held that man doth not live by bread alone. All these people have come out here into the wilds of the country to this meeting, and if they brought no provisions with them, it only shows the incapacity of the lower orders to manage their affairs and understand the value of foresight. They must, in any case, as working-class people, be accustomed to hardship and going without food, and a fast tonight will do them no harm, especially as in the heavenly mansions of the future life, they will receive an abundance of good things. Better to keep the loaves and fishes for those who have to do the hard work of talking. No, you do not need to be told that these are but bad dreams; what actually happened was something very different indeed. What it was, and how the loaves and fishes were made to go round, even with a superabundance which led to the collection of food left over, it is not my business as a scientific worker to tell you. What you think about the credibility of the miracles in the Gospels I do not know nor care. But I must suggest to you that the productive capacity of the processes which modern science has given to humanity is, if we may speak loosely, as miraculous as anything could be, and would certainly have seemed so to anyone living in the Roman empire and familiar with the productivity of human industries at that time. So what we want to know is what is happening to the loaves and fishes today. If the love of our neighbour of which the Gospels speak, means anything, it undoubtedly means a concern for his bodily welfare and the

mental happiness that depends upon it. If people at the other end of the world are finding it more profitable not to make loaves than to make them, and people as near here as Lowestoft and Yarmouth are throwing the fishes back into the sea as soon as they have caught them, while at the same time a large number of plates exist which should have loaves and fishes on them, but in actual fact have little or nothing on them (and I know not a few in this town), then where has our christianity got to, and what good will the spiritual thrill derived by coming to church services do us? But, of course, the inequality in the distribution of the good things of this world is a political matter, and as a great many people have probably already told you, Religion can have nothing to do with Politics.

Yet there cannot be much room for doubt about the real meaning of the christian religion; the Church states it for us categorically at the beginning of every Mass; "thou shalt love the Lord thy God with all thy mind and all thy strength, and thou shalt love thy comrade as thyself." John Evangelist provides the link between these two commandments when he says, "If a man love not his brother whom he hath seen, how can he love God whom he hath not seen?" And the sacramental principle, to which we have already paid some attention, lays down that besides inward and spiritual graces, there shall also be outward and visible signs. How, then, shall the outward and visible sign of the love between man and man be brought into being? This is the compelling reason, as I said at the beginning, why it is absolutely obligatory upon each one of us, if he proposes to be a christian in anything but name, to give the gravest thought to the great social and political movements of our time, both revolutionary and evolutionary, in the attempt to decide which of them shall command his allegiance. This difficult thinking process has always been necessary in every age of the Church's history, but never more so than now, when in the opinion of many, we are standing at a parting

of the ways which may be as fundamental as the parting of the ways between the old order and the new at the beginning of the christian era itself. If you shirk this task you will go dead, as they say, from the neck up, in a variety of ways; I will try to show you three of them.

First, you will in all probability fall a victim to one of the several fantastic attitudes to life which are always lying in wait for those who cannot face it as it really is. The concept of escape mechanisms is a familiar one in psychology, but a great army of people make use of them who have never opened the pages of a psychological book. Certain kinds of poetry belong in this category. The escape mechanism into unreality will vary a good deal according to the social status of your group. If one comes to the University, one is likely to be led into the support of some slogan such as "Back to the eighteenth century," and if one has a little private means or a not too exacting job, one can, by dint of continuous reading of Dr. Johnson and Lord Chesterfield, live so much in the period as to suppose that one can put back the clock of other people's lives as well as one's own.¹ Or we may feel inclined to mediaevalism, and here again, the scholastic philosophers and the Latin poets between them may form a highly efficient insulating medium between ourselves and the outside world. If, on the other hand, we are not of those who come to universities, but have to be content with some modest clerkship, the danger is a little different, and more emotional than intellectual. You will easily find, if your eyes are open to it, an innumerable company of young men who by means of the mass hypnotism and shamanistic hysteria of certain organisations,² succeed in

¹ Cf. the words of Marx: "Thus the Tories in England long imagined that they were raving about the Kingdom, the Church, and the beauty of the Old English Dispensation, until the day of danger snatched from them the confession that they were only raving about Ground Rent."

² The faults of these are, of course, only faint shadows in comparison with the youth "movements" of nazi-fascist dictatorships.

persuading themselves that all is well with our social system. In themselves there may be nothing wrong with them, but they are liable to be used as a substitute for religious-political thinking, and to that extent they are the enemy I am warning you about. This point has been emphasised recently by Harold Stovin in his interesting book *Totem*.¹ In our religious political thinking, we must be realistic or nothing.

Somewhat akin to this is the second sort of death which you may die. If you are theologically-disposed, there will be a powerful temptation to be occupied with dead theological issues, to tithe mint and cummin, and to neglect justice and mercy, the weightier matters of the law. One need not speak of a preoccupation with matters of ceremonial and liturgy; admirable in its place as an archaeological hobby, this may become, as I have seen in some of my friends, no less than a mental carcinoma. Or you may be concerned with the union of the churches. Anyone tempted along these lines might be well-advised to ponder the following suggestion, which I offer to you without comment, that the reunion of the churches will take place in the last ditch of opposition to world-communism.

Thirdly, it is, I think, a sort of mental death when one is utterly unprepared for those great events which come upon us, in the old words, like a thief in the night. You can never foresee even approximately what is going to happen. When the first Red battalions marched through the streets of St. Petersburg in 1917; when three years before in Cambridge, recruiting offices had opened, as they did everywhere else in England; when later on in 1926 the General Strike broke suddenly towards the end of the spring; they surprised an immense number of people who with all the best will in the world, had only the foggiest idea of what was happening. Is it good to be among those thousands; is it even right for a christian who means what he says, to be among those thousands? Does it not imply that he has failed to take

¹ London, 1935.

christianity seriously, that he has let drift his obligation to thought, that he has attained no mind of his own about the significance of these great events for his religion and its fate? Under what banner and with what ideals were those first Red battalions marching? Was the European war really a war to end war, to save little Belgium, to honour a scrap of paper; or was it also a war to exhilarate the steel and nickel shares? Was the mining industry in 1926 an industry fit for heroes to work in? The amiable but muddle-headed christians looked blankly out of their windows at what was passing; they didn't know, they couldn't tell. But they ought to have known, and they ought to have taken their stand, either on one side or on the other. They might have paid the divine founder of their faith the compliment of being taken seriously. And if you do not propose to be puppets the next time, you must take him seriously.

So far in what has been said, your conclusions have not been forestalled. Only by implication have I made any suggestion as to where I think you will come out if you follow through your thoughts about christianity into the world of social struggle. But it would hardly be fair if I were to attempt to hide from you my personal convictions, and these may be summed up in the words of Stewart Headlam,¹ that people who come to Holy Communion should be holy communists. This will lead you, if you follow it out, to an increasingly deep conviction that the love of our neighbour is an urge utterly incapable of full satisfaction in a world shot through and through with class-distinctions, radical inequalities in the distribution of the good things of life, and national sovereignties above all moral law. We have said already that to make christian love a purely theoretical concept is to castrate and neutralise it. Yet in a society

¹ Cf. Stewart Headlam's *The Meaning of the Mass*, Brown & Langham, London, 1905, p. 29 ff., and *The Service of Humanity*, Hodges, London, p. 14. There is a biography of him by F. G. Bettany, Murray, London, 1926.

where equal opportunities for the enjoyment of all that life has to offer do not exist, how can we be said to love our comrades? While we enjoy what they can not enjoy, friendly feelings towards them are a snare and a delusion. We are not taking christianity seriously.¹ Do not be deceived by black paradoxers such as Berdyaev²: "When societies begin to hanker after equality, any kind of renaissance and harvest of creation is at an end. For the principle of equality is one of envy, envy of the being of another, and bitterness at the inability to affirm one's own. The passion for equality is a passion for nothingness." That is a lie. The principle of equality is one of love; it is the burning desire to share with other people the delightful things which we come upon as we journey through life, the things to eat and things to drink, the scenes and songs, the useful implements and the attractive objects. That there should be a true *communitas* in work and pleasure; that "all mankind should come into the general dance."³

I see no sense in disguising from you the fact that, if you set out seriously to fight for these ideas, there will be much distress to be endured, much sacrifice, much association with crude people you had never dreamed you would be one with. There will also be much indignation and hatred; a surprising thing for minds brought up in the namby-pamby pietistic style of christianity. As one of our Cambridge historians has written, "The Enthusiasm of Humanity does indeed destroy a great deal of hatred, but it creates as much more; selfish hatred is indeed charmed away, but a not less fiery passion takes its place. . . . The bitter feelings

¹ In recent years all countries in Christendom have had lonely socialist prophets of God's commune. After Stewart Headlam there was Conrad Noel of Thaxted in England; Leonhard Ragaz at Zurich in Switzerland, with his journal *Neue Wege*; and José Bergamin in Spain with his journal *Luz y Raya* (cf. *Days of Our Years*, by P. van Paassen, 1939).

² *The End of Our Time*, 1924 p. 54.

³ The words of an old Cornish carol.

which so easily spring up against those who thwart us, those who compete with us, those who surpass us, are destroyed by the Enthusiasm of Humanity; but it creates a new bitterness which displays itself on occasions where before the mind had reposed in benevolent calm. It creates an intolerant anger against all those who do wrong to human beings, an impatience of selfish enjoyment, a vindictive enmity to tyrants and oppressors, a bitterness against sophistry, superstition and self-complacent heartless speculation; and an irreconcilable hostility to every form of imposture, such as the uninspired inhumane soul could never entertain.”¹

The true destiny of mankind is seen in the Proper Preface for Trinity Sunday—“neither afore nor after other, without any difference or inequality.” And from this arises the christian ideal of leadership from within, not from above. The principle of equality, too, involves the great moral virtue of humility, that humility which recognises the similarity of the fundamental needs of the simplest worker with those of the most profound intellectual or administrative genius. For how many and great evils is spiritual pride not responsible. As Auden says:—

“All true democracy begins
 With free confession of our sins;
 In this alone are all the same,
 All are so weak that none dare claim,
 ‘I have the right to govern,’ or
 ‘In me behold the Moral Law’;
 And all real unity commences
 In consciousness of differences,
 That all have wants to satisfy
 And each a power to supply.
 We need to love all since we are
 Each a unique particular

¹ Sir John Seeley, *Ecce Homo*, 1865, p. 222.

That is no giant, god or dwarf,
But one odd human isomorph;
We can love each because we know
All, all of us, that this is so:
Can live because we've lived; the powers
That we create with are not ours."¹

If we take christianity seriously, moreover, we can find no excuse for that terrible and obsolete doctrine which sets national units beyond all ethics and gives them the right to plunge humanity into wars at least as appalling as the World War of 1914-18. This it is which leads men such as Reinhold Niebuhr, the American theologian, to speak of "moral man" contrasted with "immoral society." Are we loving our comrades in other lands if we remain content with fearful acquiescence in a world divided by national sovereignties? In the words of Sigmund Freud: "Although in our ignorance of the individual processes of societal formation we do not claim any great significance for our assertion, we might nevertheless say, that the overcoming of nationalism, that macroscopic repetition of narcissism, and the building of higher social units in the form of confederations of states, is the future task of Eros."²

"To set in order—that's the task,
Both Eros and Apollo ask."³

¹ This raises the question whether there is any historical connection between democracy and christianity. The commonly assumed connection has been contested in a striking essay by Freda Kirchwey (*Nation*, New York, 1940, p. 521) and by A. G. Whyte (*The Danger of being an Atheist*, R.P.A., London, 1940). While the history of democracy as a political doctrine does not begin with christianity, it would never, in my belief, have reached its modern forms and its vast distribution without the backing of the christian view of the importance of individuals and their essential equality. Soviet communism powerfully furthers this tendency; fascism denies it.

² Cf. *Civilisation and its Discontents*, London, 1930.

³ *New Year Letter*.

It was not the Communist Manifesto which first said "Thou shalt love thy comrade as thyself." Nor was the answer to the question "Who is my comrade?" first given by that admirable document. We cannot be content with anything less than the whole world as the country of the future. This is that country which some call the Kingdom of God; this is that country which Stephen Spender refers to:—

"Readers of this strange language,
We have come at last to a country
Where light equal, like shine from snow, strikes all
faces;
Here you may wonder
How it was that works, money, buildings, interest,
could ever hide
The palpable and obvious love of man for man."

The concept of the Kingdom is of such importance for the line of thought we are pursuing that it is worth while to amplify discussion of it a little. Many of us probably have little belief in the possibility of arriving by scientific biblical criticism at exactly what was meant by a great deal of the Gospels. But this only makes it all the more necessary that we should at least know the various interpretations which at various times in the Church's history have been put upon the difficult passages, so that we can form for ourselves, as it were, myths; myths that will enable us to take our stand on one side or another in the colossal struggle that is always going on. With regard to the Kingdom of God there were several logical possibilities. It has been thought to exist now and here among us, or else now though in some other, spiritual, world. It has been thought to exist neither here nor elsewhere as yet. It has been thought to be a future state upon our very earth. Clearly the most profound distinction is between those who have looked for a Kingdom on earth, whether now or in the future, and those who have interpreted it as meaning an essentially invisible and other-

worldly state. The former have always been in a minority, except perhaps among the "naïve" christians of the first century. It was fully in accordance with the interests of successive ruling classes that they should be.

Christian theology three centuries ago gave up the attempt to apply a this-worldly ethic to human affairs. You can follow the process in many works of historical scholarship. You can examine first how the mediaeval Church, through its scholastic philosophers and divines, laid down minutely what things were lawful and what things were not, with regard to the conduct of economic affairs. We all know how usury, or lending upon interest, a fundamental characteristic of the system of capitalist enterprise, was forbidden by the mediaeval Church, and how by concepts such as the "just price" a certain system of social justice, narrow and static though it might be, was stabilised. Then you can read how from the sixteenth century onwards financiers and merchant venturers gradually elaborated what we know as the capitalist economic system. For its development it was necessary that there should be freedom in economic affairs, freedom to buy as cheaply and to sell as dearly as possible, freedom to set up mechanised production systems and to exploit the labour of other men in them, freedom to lend money upon interest wherever a return seemed likely. The mediaeval Church was one of the greatest obstacles in the way of this "liberating" process. You may read in Weber and Tawney how the Protestant theologians led the way in renouncing the claims of religion to control economics, and in Robertson and Borkenau how the Catholic theologians, seeing which way the world was moving, trimmed their sails to meet the ill wind, and adapted their demands accordingly. Not till all this is realised can you understand, for example, what was the ulterior significance of the fight between Pascal and the Jesuits, or what was the real meaning of our English civil war. The Jesuits wished to reconcile catholicism with capitalism; Pascal was a mediaevalist. The English civil war

was not fought between King and Parliament, as we are taught in the school history books; it was fought between the feudal mediaevalist and Anglican government on the one hand and the financial interests of the City of London on the other. But we must not be hasty in making historical judgments. We need not hesitate to admit that in the seventeenth century capitalism was the progressive force, and feudal mediaevalism was the obscurantist one. The question we shall have very seriously to ask ourselves is whether capitalism is still a progressive force. And the tragic thing about the religious aspect of these historical changes is that when the control of economic affairs was wrested from us Churchmen, we were so thoroughly defeated that we dared no longer insist on the basic principle of the realisation of the earthly Kingdom of God. The ancient theories of the Church being overthrown, no effort was made to better the theories of its adversaries. And so religion became one thing and business another, as I said at the beginning.

The Kingdom of God is like to a certain man (it was said), the which had two sons, and he came to the first and said, Son, go work today in my vineyard. He answered and said, I will not, but afterwards he repented and went. And he came to the second and said likewise, and he answered and said, I go, Sir, and went not. Which of them twain did the will of his father? So it is today. The thing that hath been, now is. If we christians will not work for the coming of the Kingdom, the Kingdom shall be taken away from us and given to all kinds of dreadful people, people who call themselves dialectical materialists; people who regard religion as an abomination, opium for the enslavement of the simple; people who arrange anti-God museums and turn churches into libraries. Ever since the Renaissance, at least, the christians have been saying "Sir, I go" and not setting a little finger towards the work. It is the atheists, on the contrary; the sons who say "I will not," who have made

mighty progress towards the attainment of the Kingdom of God, the Kingdom of comradeship, the new country.

In a short while it may be too late, I always remember that sinister passage of the Cambridge philosopher, C. D. Broad, in which he says :—

“The conclusion of the whole matter seems to be that perpetual mental progress is certainly not logically impossible, but certainly not causally inevitable, in the sense of being bound to happen whatever we may do. On the other hand, there seems to be no positive reason to believe that it is causally impossible, in the sense that it is bound *not* to happen whatever we may do. So far as we are concerned, the possibility depends on our getting an adequate knowledge and control of life and mind before the combination of ignorance on these subjects with knowledge of physics and chemistry wrecks the whole social system. Which of the runners in this very interesting race will win, it is impossible to foretell. But physics and death have a long start over psychology and life.”¹

And this is the meaning of what Day Lewis writes :—

“All you that have a cool head and safe hands,
Awaken early, there is much to do;
Hedges to raze, channels to clear, a true
Reckoning to find. The other side commands
Eternity. We have an hour or two.”

¹ The concluding paragraph of his *The Mind and its Place in Nature*, London, 1925.

Final Revision
Anning, Yunnan
July, 1944

CAMBRIDGE SUMMER

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additions from the Cambridge Review and elsewhere)*

I

The mere idea of a university in vacation-time brings to mind the disquisition of Charles Lamb on the subject.¹ No doubt the pleasure he got out of it was partly due to the fact that in ordinary life he had nothing to do with it, and so could easily imagine himself whatever he liked—a D.D. for ten minutes while walking through King's; a Reader in Pathological Entomology or what not while strolling up Tennis Court Road. But no less, for those who do belong to it in ordinary life, is pure pleasure to be found in vacation-time. The blessed absence of undergraduates releases the tutor from his hundred and one little jobs, and the scientist can get something done in his laboratory without having to worry about tomorrow's nine-o'clock lecture. In the evening, Colleges sit down to dinner in combination-room and not in Hall, with sevens and eights instead of twenties and thirties, so that conversation becomes more interesting, and dons who have belonged to the same college for years without time to see much of each other, can make some contact at last. Best of all if hot weather comes in August and September. The University is practically empty, and a sort of general lifting of clothes conventions makes itself felt. Eminent physiologists are seen passing along Trinity

¹ In *Essays of Elia*.

Street in shorts, and a historian in a Palm-Beach suit is no rarity.

It is at such times that one realises how well Cambridge is provided with places where one can swim. Even in the middle of the town there are good places in or beside the river, and the river itself upwards from Byron's Pool is one long and excellent bathing-place. It was there that I used to experience, when a young student, a curiously vivid sensation of unification with Nature. One felt at first reluctant to dive in, thinking of all the creepy things in the river-mud, the decaying leaves, the insects on the surface; but all of a sudden an almost ecstatic identification of the clothless self with the sum of beautiful coloured natural things around sent one flying into the river like a projectile. Long afterwards it seemed that perhaps Ludwig Feuerbach had felt the same. For he wrote, "To bathe is the first, though the lowest, of virtues. In the stream of water the fever of selfishness is allayed. Water is the readiest means of making friends with Nature. Man rising from water is new, regenerate man."¹

Happily the country round Cambridge, especially towards the north-east where the fens are, is wonderfully well provided with wild pools. To such places one may go off for a whole day, carrying two or three books, and with fair confidence that no one, except a few farm-workers, perhaps, will be met with. One of these pools lies very difficult to find in what is practically a piece of untouched fen. It is surrounded with reeds whose stems are almost white, but bear at the top their long green blades which stream unanimously out in one direction if there is a little wind. If you lie flat on the bank of the diving-place and look along the pool, you see a picture of reeds in the best Chinese manner. Then if you dive in, you find the water absolutely clear and beautifully brown, contrasting marvellously with the brilliant blue of the surface, reflecting the sun. Or at midnight, on

¹ *The Essence of Christianity*, p. 272.

one of those few nights of the year when the air and water are warm enough, it is lovely to swim through the moon and stars glittering on the water. Nor are excellent smells wanting, for the water-peppermint is about, and there is always a slight unidentifiable smell of fresh waters which delights those bathers, who, like myself, find nothing but disadvantages in the sea. Growing all round the pool you get ragged robin, purple loosestrife, scabious, and what Scottish friends call mouse's pea. And there in some convenient place you may lie, reading and swimming alternately, with your cells hard at work manufacturing vitamin D, and storing it, you hope, for your advantage in the coming gloomy Cambridge winter, abounding in cold and rain.

But meanwhile, wherever you look, the heart is rejoiced. In the distance, across the flat landscape, certain rows of poplars stand up, and an uninterrupted view of the whole sky can be had. There are those who pretend that no landscape has virtue unless it contains hills; to please them, everything must be at an angle to the horizontal, and flatness is dull. But others, of whom I am one, find constriction in hills and freedom in the plain; moreover, if you are as interested in clouds as in anything else, only a flat country allows you to observe them. Hills, too, are distracting; they take off your attention from the small but beautiful details of your surroundings. Market Hill, with a gradient of about one in 10^6 , is quite hilly enough for me.

Quy pool is not the only swimming place near Cambridge. Towards Fordham there is a deserted brick pit which gives an impression of inconceivable depth, and where someone has fixed a high springboard. Tall derelict chimneys are reflected in the water. In 1919 there used to be a fine bathing place of white earth and bright blue water in the coprolite diggings near Hauxton, but after several years it was suddenly invaded one summer by a rapidly growing red weed which silted it up and spoilt it. And many another pool and stream could well be sung; celebrated as yet by no adequate poet.

It is surprising that Cambridgeshire has never had poetic justice done to it, and that no Matthew Arnold has arisen to deal with Madingley Hill and Bottisham Lode as well and faithfully as their Oxfordshire colleagues. Rupert Brooke, it is true, did something in this direction, but his praise was double-edged, for he found it necessary to vilify half the villages in the county in order to hand out compliments to Grantchester; a place pretty enough, indeed, but no better than many others. John Milton, I like to think, was speaking of Cambridgeshire in *Lycidas*, but no one will ever know, for he took no pains to make the references explicit, and the well-attir'd woodbine might have been growing anywhere, though I hope and believe it was at Haslingfield. And there are "Cowslips wan that hang the pensive head" in great numbers near the chalybeate spring at Knapwell, if you choose the right time to go there, as no doubt Milton did when, with Edward King, his friend, he "drove a-field, under the opening eye-lids of the morn." Yes, on the whole, he must have been talking of Cambridgeshire: "Mean while the Rural ditties were not mute, Temper'd to th' Oaten Flute: Rough Satyrs danc'd," and so on—one remembers that Madingley and Comberton were "desperate Morris places" right up to the middle of the last century. And the wooden Plough Monday plough still rests intact, though little used, at Balsham. And at Little Downham they expect the arrival of the dancers to "do the droves"; they "look for them to come."

I suppose that one reason why so little has been written in praise of Cambridgeshire is that the county as such does not form an aesthetic unit. In the south, the hills around such places as Chishall are of a piece with Hertfordshire or the Chilterns; in the north, the valley of the Ouse (that lovely river) might well be part of Huntingdon; and in the east, the fens, with their geometrical drains and Dutch gables, are not confined to Cambridgeshire but stretch over into Norfolk and Lincoln. And yet one would have thought that

the neighbourhood of Cambridge was beautiful enough to raise up ten major poets. Nor are historical associations wanting, as witness Bourne, where the Ferrar family lived after Nicholas had retired from the business of the Virginia Company in London, and before they moved to Little Gidding to found their illustrious religious house, the chapel of which is still standing, as beautiful as ever. To Bourne rode out one Mr. Richard Crashaw from Peterhouse, making up verses probably, as he went, and happy to see there the ingenious Mr. George Herbert, lately Orator of the University, and now vicar of Leighton Bromswold, just over the border into Huntingdonshire. Mr. Herbert would tell them, doubtless, of the fine obelisks with which he was capping the repaired church tower at Leighton, and of the two panelled pulpits he was erecting (still there to this day), one on each side of the chancel arch, to show the people that the Book of Common Prayer was just as important as the preacher's sermon. And back Mr. Crashaw would ride, to find, probably, bad news awaiting him in Peterhouse combination-room, some new political victory of the puritans, some new attack on the Church. Or if his luck was better, he might find his friend from London, Mr. Abraham Cowley, come to spend a few days with him in that Society, and full of information about the doings of the natural philosophers, at Merton College, Oxford, and elsewhere, or ready to consider whether the Roman Church could be accepted if the English Church were utterly levelled by puritanism. In the end it was Crashaw who went and Cowley who stayed, to write:—

“Pardon, my mother church, if I consent
That angels led him when from thee he went,
For e'en in error such no danger is
When join'd with so much piety as his.
His faith perhaps in some nice tenets might
Be wrong: his life, I'm sure, was in the right.”

Or again, go back some fifty years to another little theological episode. In the 1580's Cambridge was in a condition of permanent convulsion, owing to the war between the puritans and the orthodox Church of England men. They lectured against each other in the schools, and preached against each other in Great St. Maries, they insulted each other at dinner and their student followers fought after dark in the streets. Of all the Anglicans, none was more learned, wise and commendable than young Master Lancelot Andrewes, the junior fellow of Pembroke, who lost no opportunity of censuring the strict sabbatarianism of the opposite faction. For this he was constantly preached at on Sunday afternoons in the University Church, but at last he had the best of it in some such manner as follows:—

“The puritan faction (says John Aubrey) carried themselves outwardly with very great sanctity and strictness; they preached up very strict observing the Lord's day and made damnation to breake it. Yet did these hypocrits bowle in a private green every Sunday after sermon; and one of their College (a loving friende to Mr. L. Andrewes) to satisfie him one time lent him the key of a private back dore to the bowling green, on a Sunday evening, which he opening, discovered these zealous preachers, with their gownes off, earnest at play. They were strangely surprised to see the entry of one that was not of the brother-hood.”

Paradise Gardens was the name of the place where the puritans played at bowls, and Paradise still exists; a back-water of the Cam between Cambridge and Grantchester. For hundreds of years the gentle river-water has welcomed the men of Cambridge, townsmen and gownsmen alike, coming out to swim on hot summer days. William Stukely, the archaeologist, who went up to Corpus in 1704, wrote in his diary:—

"I used to frequent, among other lads, the river in Sheep's Green and learnt to swim in Freshmen's and Soph's pools, as they are called, and sometimes in Paradise, reckoning it a Beneficial Exercise."

And unlucky Walter Haddon, a student of King's, was drowned in 1567 while washing himself "in a place in the river Cham called Paradise."¹

The other day, as I lay in the sun beside one of the fen pools, I had for companions two books little known today, but precious as containing the very essence of seventeenth century life. One was Peter Heylyn's *Life of Archbishop William Laud*, the other Henry Isaacson's *Life of Bishop Lancelot Andrewes*. Nothing that has been written since compares at all, to my mind, with the prose of the seventeenth century, which has weight without the ponderosity of subsequent times, and grace without romanticism. How delightful it was to read Heylyn on Andrewes:—

"This year we lost the stupendiously learned prelate, Dr. Lancelot Andrewes, Bishop of Winchester, in the oriental tongues surpassing knowing; so studiously devoted to the Doctrine of the Ancient Fathers, as his extant works breathe nothing but their Faith; nor can we now read the Fathers more than we should have done in his very Aspect, Gesture, and Actions; so venerable in his Presence, so grave in his Motions; so pious in his Conversations; so primitive in all. The World wanted learning to know how learned he was; so skilled in all (especially the Oriental) languages, that some conceive he might (if then living) almost have served as an Interpreter-General at the Confusion of Tongues."

An excellent conceit. Far away in the distance there was the implacable hum of a tractor, harvesting on a farm

¹ A. Austin-Leigh, *History of King's College*, p. 64.

towards Horningsea, speaking a language symbolic of the future, a language of tremendous possibilities, but sometimes seeming too alien from the past and the ideas of the past. How difficult to translate into it the spiritual and intellectual beauties which the men of the past found it worth while to live for. The task would try to the uttermost, I thought, even the interpretative powers of Lancelot Andrewes. I turned to Isaacson, again both lovely and instructive:—

“To Pembroke Hall, where he had been a scholar, fellow and master, Bishop Andrewes gave one thousand pound, to purchase land for two fellowships, and for other uses in that Colledge, together with a gilt cup and a bason and ewer, in all points, as weight, fashion, inscription, etc., so like to the cup, bason, and ewer, given about three hundred years before to that colledge by the religious foundress thereof, as that no *ovum ovo similimus*; and these, he professed, he caused to be made and given, not for the continuance of his own memory, but for fear that those which she had given so long since might miscarry, and so her remembrance might decay.”

The tractor continued its background noise, as if straining steadily towards another spiritual world. “You look back too much,” it said, “and not forward enough; the future is there and its colour dark or light as you help to make it.” Perhaps we find ourselves at a term or period in the history of civilization when there is no virtue left in the old traditions and the new have not yet been made. Lancelot Andrewes could look back to the Countess of Pembroke with clear vision, certain that he belonged to the same tradition as she. It was the mediaeval tradition, composed of rigid class distinction, duties from above to below, commerce controlled by theology, and life an antechamber to Heaven. But just as Andrewes lay dying in the palace at Winchester,

divers resourceful and crafty merchants in the City of London, who feared neither God nor man, were hard at work laying the foundation-stones of that capitalist system of private enterprise and usury which changed the face of Andrewes' world and presently brought even the Church to submission. Andrewes' chaplain could well preach in high Thomistic vein at Winchester against usury—eighty years later any who should have challenged the right of citizens to lend their money upon interest would have been thought mad indeed. The Civil War transferred the right of oppression from the Court to the City, where it still is today.

What traditions those will be that will arise in the classless society of the future, who can tell? But we may hope that in the end, when the dust has cleared away, some thoughts will return to the seventeenth century and Lancelot Andrewes, who also, in his day, prayed for social justice, though vainly thinking it could come within the framework of the feudal classes and by the strict prohibition of high finance.

I put down Isaacson and took up Heylyn. Royalist, Anglican, reactionary though he was, he was very much aware of the talents latent in the mass of the people. I decided to copy out a lively passage of his which might be headed "On Birth," Archbishop William Laud, he said:—

"was not born therefore of such poor and obscure Parents as the publisher of his Breviat makes him, much less *e faece plebis* (out of the dregs of the People), as both he and all the rest of the Bishops were affirmed to be by the late Lord Brook (who of all others had least reason to upbraid them with it) in a book of his touching the nature of that Episcopacy which hath been exercised in England. But granting that he had been born of as poor and obscure parents as those Authors make him; yet must it needs add to the commendation of his Parts and Industry, who from so mean and low a birth, had raised himself into such an Eminent Height

of Power and Glory, that no Bishop or Archbishop since the Reformation had attained the like. The greatest Rivers many times have the smallest Fountains, such as can hardly be found out, and being found out, hardly quit the cost of the discovery; and yet by long running, and holding on a constant and continual course, they become large, navigable, and of great benefit unto the Publick. Whereas some Families may be compared unto the Pyramides of Ægypt, which being built on great Foundations, grow narrower and narrower by degrees, until at last they end in a small Conus, in a Point, in Nothing. . . . Which brings to my mind the Answer made by Mr. Secretary Pace to a Nobleman about the court of King Henry VIII; for when the said Nobleman told him, in contempt of learning, that it was enough for Noblemans sons to wind their Horn, and carry their Hawk fair, and to leave study and learning to the Children of Mean Men; Mr. Pace thereunto replied, Then his Lordship, and the rest of the Noblemen, must be content to leave unto the sons of meaner Persons, the managing of Affairs of State; when their own children please themselves with winding their Horns, and managing their Hawks, and such other Follies of the Country."

A very subtle passage. Doubtless Laud and Heylyn were on the reactionary side of ecclesiastical feudalism, on the losing side; but in this stout affirmation of the career open to talents they were men of their age, a changing age, just as much as the merchants of the city or the officers and men who met in the Council of the New Model Army to debate the fundamentals of democracy. Of course, the encouragement of "poor scholars" in the universities had had a long history previous to this, for the feudal system had been long decaying. This thought put me in mind of that charming description given by Dean Nowell of St. Paul's about 1590

of the benefactions which Mistress Jocosa Frankland gave to my own College in Cambridge. I always like it for its genuine humanity, and moreover the tale repeated itself almost exactly in the history of the founding of Stanford University centuries later in far-away California.

“ . . . One Mrs. Jocosa Frankland, late of Herts., widowe” (Dean Nowell was writing to Archbishop Whitgift), “had only one sonne, who youthfully venturing to ride upon an unbroken young horse, was throwne downe and slaine. Whereupon the mother fell into sorrowes uncomfortable; whereof I, being of her acquaintance, having intelligence, did with all speed ride unto her house near to Hodgden to comfort her the best I could. And I found her cryinge, or rather howlinge continually, O my sonne, O my sonne. And when I could by no comfortable words stay her from that cry and tearing of her haire; God, I thinke, put me in minde at the last to say: Comfort yourselfe, good Mistress Frankland, and I will tell you how you shall have twenty good sonnes to comfort you in these your sorrowes which you take for this one sonne. To the which wordes only she gave eare, and lookinge up, asked, How can that be? And I sayd unto her, You are a widdowe, riche and now childlesse, and there be in both Universities so many poore toward youths that lack exhibition, for whome if you would founde certaine fellowships and schollerships, to be bestowed upon studious younge men, who should be called Mistress Franklands schollers, they would be in love towards you as deare children, and will most hartely pray to God for you duringe your life; and they and their successors after them, being still Mistress Franklands scholers, will honour your memory for ever and ever. This being sayd, I will, quoth she, thinke thereupon earnestly. And though she lived a good time after, yet

she gave in her Testament to the College of Brasen Nose in Oxford a very greate summe, and to Gonville & Caius College in Cambridge she gave £1,540 in money, and annual rents besides."

It was now after sunset. I closed up the books and departed from the pool.

II

The swimming places of which I was speaking just now are all, of course, highly unofficial. But Cambridge has a number of official ones, too, each with a distinct *esprit de quartier* of its own. Furthest out is the bath on Coldham Common, not far from the so-called leper chapel of St. Mary Magdalene on the Newmarket Road, a charming little Norman building which it is thought was rather the chapel of the famous Stourbridge Fair. Here on Coldham Common, since it is nearest to the railway, brawny drivers and firemen may be seen cleaving the water. Misdummer Common, too, has its bathing-pool, an attractive place embanked around with shrubs on a hill; it resounds loudly with the shouts of children in the summer-time, but it was the scene of my one attempt to continue an early morning swim right through the winter. When we were living in an old eighteenth-century house in Thompson's Lane I used to cycle through the mists and fogs along the river bank until one dreadful morning in November my friend failed at the rendezvous and our enterprise stalled.

On the river itself there are two chief bathing-places, the so-called "Town Sheds" on Coe Fen itself, and the "University Sheds" embowered in trees some considerable way further up, and reached through that isolated bit of Cambridge which still preserves, like Greenwich Village in New York, the name of Newnham Village. In the last century, when the University bathing-place took its present form (I

do not believe it was there already in 1705, as some affirm), one supposes that it would have been far beneath the dignity of "Varsity men" to mix with the populace on Coe Fen. Issuing from their brown-grained panelled rooms, from their ginger-tiled fireplaces with little brackets beside them for whisky-and-soda, rising from their green baize-covered tables, they sought, with tiny little caps on their heads and enormous beards on their chins, a more dignified seclusion. The "University Sheds" are a sort of quay, sloping backward like a staithe, with a long low building behind of wood and corrugated iron, on the top of which Professors lie and daringly take the sun. I can honestly say I have never once bathed there; I never belonged to the University Swimming Club (it always seemed to me an extraordinary thing that one should have to swim in a club—why not a club for sleeping or breathing?), and I always frequented the "Town Sheds" on Coe Fen. For years now the Town Council made these far more elegant than the others, with delightful lawns and beds of flowers at the edges and good springboards on the banks.

It is a truth, indeed, that those who disdain to mix with the people miss a very great deal. Their idea of paradise is that of the man who woke up in a dream in an empty place and remarked, "This certainly must be Heaven. There isn't a soul in sight." Paradise creek in summer-time would certainly not please them. Returning one hot summer evening after some particularly pleasant exchanges at the Town Sheds, I got out my commonplace-book and turned to a page on which I had written a number of passages come upon at various times, celebrating that easiness of intercourse with people in general which the kind of sincere people I admire usually show. It would be too portentous to call it a sense of due humility, but the intuitive recognition on the part of complex and learned people that simple and unlearned people are of the same essence as themselves is, to my mind, the root of the charm which the truly great possess. Of Sir

F—— G—— H—— it was said that he suffered fools gladly and that all his geese were swans. Although this sometimes produced inconveniences, it was far better than habitually biting off the heads of their students and denying the existence of any young swans, as so many “proud professors” do. Of Sir C—— S—— it could be truly said that though a physiologist and not a scholar of Oriental matters, he perfectly obeyed the injunction of Confucius to behave to every one as if receiving a great guest. And so with Sir H—— H—— and some few others, though, alas, not the majority.

I suppose what I tend to regard as the *locus classicus* of this type of personality is that saying of John Aubrey’s about Dr. William Harvey. Aubrey said he had spoken with a country sowgelder, a man of little school-learning but much rustic wisdom and experience, with whom Harvey had often had discussions—“and had he been,” the countryman went on, “as stiff as some of our starched and formall doctors, he had known no more than they.” Useful for any scientist, this human attitude must be especially so for an anthropologist. I was not surprised to find this in the account of the great Cambridge ethnologist, A. C. Haddon, by H. J. Fleure:—

“Haddon was deeply attached to lowly folk, and his frank simplicity, as well as his vital consciousness of the non-logical elements in the thoughts and desires of even the completest European, helped him to get near to them. He could often see what, from their point of view, was the justifiable motive for acts and customs that shocked Western conventions.”

I could well imagine that this had been true of Haddon as I knew him in his old age. So also A. J. Tiddy, the man who saved for us from oblivion the orally handed-down texts of the English Mummers’ Plays, before his death while still young in the first world war.

"When Tiddy bought a cottage at Ascott-under-Wychwood he felt he was making a home for himself among his own kind. His neighbours were his friends and there was nothing he enjoyed so much as to be talking with the people young and old in and around the village. Because he felt no social barriers they ceased to exist."

This is reminiscent of a somewhat more extravagant but very striking description of de Quincey.

"His whole aspect and manner exercised an indefinable attraction over everyone, gentle or simple, who came within its influence; for shy as he was, he was never rudely shy; making it always his 'pride to converse familiarly, *more socratico*, with all human beings, man, woman, or child'—looking on himself as a catholic creature standing in an equal relation to high and low, educated and uneducated. He would converse with a peasant lad or servant girl in phrases as choice and sentences as sweetly turned as if his interlocutor were his equal both in position and intelligence; yet without a suspicion of pedantry, and with such complete adaptation of style and topic, that his talk charmed the humblest as it did the highest that listened to it." (J. R. F.)

There are some amusing examples, of course, where a failure of recognition of the nature of one's audience degenerates into pure pedantry and even becomes ludicrous. There is a story of an eminent theologian of St. John's who preached at a service for the College Bedmakers during the Christmas vacation. His sermon was so long that the organist fell asleep, and on waking was surprised to hear the preacher crying argumentatively to the old women, "But, you will say, Tertullian is on our side. . . ."

Lastly, the supreme social grace of humility is as often found among women as among men. From an essay

on L. Stevenson's *Life of Sydney Owenson*¹ I culled the following:—

“Lady Morgan had a wholesome respect for the rich and great; but she was prepared to smile as sweetly and prattle as artfully, for the benefit of an audience whose social status was far beneath her own; and, her husband having been taken ill and put to bed at a country inn on the way home to Ireland, Lady Morgan (we are told), in the intervals of nursing him, passed her time ‘sitting on the bench in front of the “Black Bull,” conversing with the landlord, the boots, and the rector, and standing pints of ale to the passers-by.’ ”

But to return to the river. As the years go by, Cambridge customs improve. Passing some tennis courts the other day, young men were to be seen playing clad only in white shorts and shoes, an admirable and healthy sight. The reign of the bathing-dress, and then of the bathing-shorts, steadily extended itself year by year down from the upper reaches of Cam and Granta to the very College gardens themselves during my twenty-five years. I rejoiced to see it, and was often reminded of the Greek attitude to the body, so long overlain by mediaeval asceticism. But my second thoughts were always of that helot population on which the Greek city-states were built. The slavery of artificially made morons might be one degree better than that of helots with all the capacities of free men, but our ideal society has no place for slavery at all. A classless society of unascetic uninhibited men and women in equal comradeship based on universal mechanisation and control over the forces of Nature would be in a sense a dialectical synthesis of the Greek and the Christian ethos. Hence the interest of the following passage:—

“William Liebknecht says that Marx, excited and flushed over an electric locomotive that he had seen on

¹ London, 1936.

exhibition in Regent Street in London, exclaimed, 'Now the problem is solved! The consequences are incalculable. In the wake of the economic revolution the political must necessarily follow, for the latter is only the expression of the former.'"¹

And we remember Lenin's watchword "Electrification! Electrification!"

III

Those who do not know the Fen Country north-east of Cambridge have missed one of the most fascinating and specialised types of English scenery. The straight canals and high-chimneyed pumping-stations, like Holland (of which we are reminded by many Dutch names and traces of Dutch architecture, the relics of Sir Cornelius Vermuyden and his seventeenth-century engineers); the "islands" standing out above the plain at Stuntney and Downham and especially at Ely:—

"Ely the stately,
Shining a landmark
O'er the broad waters
Gold-bright in sunrise
Gold-red in sunset
Grey in the waning
Kissed by the moonbeams
Glimmering through mist-cloud
Magic and matchless,
Tower of the Lord God
Lord Everlasting
Dreaming o'er Fenland
Upland and Seaboard
All through the ages."

¹ M. M. Bober, *Karl Marx's Interpretation of History*, Harvard, 1927, p. 10.

There are innumerable delightful surprises in the Fens; the Wisbech and Outwell steam tramway, for example; but on a pumping-station between Pymore and Suspension-Bridge the following remarkable inscription is to be found, written in black letters on a white board in a style suggesting a date such as 1812:—

“These Fens have oft-times been by Water drown’d;
Science a Remedy in water found;
The Power of Steam, she said, shall be employ’d
And the destroyer by itself destroy’d.”

Pondering the reason for the strange charm of these rustic lines, far in the wilderness, with nothing in view but flat fields of black earth and a geometrically straight canal, it occurred to me that it echoes one of the favourite paradoxes of the great Latin hymns. The *Vexilla Regis* for example:—

“On whose dear arms, so widely flung
The Price of this world’s ransom hung,
The Price which He alone could pay,
And spoil the Spoiler of his prey.”

Or take a little country church hidden away in an unfrequented valley just over the border into Essex on Cambridge’s south-eastern side—Hempstead. There is indeed a reason for pilgrimages to Hempstead, for none other than little Dr. William Harvey, England’s greatest physiologist, lies buried there. In long after years Hempstead’s tower was struck by lightning, and such bells as remained were placed in a wooden campanile in the churchyard. Hence it is now easy for us to read on one of them the following verse, at first sight obscure, and even at second sight containing a false quantity:—

BARBARA SIRENUM MELOS DULCEDINE VINCO

“I, Barbara, conquer with my sweet music
the song of the Sirens.”

Outsinging the singers, despoiling the spoiler, bringing death to Death and harrowing Hell, negating the negation. However sophisticated we become, the resurrection remains the symbol of the triumphant rise of humanity from the dark night of animality into the bright day of the heavenly city.¹ And the cost of it is the voluntary sacrifice of that innumerable company of beings at all stages of social evolution who have given themselves for others in the assurance of a hope that often they only dimly understood. Of this sacrifice the Cross is the ever-enduring symbol. But the compassionate Kuan-Yin also turns back on the very threshold of Paradise, unable to leave the world of suffering while her ears are still assailed by so many little cries. Long may it be before we cease to appreciate the beauty of old words recording these things, such as the runes on the Ruthwell Cross, where the tree itself is speaking:—

“Then the young hero, who was mightiest God,
 Strong and with stedfast mind,
 Up to the Cross with steps unfaltering trod
 There to redeem mankind.
 I trembled but I durst not fail.
 I on my shoulders bore the glorious king.
 They pierce my sides with many a darksome nail
 And on us both their cruel curses fling.”

Or the most triumphant poetry of the resurrection ever made (by Master William Dunbar, sixteenth century, in Scotland):—

“Done is a battell on the dragon blak
 Our campoun Chryst confountit hath his force;
 The gettis of hell are broken with a crak
 The signe triumphall rasit is of the croce,

¹ Cf. Matthew Arnold's words on resurrection, *Culture and Anarchy*, p. 153.

The divillis trymmyllis with hidous voce,
The saullis are borrowit and to the blis can go,
Chryst with his blud our ransomis dois indoce;
Surrexit Dominus de Sepulchro. . . .

He for our sake that sufferit to be slane
And lyke a lamb in sacrifice was dight,
Is likke a lyon risin up agane
And as a gyant raxit him on hicht;
Sprungin is Aurora radius and bricht
On loft is gone the glorious Appollo,
The blissful day depairtit from the nicht;
Surrexit Dominus de Sepulchro."

IV

Pacing along the grass-grown quays at King's Lynn on another summer day, I discovered the infallible formula for delightful places in which to spend one's days of rest and refreshment. Seek for the Abandoned Trade Route. This formula never fails, whether it be beside some overgrown canal piercing the Cotswolds, at a charming tavern where once the bargees used to pause for a drink before their long passage underneath the earth; or whether it be on the rocky coasts of Devon and Cornwall where certain quays, the haunt now of but a few rustic fishermen, used once to be the main channels of entry and exit to whole regions of inland country. So also in Cambridgeshire. Bottisham Lode and Twenty-Pence Ferry; Mare Way, Orwell and Foxhole Downs; Bourne Bridge station on the old Newmarket-Great-Chesterford railway where the metals were taken up long since and only the cuttings and embankments remain; or the Via Devana rolling over the chalk; all have the nostalgia of human business over which the waves of many years have washed. And of such places, Clayhithe, down

river from Cambridge, where the towpath ends, is rightly numbered. An old tavern, beside the only bridge between Cambridge and Ely, has grass sloping down to the river. One may sit there enjoying a cup of tea, while across on the other side a microcosm of industry dozes in the afternoon sunshine. A ghost of a quay, an official weather-beaten house with a large panel of printed matter concerning harbour-master's dues, river conservancy rules, and so on. To the left, a ghost of a shipyard with a three-legged derrick, but with no appearance of having been used these thirty years.

Such is the place in which to meditate. Why not about the real world of industry today, in the midst of whose roar thought is more difficult?

. Among the books I have read in leisure afternoons in that charming spot, none gave me more pleasure than those of Pierre Hamp. It seems that Hamp is a writer little known in this country. Perhaps he has not been translated into English owing to the technicalities of which his work is full—necessarily so, since he deals always with “*La Peine des Hommes*,” the daily work of trades and professions. He sees that to be doing a job that one enjoys, *aimer son métier*, is the highest point of human felicity, but he also sees that in the modern world such jobs have become rarer and rarer, partly owing to the collapse of craftsmanship before mass-production, partly owing to the insensate lust for profits, and partly owing to the control of working conditions by administrators who have never been workers themselves.

Pierre Hamp's masterpiece, I believe, is *Le Rail*.¹ Anyone at all acquainted with railway technology will have little difficulty with its terms, and will enjoy every page of this detailed account of the life of a large railway centre, for that is what it essentially is. The book contains almost no women and derives its fascination wholly from the description of the interplay of character between the officials and subordinate workers in the different departments. In its structure,

¹ Paris, 1924.

too, the book is interesting, for just when you are beginning to feel a little of the monotony accompanying the daily attempt to accomplish the impossible, a serious accident to an express occurs, and with the unexpected suddenness of such events in real life, you are plunged into the immediate horror of it, and the havoc and disorganisation in the system which follow it. The latter part of the book is taken up with a brilliant description of a strike. And in this connection one gets a little enlightenment regarding anti-clericalism in France, for the so-called "Catholic Unions" are set up side by side with the real ones, highly to the benefit, of course, of the company.

In a brilliant passage, Pierre Hamp exposes the value of continental catholicism to the capitalist system. After the conclusion of the strike, M. Griaux, the locomotive superintendent, is talking to M. Bally, the engineer of the repair shops. The parish priest, the abbé Heyndrickx, has furnished firemen and fitters to replace those victimised by the company for their part in the strike, and M. Griaux is taking leave to doubt the efficiency of the new men:—

"Never mind" (says M. Bally), "he takes pains to find us well-affected minds. The way our moderate men were carried away by the revolutionary hotheads shows that our percentage of Catholic personnel was insufficient. It must be raised. Reflect, M. Griaux, that the railway, like the army, requires absolute discipline. The army can establish it by force and has no need of persuasion. But for us such constraint is forbidden, and we must persuade. Now where can we find a more perfect school of submission than the Catholic Church? From one end of the hierarchy to the other, the obligation is to obey, the layman to his priest, the priest to the bishop, the bishop to the Pope, the Pope to God. Translate this discipline into terms of the railway, and you have the ideal organisation. And this has nothing

to do, M. Griaux, with beliefs, with faiths, or with this or the other dogma. They are without importance. It is the philosophy alone of the Catholic Church which is important for us, and that philosophy is, Obey, Obey."

What corresponds in England to the emotional force of catholic obedience in France would make the subject of an interesting investigation.

From *Le Rail*, I went on to *Marée Fraiche*,¹ which describes the passage of fish from the North Sea to the table of a city restaurant, in terms of the conditions of work of the men involved. How well the following passage illustrates the kind of psychological clash which is so common:—

"In the goods yard, the shunters' horns were ceaselessly blowing. A long train had stopped before a danger signal. Beside it, the inspector, while waiting for the signal to change, was delivering acid remarks to M. Ramblenne; an excellent man, nevertheless, who had been a shunter for fifteen years. Such work left him ill-prepared to reply to the criticisms of an office worker for whom everything amounted to figures on pieces of paper. The habit of seeing all realities in terms of statistics had removed from the inspector all conception of the indocility of matter. He would have liked everything done as quick as thought, and could not appreciate the difference between moving one's tongue to say 'thirty wagons' and actually getting them moved; tare: ten tons; total: three hundred thousand kilos."

And then in *Vin de Champagne*² there is a remarkable description of a glassworks where the bottles are made, and of the vineyards, their owners vainly struggling against the big merchant corporations. I read also *Mes Métiers*, in which

¹ Paris, 1923.

² Ibid.

Hamp describes autobiographically his apprenticeship to the trade of cook and confectioner.

Why have we no English Pierre Hamp? Grierson's documentary film, *Drifters*, was an attempt at a similar objective, carried out in terms of the cinema for the English fishing industry, but it lacked the compelling power of a consciously proletarian sympathy, and gave only a cold analogy to *Marée Fraiche*. The trawlers were looked at, as it were, from a great distance, so far away that everything seemed happy and contented. Yet there is a vast scope for an English Hamp. Ernest Bevin once gave some particulars about the London bus-drivers. In 1926 the average horse-power of bus engines was forty, in 1932 it was ninety. In 1921 they drove a bus that carried thirty-four passengers, in 1932 there was room for sixty-five. Yet although the traffic conditions have become much more difficult and the number of passengers has practically doubled, the hours worked by drivers are exactly the same, and two conductors are not provided to do the doubled work. On the contrary, in 1932 we found general wage-reductions demanded in this industry. There would be no lack of work for an English Hamp.

V

In whichever direction one decides to go out from Cambridge on a sunny summer morning, one will be travelling into the past as well as in space, so saturated with memories is the East Anglian countryside. One takes down, for instance, the footpath map. There, to the south, is a good direction, past Hauxton Church (with its long hidden mural painting of St. Thomas of Canterbury, that staunch friend of the people), diverging before Harston to Fowlmere and Thriplow. Fowlmere was the village where the charming, perhaps unique, May Day carol was found:—

"Awake, awake, good people all
Awake, and you shall hear
That Christ has died for our sins,
For he loved us so dear. . . .

A branch of may I've brought to you
And at your door it stands,
It is but a sprout, but it's well budded out,
By the work of our Lord's hands.

Now my song, that is done, and I must be gone,
I can no longer stay,
So God bless you all, both great and small,
And I wish you a joyful May."

Thriplow, with its cruciform church, has sterner memories. For it was on Thriplow's bare and wind-swept heath where Cambridgeshire borders on Hertfordshire that in June, 1647, the victorious New Model Army met in general assembly, and refused even to listen to the Commissioners of Disbandment sent down from Parliament. The Army's manifesto declared that it was not mercenary, but the free commoners of England drawn together and continued in judgment and conscience, for the defence of their own and the people's rights and liberties. The regiments (21,000 men) pledged themselves not to disband until security was obtained that "we as private men, or other the freeborn people of England, shall not remain subject to the like oppressions, injury, or abuse, as hath heretofore been attempted." At this stage of the revolution Cromwell and Ireton were still able to lead the army as a whole. It proceeded to the occupation of London.

These were the regiments which elected democratic delegates to the General Council of the Army, known by the name of "Agitators"—the first time the word was used. They were so called because they were appointed to *do* something (not hearers of the Word only), to see that the council

carried out the wishes of the mass of the army. The Council met first in the great church at Saffron Walden—another pleasant journey from Cambridge today, through Duxford and Roman Ickleton. A journey pleasant to me, since it leads into Essex and to the town of Thaxted, the very embodiment and incarnation of England, though the England of More and Bunyan, Blake and Owen, not of Gresham, Pitt and Rhodes. For there *are* two Englands. As Tessimond has so well written:—

“The generous smile of music-halls,
Bars and bank-holidays and queues;
The private peace of public foes;
The truce of pipe and football news.

The smile of privilege exultant;
Smile at the ‘bloody reds’ defeated;
Smile at the striker starved and broken;
Smile at the ‘dirty nigger’ cheated.

The old hereditary craftsman;
The incommunicable skill;
The pride in long-loved tools, refusal
To do the set job quick or ill.

The greater artist mocked, misflattered;
The lesser forming clique and team
Or crouching in his narrow corner,
Narcissus with his secret dream.

England of rebels—Blake and Shelley;
England where freedom’s sometimes won,
Where Jew and Negro needn’t fear yet
Lynch-law and pogrom, whip and gun.

England of cant and smug discretion;
England of wagecut, sweatshop, knight,
Of sportsman, churchman, slum-exploiter,
Of puritan grown sour with spite.

England of clever fool, mad genius,
Timorous lion and arrogant sheep,
Half-hearted snob and shamefaced bully,
Of hands awake and eyes asleep.
England the snail, shod with lightning,
Shall we laugh or shall we weep?"

But wherever you go, East Anglia's days of greatest seventeenth-century glory have left their mark. Out north-west, perhaps, towards Huntingdon and St. Ives, or by way of St. Neots to Bedford. There, a few miles out, is Childerley Manor, still retaining its mediaeval chapel by the lake, whither the New Model's general staff rode out for a conference with the captive King, newly apprehended by Cornet Joyce, and temporarily lodging at Childerley. Or on the left there is Toft, where in a large barn John Bunyan used later to preach, and where he fell into argument loud and long with the University Librarian (the Arabic scholar, Thomas Smith), who happened to be passing that way. Mr. Bunyan in his youth had been a soldier of the Parliament, a member of the revolutionary garrison of Newport Pagnell. At St. Ives itself, of course, Mr. Cromwell was himself for many years a farmer.

It was on this very Huntingdon Road that a couple of incidents took place of which I often think. Nothing shows the confused atmosphere of the early phase of the revolution so well as the account of two young Royalists, the Branstons (whose father was an eminent judge), who were riding from York to Essex in September, 1642:—

"In our return on Sunday, near Huntingdon, between that and Cambridge, certain musketeers started out of the corn and commanded us to stand; telling us we must be searched, and to that end must go before Mr. Cromwell and give account of whence we were come and whither we were going. I asked, Where Mr. Cromwell was? A soldier told us he was four miles off, I

said, it was unreasonable to carry us out of our way; if Mr. Cromwell had been there I should willingly have given him all the satisfaction he could desire; and putting my hand into my pocket, I gave one of them twelve pence, who said, we might pass. By this, however, I saw plainly that it would not be possible for my father to get to the King with his coach; neither did he go at all, but stayed at home till he died."

About the same time, the Colleges, both at Oxford and Cambridge, were invited by letter to send silver and plate to the King's Treasury. The response at Cambridge was very poor, only two Colleges sending a consignment, and the waggons containing it were ambushed by Mr. Cromwell and a troop between Cambridge and Huntingdon. The plate was thus safely lodged in Cambridge castle, and probably went to swell the funds of the Eastern Counties Association. The place where the ambush took place is traditionally identified with Lolworth wood, which marches with the main road just east of Lolworth village.

Those who are always searching for pleasant waters find them in plenty over from Cambridge towards Bunyan's Bedfordshire and Cromwell's Huntingdonshire. For there runs the valley of the Ouse, a lovely river already at Bedford, and improving as it passes under so many old stone bridges at St. Neots, Huntingdon, and St. Ives down to the border of the fens at Earith. The bridges, some of them so narrow that they have traffic lights on them now, echoed once to the hoofs of the New Model's troops of horse. And everywhere, as at Houghton Mill or the Hemingfords, there are excellent places where one can swim, or row a boat, or simply sit on the bank, chew grass-stalks, and read a book.

In such surroundings, in a moored boat with the water gently lapping, I read one year what I came to regard as one of the greatest books of our generation.

Among the literature of our time, so critical with decisions

about the future of human civilisation, there is much that is escapist, much that is trivially realistic. Poets are face to face with serious dilemmas; the necessity of writing for the mass of the people on the one hand, and the desire to elaborate subtle poetic forms on the other. Causes for the decay of popular taste receive detailed attention, a decay which no one doubts but for which few can show, so long as present conditions continue, any remedy. Q. Leavis¹ regards it as the escape from a life where *l'ouvrier ne chante plus*; and as the result of the pure play of the profit-making motive in the writing and publishing trade; N. Bachtin² as the outcome of an atomistic society of competitive monads with absolutely no common purpose which the poet can express. Into all this there came a book reminiscent of John Bunyan's *Pilgrim's Progress*, or rather his *Holy War*, portraying the spiritual situation of today with unerring accuracy by means of a spacious allegory.³ With justice I found inscribed on its first page—"For our contention is not with the blood and the flesh, but with dominion, with authority, with the blind world rulers of this life, with the spirit of evil in things heavenly."

In one matter, at any rate, John Bunyan (whose ghost, I hope, was looking over my shoulder) had the advantage of Rex Warner. The spiritual truths which he was concerned to demonstrate by his allegory were the common property of the vast mass of his readers. But today the christian tradition, for better or for worse, has ceased to have the universal appeal which once it had, and the minds of the people are no longer conditioned to receive it. Hence Rex Warner was forced to construct a mythological framework of his own, and of course that made his allegory considerably more obscure than it would otherwise have been. But the general meaning of *The Wild Goose Chase* is plain. If Bunyan was

¹ *Fiction and the Reading Public*, London.

² In an address at Cambridge.

³ *The Wild Goose Chase*, by Rex Warner, Lane, London, 1937.

concerned primarily with the struggle of the individual human being to attain blessedness, Warner proclaims that the individual's aim can only be attained through comradeship in the collective enterprise of humanity. This is in line with many great currents of christian thought, and if Bunyan emphasised the individual, that was of the essence of puritanism and part of its historic task. But Heaven is where there is fellowship.

The style in which *The Wild Goose Chase* is written is one of delightful simplicity which never jars on the reader, and the likeness to Bunyan is reinforced by occasional faint echoes of seventeenth-century prose. But Warner has drawn on many other sources of inspiration, such as the novels of Kafka with their atmosphere of subjection to mysterious and perhaps meaningless authority, and the work of the Surrealists in their nightmare juxtaposition of incongruous events and objects. In the beginning of the book three brothers set out from their home town, a provincial seaside resort, and after some adventures, pass across the space-time frontier into a new country in a search for the breeding-place of the Wild Geese. This country has a rural population of enslaved, oppressed, and rather stupid peasants. In the centre is what is called The Town, a vast completely roofed-in concrete structure, hundreds of square miles in area, and surrounded by cloud-piercing towers and walls. Within the town there is The Government, working according to highly developed scientific technique with an organisation apparently perfect. Its servants are the ubiquitous Police, who wear crystalline helmets, carry electrically energised straw truncheons, and are constantly in touch with headquarters by wireless. One of their weapons is their continual silly laughter, and the ridicule which they pour on anything real. All the manifestations of the Government and its servants convey in a brilliant manner that atmosphere of *slightly sinister irrationality* required to make a biting satire of most human governments today. The police keep in subjection, besides

the peasants, large numbers of miners and industrial workers who live in caverns beneath the town. Their task is rendered the easier by the regimentation of the intellectuals, mostly hermaphrodites, who live in an enormous college, known as The Convent. Here are cultivated Science for Science's sake, and Art for Art's sake. In the Research Department there was "a poet who had invented a new language, but could neither pronounce a syllable of it nor attach any meaning to any of its words. There was an artist who spent his time rapidly arranging fir cones on the floor of his cell, and sweeping them together again with his hand when he was for an instant satisfied with their arrangement." The inmates were encouraged to gratify every wish, however cruel, absurd, or repulsive to the ordinary mind. The Convent is indeed a satire on the degeneration which intellectual culture suffers when it cuts itself off from the life of the human collectivity in the processes of material production.

Introduced into The Convent, George (the best and youngest brother) is asked to referee a football match between the Pros and the Cons, played on a rubber ground and finished off with machine guns and an armoured car, in spite of the fact that the score had previously been decided upon and announced by the Government. His attempts to referee fairly land him in trouble, but he appeals to the king. He is taken first to an aristocratic fencer, who speaks of Youth and Action, but turns out not to be the real king and passes him on to a scientist in a laboratory. In his search for the real king, he reaches at last the sanctum of the ecclesiastical business man with the piercing eyes, from whom he escapes only with difficulty, and whom he is not to meet again until the end of the book. This part of the allegory well depicts the uncertainty in which so many find themselves regarding the real seat of power in modern human societies. A quotation at this point may serve to give an idea of the book's whole atmosphere. George is about to referee the football match. "Puzzled, he made his way back to the main entrance hoping

to find the games master or some other person who could supply him with a whistle. . . . I have been treated, he thought, in two opposite ways, with suspicion and contempt by the police, and with a certain amount of respect by the inmates of the Convent. How am I to account for a policy which appears self-contradictory? Have the Government perhaps given orders that I am to be treated well inside the Convent (though the behaviour of the students during my lecture was far from satisfactory) and badly outside, to the end that I may be induced to spend my life there, change my manner of thought, and perhaps undergo the operation? Or, for that matter, are the Government aware of my existence? If even their Chief Statistician is unacquainted with them, how can I suppose that they are likely to have taken much notice of me? And yet the Headmaster, or at least some deputy of his, interviewed me from behind a rubber curtain, and the eavesdropping of the Rev. Hamlet is not a fact lightly to be dismissed. True, these men may be very subordinate officials, but they are in touch with their superiors, with whom I, through them, must also have something to do. But my time is slipping away, and so far I have achieved nothing notable."

In the end George returns to the country, and realising that the Wild Goose Chase can go no further until the tyrannical Government of the town is overthrown, casts in his lot with the revolutionary movement among the peasants and miners. After some years a revolutionary army has been built up in secret, and during a series of exciting adventures and battles, the town is captured and the king driven out. All this part of the book, which is excellent, gives much scope for the delineation of typical revolutionary characters, and what with the defections of traitors, the quarrels over how much of the town's culture shall be built into the culture of the new order, and the deviations to left and right, a penetrating description of the choices before men today is given. In some passages of great beauty George

discusses freedom with one of the Convent's intellectuals, Marqueta, who comes over to the revolutionaries, trying to show her that freedom is knowledge of necessity, the necessity of the regularities of nature, and that of work in human community. Above all, he says, the king's Government "waylaid adventurers and did not permit them to chase the Wild Geese." In other words, true creative activity in all its forms, carried on by all those who are capable of doing so, will never be achieved until the essential material relationships between human beings have been set right, until the satisfaction of fundamental human needs has been assured to all; and the only course open to the adventurer (or pilgrim) is to join forces with those who are working and fighting for this end. Seek ye first the kingdom of God, and his *justice*, and all these other things shall be added.

Bunyan's trumpets are not absent. The Town had contained, of course, its Cathedral, the "Anserium," in which the sacred cult-object had been a *stuffed* goose, not a live wild one. The book closes with a mass-meeting, celebrating the successful conclusion of the revolution, in the Anserium. "What our old leaders most respected," said George, concluding his speech, "we chiefly despise—the frantic assertion of an ego, do-nothings, the over-cleanly, deliberate love-making, literary critics, moral philosophers, ballroom dancing, pictures of sunsets, money, the police; and to what they used to despise we attach great value—to comradeship, and to profane love, to hard work, to honesty, the sight of the sun, reverence for those who have helped us, animals, flesh and blood. Let us live, comrades. Long live the Revolution!" And then the trumpets sounded (in a metaphor), but what it was that actually happened, I shall leave to the book's thousandfold readers, both old and young, to discover. For this is a book profoundly germane to the individual of today, and will be understood and treasured when much that now receives praise has long been little regarded.

6

UNIVERSITY DEMOCRACY; A LETTER TO AN AMERICAN FRIEND

(Based upon an article in the Democrat, 1938)

My dear X:

Now that I have a spare moment to set down something about democracy in the English Universities, especially Cambridge, I find the task you have set me quite an enjoyable one. Deeply attached though I am to my first American home, Stanford, out on the Pacific Coast among the dry brown grass and the dark green wild oaks, I was never there long enough to understand much of the inner workings of American University life. I remember, however, enjoying being slapped on the back by one of the student-assistants after a lecture I gave at the Pacific Grove Marine Biological Station, who said with every appearance of warmth, "Say, professor, that was swell." I thought that was indeed nice and democratic. To me, the essence of American democratic feeling is expressed in that story of the transcontinental train conductor who was told that Lord Halifax would be travelling on the train and that he would find the Ambassador very democratic and easy to get on with. To which he replied, "Well, he'll find me just the same."

It has for long been a happy tradition of the students of Cambridge and Oxford that they should look out from their Universities to consider and to debate upon the political events of the world outside. We who know the American Universities realise that this political-mindedness of students is by no means universal. Here in England we enjoy it owing to the historical circumstance that in the eighteenth

century Cambridge and Oxford were the seminaries of an oligarchic class, destined for the training of the clergy and other officials whose duty it would be later on to uphold in every parish the established order. They were also the institutions wherein the sons of the aristocracy could acquire that surface-polish of learning regarded as necessary for the completion of a gentleman. Cambridge certainly suffers today from the persistence of this eighteenth-century tradition in a world in which it has long since become an anachronism.¹ But part of the tradition was a serious attitude to politics, and even Ministers of State do not disdain to come and participate in the debates of the Union Society.

In the so-called "provincial" Universities of this country, this is not so much the case. There the dominant influence in university affairs is often a Board of Governors, largely representative of the greater local industrial and landowning interests. The lines of D. H. Lawrence about the University of Nottingham may be called to mind:—

"Men shall arise and say,
By Boots, I am M.A."

This tendency, although it has not usually gone so far in our country towards the suppression of unorthodox or unconventional ideas among the staff, and the discouragement of political consciousness among the students, obviously leads in that direction. Not long ago I found on one American campus while dining with some distinguished young scientists that they thought it was as much as their jobs were worth to embark on the founding of a local branch of the perfectly respectable scientists' professional organisation. A case occurred not long ago with us at a Northern English university in which one of the lecturers, a distinguished economist, uttered, when in the antipodes, some pacifist opinions in a

¹ For glimpses of eighteenth-century Cambridge, see the immortal *Reminiscences* of Henry Gunning, a contemporary University official, and the novel of F. L. Lucas, *Dr. Dido*, London, 1938.

public speech. His Vice-Chancellor took steps, happily unsuccessful, to oust him, and the case nearly threatened to become a *cause célèbre*.

Control of a university by a Board of Governors closely associated with Big Business is one danger to academic freedom; control by a Government Bureaucracy is another. The restriction of liberty of thought which may follow has been notoriously seen in the German Universities, modelled on those of Prussia long before the nazi régime, though inconceivably intensified since 1933. In France, on the other hand, the activity of research workers within the universities was greatly hampered by the financial economies of the Ministère de l'Instruction Publique, until the Conseil Nationale de Recherche Scientifique, set up by the Popular Front Government, came to save the situation. Cambridge has been particularly fortunate in that the Government grant, which adds a very substantial and essential quota to the University's income each year, is given without any conditions whatever. It must, of course, be remembered that the University is subject to the periodical visitations of Royal Commissions.

In some English Universities there is still an insufficiency of representation of the younger teaching staff on the Board of Governors. The (Government) Universities Grants Committee, in their report for the five-year period preceding 1934, drew special attention to this. "In our last Report," they said, "we drew attention to the desirability of the internal organisation of each university being so developed as to enable the non-professorial staff¹ to feel that they are being given an opportunity of taking a reasonable share in the guidance of the Institution's work. We believe that in most cases, *though not in all*, the non-professorial staff are now

¹ In English terminology. We may take it that full Professors are of the same grade in England and the U.S.A. and that Associate Professor (Amer.) corresponds to Reader (Eng.), Assistant Professor (Amer.) to Lecturer (Eng.) and Instructor (Amer.) to Demonstrator (Eng.).

represented on the Senate or the Academic Board. On the other hand, in a number of cases, no steps have been taken to afford the non-professorial staff any representation on the Governing Body. We cannot but think, judging from the admirable results in those cases where such representation has been arranged, that this policy might be more widely followed." The Report went on to say that the Universities of Oxford and Cambridge possess the most democratic constitutions of all; and to these, or rather to that of Cambridge, we may now turn.¹

It is true that all full graduates of the University are *ipso facto* members of the Senate.² But the Senate would only be called upon to meet in the case of issues of the utmost conceivable gravity, or if in some matter the Regent House were exactly divided. The Regent House (corresponding to Congregation at Oxford) is the real "Senate" and it consists of all the teaching and administrative officers of the University, together with any Fellows of Colleges who do not otherwise qualify and who may be engaged purely on research. Voting in the Regent House in recent years has taken place on all kinds of internal matters, such as the question of grants to the extra-mural lectures board (adult education), the location of the Philosophical Library, the provision of facilities for undergraduates to train as airplane

¹ The relation of Colleges and University is often considered a great mystery by friends from your side. It is best to adopt a historical approach for which such books as these may be helpful: *Early Collegiate Life* by John Venn, Cambridge, 1913; *Caius College* by John Venn, Cambridge, 1901; *Cambridge Papers* by W. W. R. Ball, London, 1918; *Cambridge Revisited* by A. Gray, Cambridge, 1921; *Early Science in Cambridge* by R. T. Gunther, Oxford, 1937.

² Reference may be made here to the fact that the University of Cambridge returns two members to Parliament. Every graduate can exercise this, as well as his territorial franchise. Although in the days before universal education there may have been some point in the view that University graduates were twice as well fitted as other people to guide the counsels of the nation, there can be none now, and the system is one of those survivals which ought to be abolished.

pilots, etc. Such voting is frequently preceded by a brisk exchange of "flysheets," printed résumés of arguments pro and con circulated over the signatures of various groups of Lecturers and Professors. So far the constitution is democratic enough. But strange to say, there is absolutely no provision for "private members' bills." All bills ("Graces") are introduced by the Council of the Senate, either on its own initiative or at the request of one of the various Faculty Boards or other permanent "Syndicates." The Council itself is an elective body, and its ranks are filled from the Regent House by periodical elections, in which any group of members may put forward a name. A person whose name is thus put forward may, indeed, be elected, but there exists, perhaps naturally, a tendency among the less progressive elements in the University (who always have plenty of time) to go and vote for whoever was there before, and a tendency among the more progressive elements (who are usually very busy) to shirk the duty of voting at all. Since no private members' bills exist, anyone who wishes to introduce some new proposal must either (*a*) have a friend on the Council who will introduce it for him or (*b*) collect a sufficient number of signatures among his likeminded friends and send them in the form of a "Memorial" to the Vice-Chancellor. In the latter case there is no guarantee that anything further will happen. Democracy in the constitution of Cambridge does not therefore go to lengths so extreme as the University Grants Committee suppose. Indeed, it is fairly generally agreed that some provision ought to be made for "private members' bills," subject always, of course, to machinery which would weed out purely frivolous suggestions.

On the other hand, the existing mechanisms do provide for a considerable degree of criticism of the policies of the authorities. The various departments of University life, such as the Library, the Press, the upkeep of Buildings, the conduct of Research Studies, etc., are each presided over by a Board or "Syndicate." These councils do in fact frequently have to

take important decisions, though a great deal of their business is extremely dull.¹ Hence the ancient advice, addressed to the young man entering University affairs (an oft-repeated rhyme in Cambridge, but possibly new to you):—

“Let not your thoughts towards Syndicates be soaring,
A place on Boards is scarcely worth the winning,
For Boards of Studies are more bored than boring,
And Syndicates more sinned against than sinning.”

Now from time to time one or other of these permanent executive committees issues a report giving particulars of changes which it proposes to introduce, through the authority of the Council of the Senate, into University practice. These reports are published in the official University journal, and a day is appointed for their public discussion by any members of the Regent House who so wish. The discussions used to take place in the eighteenth-century Senate House, but since the restoration of the mediaeval “Old Schools” to their original purposes, the Regent House has a real Hall of its own. If the arguments advanced by critics of the proposed measure are thought to be sufficiently weighty, the report is sent back to the Syndicate which proposed it for further consideration, and this may happen twice. Eventually the measure may be dropped altogether.

Such arrangements do allow for the expression of democratic principles. To take a recent instance, the Proctorial Syndicate (the disciplinary body corresponding, I suppose, to your Dean of Men) brought in some proposed regulations which it was thought would severely limit the freedom of speech and writing which Cambridge students have long enjoyed. In this case, the criticism expressed by several progressive members of the Regent House was very strong,

¹ The classical guide to University affairs, to be treasured as a *Libellus aureus*, is the work of that late greatly loved ingenious wit and ancient philosopher, F. M. Cornford, *Microcosmographia Academia* (Cambridge, 1922) well worth the noting.

and the critics were accordingly later invited by the Vice-Chancellor to attend a meeting of the Syndicate themselves, and try to arrive, with its members, at some satisfactory arrangement. In the end, the measure was passed in an attenuated form.

Much of the present machinery, therefore, could well be retained, no matter how much the University were improved in other respects.

Within the Colleges great differences exist, according to the variations in their Statutes. Democracy there may mean that every Fellow has to spend long afternoons with his colleagues discussing the repairs to the chancel of Mud-upon-Stoke or the state of the geraniums in the front court's window-boxes. Absence of democracy may mean that the Fellows elect a College Council which then manages everything so well, or rather, so completely, that the rest of them have no serious business to discuss at their General Meetings, and no voice even in the election of new Fellows. How saving of time can be combined with democracy within the Colleges is as yet rather an unsolved problem, but in some cases a satisfactory compromise seems to have been reached.

Colleges and the Senate-House make up, however, only half the life of the University. The great University Laboratories have an intense life of their own, always rather enigmatic to those who work in the "humanities" or in mathematics. The scientific faculties are each a grouping of a certain number of University departments and laboratories. The Faculty Board, which conducts the affairs of the whole, and has sub-committees for degrees, appointments, etc., connects below with the separate laboratories and above with the General Board and the Council of the Senate. Membership of faculties (from which the Faculty Boards are elected) is much wider than that of the Regent House, for it may include research workers of all kinds and those who give special courses of lectures but are not full teaching officers of the University. Here again, as in the Council

elections, there is a tendency for members to shirk their democratic voting duties.

Now the governance of a large laboratory is a very complicated affair, and Professors often have a "laboratory Manager" (one among the lecturers) to assist them in the administrative routine. Each Professor, however, is practically supreme in his laboratory, and the degree of democracy to be found therefore depends almost entirely upon his personality. Not a few of the laboratories have regular staff meetings, analogous to College meetings, at which decisions concerning lecture-lists, the buying of apparatus, help for research students, etc., are made. The difference is, however, that the responsibility is wholly the Professor's, not, as in a College, that of the Master *and* Fellows. In some laboratories, on the other hand, the system is quite autocratic.

It must be admitted that in a laboratory the inconveniences of the class-stratification of our society appear much more markedly than in a College. The servants of the College are segregated. The Fellows do not lend a hand with the cooking or keep an eye on the front gate. But in a laboratory a research worker and teacher of long experience may be found struggling with a recalcitrant gas-cylinder side by side with a laboratory assistant of anything from one to forty years' service. The contradictions of a society divided into classes thus become more glaring. Fifty years ago, indeed, laboratory assistants were little more than servants. An old assistant, now retired, once told me that when he began, as a boy, he would have to carry messages on foot for the Professor all round the town and far into the countryside till ten or eleven o'clock at night. But with the steady increase in the degree of skill required for technical jobs, the laboratory assistant of today is worthy of a much better position than he has. The profession has always been regarded as a kind of "dead-end," and although the University now has a regular pension scheme and fairly good employment regulations, there is much room for improvement, especially in the provision of

facilities for the assistant to have time for study if the desire for intellectual work should awake in him and he should wish to take a degree. There are those who go further and who believe that the laboratory assistants should take part with the research and teaching staff in the discussion of contemplated research programmes. For something of this kind there is much to be said, because an experienced mechanic will often think more quickly of some device required than the biologist or chemist who needs it. But in point of fact, it is happening informally all the time.

There is another matter, too, in which junior as well as senior research workers (and we may say, assistants also) should have a certain voice, namely, in the election of Professors. At present, elections to a given Chair are made by a specially appointed Board of Electors, not all of whom (and this is an excellent feature) are members of Cambridge University. They know the opinion of experienced colleagues about the merits of the candidates. They know (though they are commonly said not to regard) the opinion of the retiring Professor. What they do not know, and presumably do not consider worth knowing, is the opinion of the research workers and the laboratory assistants, although the future happiness of all these may well be at stake. It is obvious that their opinion can only have a certain limited value, but it is characteristic of our imperfect democracy that it should be utterly neglected, and not thought sufficiently important even for a minor place among the data before the Board of Electors.

We now come, perhaps too late, to the great question of student participation in University government. As we all know, European Universities are of two different types, modelled either on Paris or on Padua. Paris was a *Universitas Magistrorum*, that is to say, a spontaneous assembly of teachers, who were willing to teach any who wished to learn from them. Oxford and Cambridge are modelled on Paris. But Padua was a *Universitas Scholarium*, that is to say, a

spontaneous assembly of students, who were willing to learn from any who could show that they had something worth while to teach. I shall always remember once being conducted along a quiet street beside the quays in Leyden in Holland by my friend Professor Baas-Becking (once a colleague of mine at Stanford), when there passed an open landau, with footmen before and behind, horses with red and white plumes nodding in the sunny air, and men in top hats seated within. In reply to my question, the answer was, "Oh, that's the President of the Student Body going to call upon the Chancellor." Leyden was evidently modelled on Padua. To what extent students have a real voice in University government in universities of this type today I do not know, but it is quite certain that they have had less than their share in Cambridge.

Hence moves made in recent years by the Faculty Societies, under the auspices of an Inter-Faculty Co-ordination Committee, towards constructive criticism of the teaching in the various departments, were a most desirable development. It is good to be able to record that after a considerable amount of testing of student opinion by means of questionnaires, etc., the organisers were able to meet representatives of most of the Faculty Boards and discuss with them their problems.

On one point undergraduate opinion seems to have been unanimous, namely the desire for more teaching of the seminar type and less formal lecturing. A thorough reorganisation of the teaching would no doubt lead to the removal of all supervisions from the Colleges to the University, and a rather wide choice both for the student and the supervisor in the personnel of classes. It does not, however, seem to be felt seriously in any quarter that formal lecturing should be reduced beyond a certain minimum or optimum, since it has certain definite advantages. There is no room to enumerate these here, but one of them was expressed by the late Professor Henry Sidgwick: "It may be necessary," he wrote,

"to drive certain students into lecture-rooms in order to increase the chance of their obtaining somehow the desired instruction. I say, increase the chance, because it is by no means certain that young people of this turn of mind will actually drink of the fountain of knowledge, even if they are led to it daily between 10 a.m. and 1 p.m. But the compulsion may, no doubt, increase the chance, since it is difficult to find amusement during a lecture which will distract one's attention completely from the lecturer, although I have known instances in which the difficulty has been successfully overcome by patient ingenuity." Somehow these remarks seem more appropriate to the Cambridge of 1898, when they were written, than to that of 1938.

As for the great changes coming in the future, when the University adapts itself to the onward sweep of socialist democracy, some, in direction at any rate, are already perceptible. In the first place, it is clear that there should be at all stages of student life, a much closer connection between their studies and the organisation of the industries and realms of work which they will later on enter. In a society where class-distinctions have been largely swept away, and where the trade union standards of particular employments are fully safeguarded by the State, there could be no reason why students should not take part, mainly but not necessarily entirely, in their vacation periods, in the actual processes of production. Since, in all probability, university students would be destined for administrative and intellectual positions, a period, not too short, of genuine manual work side by side with those whose permanent vocation it is, would be of the utmost benefit. This has to some extent already been achieved in your American system under which students often earn their living and make their own way through college, but its proper organisation in a socialist state would have enormous advantages, and would enable the student to give the whole of his time to intellectual training during the terms or semesters. Some kind of industrial conscription,

which could occur partly between school and university age, must therefore be envisaged. As the "army enlisted against Nature," it ought to take over some of the more stirring attributes hitherto purely military. It ought to be, in William James' phrase, "the moral equivalent of war."¹

I have often talked with those who decry the College system of Cambridge and Oxford, where, as you know, the students live in what you call "dormitories." But each such house possesses its own mediaeval library, its own chapel, and its kitchens and Hall where all the members of the College, Fellows, Scholars on the Foundation, and ordinary students or "pensioners" dine, in some formality, together. But I remember once discussing with a Soviet Russian colleague, then working in Cambridge, the place of our College system in an ideal university. Somewhat to my surprise, he was strongly in favour of it, in view of the stimuli which students of different faculties give one another, and the stimuli which emanate, too, from the Fellows who live in the College, and whose company is constantly available to the undergraduates; provided, however, as I have just said, that a far closer contact existed than heretofore, between student life and the adult working world itself. The justice of this requirement can often be seen in the restlessness with which the medical students undergo the pre-clinical part of their training. This restlessness will not be removed until by some kind of revival of the old idea of "walking the hospitals," clerkships, dresserships or the like, medical students are allowed, from the beginning of their training, to have some sort of contact with the world of healing on which their desires are set.

At the same time, the atmosphere of life in the Cambridge and Oxford Colleges must be radically changed. The anachronistic conception of the undergraduate as the country gentleman in embryo, waited upon by his bedmaker and "gyp," and generally kowtowed to by porters, kitchen staff

¹ W. James in *Memories and Studies*, London, 1911, p. 267.

and town tradesmen, must go completely. A detailed description of how the students could run the Colleges themselves, with a minimum of technical help, you would not expect me to furnish you with, and many of our friends on this side would find the idea laughable enough, but it should not be beyond the bounds of human ingenuity to work out a suitable scheme which would not interfere with the students' work. After all, consider one of my favourite Colleges over on your side, the campus at Oberlin, Ohio. Oberlin has a noble history of resistance to the slave-trade, and the trial of Professors Fitch and Peck at Cleveland recalls nothing so much as that of the Seven Bishops in our seventeenth century. Oberlin was the first co-educational College in the world. Oberlin was a station on the Underground Railway in slave-trade days, and it supplied a company to the Ohio Regiment in the Civil War. No College could have prouder traditions than Oberlin.¹ But have I not seen there a system of student self-help that appears to work remarkably well? Obviously there will be no need for us to do without all the assistance in the future that mechanisation can give to the business of feeding and living; we can install mechanical potato-peelers and electrical dish-washers. But the crux of the matter lies in the replacement of servile surroundings by an environment appropriate to the self-respecting and comradely citizen of a socialist world.

In this connection, too, a radical change is needed with regard to the somewhat over-thorough control of students' private lives at the older British Universities, which would be found deeply oppressive if it were not so old-established, and which is regarded with amazement by every foreign university man who spends a period at Cambridge.² Here

¹ Cf. R. S. Fletcher in *Ohio State Archaeological and Historical Quarterly*, 1938, **47**, 1: 1939, **48**, 57, and *Journal of American University Teachers*, 1940, p. 78.

² Cf. L. Infeld's autobiography, *Quest: the Evolution of a Scientist*, London, 1941.

the rules in force in the Colleges of Harvard and Yale have something to teach us, though I should be in favour of the utmost personal freedom and privacy. Obviously students living in large common buildings can hardly hope to have the same privacy as those who live in the individualistic conditions of Paris or Strasbourg or Zurich, but there is a great deal of lumber of this kind in England which needs throwing away. One would also like to see a great increase in the number of married students, as in the Soviet Universities.

As to the important questions of entry and personnel, it seems that the application of more stringent entry tests and the absence of all money bar, will cut out a certain number of types now here, and replace them with better material. You may know, however, that at Cambridge, for some years past, over sixty per cent of the students have been in receipt of financial help, whether from schools, counties, government, or the Colleges themselves. What seems most needed is a thorough overhaul of the "educational ladder" and the scholarship system. While it may be true today that a working-class boy or girl¹ has the opportunity of passing right up to and through the University, this will not be likely to happen if he or she is what one might call a "late developer." I often feel convinced that if I had not been the son of a well-to-do physician, who could afford to send me to the University anyway, I should never have found the opportunity to carry out the intellectual work that I have done. As a schoolboy, and for long as an undergraduate, I was ignorant of my true vocation, and never had sufficient mental enthusiasm for the studies put before me to win any scholarships. But a child of working-class parents, who, like

¹ In this connection it must be recorded with regret that Cambridge has not yet admitted women to full University membership, though Oxford has. There is also a *numerus clausus*, only five hundred women being admitted for five thousand men. These disabilities urgently need sweeping away.

me, did not succeed in finding his real aim in life until nearly the age of nineteen or twenty, would have had little chance of pursuing it.

As you probably know, one of the best studies of the so-called "educational ladder" is that made by Gray and Moshinsky¹ in 1935. Dividing English social classes into the following categories:—

- A Employing or directive
- B Professional
- C Minor professional and highly skilled
- D Clerical and commercially employed
- E Manual
- F Miscellaneous and unknown

they found that of the children of B, 57 per cent possessed ability, while of the children of E, only 22 per cent possessed ability, but since Category E was numerically far the largest, the total percentages of all able children in the country gave the following figures: B 5 per cent, E 50 per cent. Opportunity for obtaining higher education for able children divided as follows (in percentage of all with ability in each social category):—

- B 94 per cent
- D 48 per cent
- E 27 per cent

There is thus only one quarter of the opportunity which there ought to be for the children of manual workers. Opportunity for obtaining higher education for children without ability divided as follows (in percentage of all without ability in each social category):—

- A 51 per cent
- B 37 per cent
- E 1 per cent

¹ J. L. Gray and P. Moshinsky, *Sociol. Rev.*, 1935, 27, 113 and 281.

These figures speak for themselves, but for a wealth of detail and further conclusions, you must look up the original papers.

This large problem, of course, raises the whole question of the hopelessly class-divided system of education in Great Britain. England will never become the England of Thomas More and William Blake until the curse of class-stratified education has been lifted, as it has largely been already in your schools over which fly the Stars and Stripes. The solidarity of comradeship can hardly express itself until we all speak the same language. Wishing once to show something of the class nature of British education to an intimate friend of mine, a Chinese, I took her to visit the location of my own school, a charming market-town in Northamptonshire. There I conducted her round the "public school" itself, replete with every adjunct for teaching and the expansion of thought, every spacious laboratory, garden, and sports-field, that the imagination of a particularly progressive headmaster had succeeded in obtaining from an enlightened city company. Next I took her to the "grammar school," originally of the same sixteenth-century foundation as the public school, but now a day-school only, and attended mostly by the sons of shopkeepers in the neighbouring towns and farmers in the surrounding countryside. Its equipment was no more than mediocre. Last I took her to the "council school" lying towards the station, where in cramped quarters, with a bare asphalt courtyard, the children of working-class parents were given as much of an education as the State considered it could run to without arousing the fury of tax- and rate-payers. No further comment is necessary.

Allied with the question of scholarships, and provision for those of all origins who develop relatively late, is the question (which has hardly yet begun to dawn upon the minds of our educational authorities) whether there may not be, among the masses of the manual workers, some who from time to

time, at a comparatively advanced age, feel a call to undertake intellectual work. Such revolutions in men's modes of being are not as uncommon as is often thought, and may be connected with unexpected changes in their private life or personal relationships. Something like the Soviet "Rabfacs"¹ is needed, some institution for incorporating such older men and women into the life of the Universities. Existing organisations, such as the Workers' Educational Association, the Labour Colleges, and the University Extension Lectures, are but scratching at the surface of a gigantic problem in spite of all the good work they do.

Perhaps at every university a new college should be built to receive such men and women. Certainly an ideal England would be spending far more money on education than at present. Among the needs for new buildings, and it seems to me a rather pressing one, is the provision, at Cambridge at any rate, of something corresponding to the Graduate College in some of your American Universities, such as Yale and Princeton. Young men of brilliant attainments come to Cambridge from every part of the world, from China to Peru, to carry out research, and when they arrive they go into dismal and isolated lodging-houses. They find it much more difficult than they had expected to make friends, to meet the people they want to meet, and to get the contacts that will be valuable for their development and thought. We need a kind of research students' All Souls', an International College, in which it would be desirable always to include a certain number of young Englishmen who had themselves completed their undergraduate work here in Cambridge. I should like to see this building rise before the end of my time, to see young men and women of all colours and peoples living side by side in mutual amity and exchange. Cambridge ought to say:—

¹ Cf. J. G. Crowther, *Industry and Education in Soviet Russia*, Heinemann, London, 1932.

“In my Exchanges every land
Shall walk, and mine in every land
Mutual shall build Jerusalem
Both heart in heart and hand in hand.”

Undergraduate Colleges do not fill the bill: there is a community of interest among research students, who are naturally in general more mature.

And while on the subject of buildings, it would be desirable, too, besides strengthening the British Universities which already exist, to found new ones in suitable parts of the country. William Dell, Master of Caius College, during the Commonwealth, proposed this three hundred years ago, but his desires have only partially been fulfilled.

A word now on the possibility of compulsory subjects. Should there not, in our ideal university, be compulsory courses of teaching on *man*, both in the mass and as individual? So much information is distributed, so little real wisdom. One sometimes thinks of the remark of that witty Somerset country priest, Charles Marson, who observed that children were given the most detailed information about the Birds, Beasts, and Insects of Palestine, but never taught anything about the only really important insect, the Worm that Never Dies. First, then, there should be a course on political theory. If socialism is correct, it is absolutely fundamental, and whatever were the main subjects which a student was following, no university course should surely be complete without an elementary training in social consciousness. This would have to include a historical account of the evolution of human societies and the ideas that have been held about them, the origin and development of classes and their struggles, and an outline of the constitution of the world co-operative commonwealth. Secondly, with regard to man as an individual, should there not be a course on the elements of human relationships, and the gist of modern psychological knowledge? With the flowering of a free

society we may look for the disappearance of neuroses, but something on friendship, love, and the constitution of the human mind, considered in a perfectly objective and concrete way, would surely be valuable. No doubt the difficulty would be to find the suitable men and women to teach it.

As for the rest, I know you agree with me in such questions as medical insurance for students, marriage allowances for students and research workers, family allowances for staff, etc. The subject of degrees has attracted discussion, but it does not seem to me very important, since some kind of diploma or certificate of proficiency will always be useful in nearly all subjects. Emphasis on the class attained by candidates in the degree examinations, however, ought to be discouraged as much as possible, for most purposes; since the capacity of being a good examinee has, in my experience, almost no relevance whatever to the capacity for bring a good research worker or a good administrator or almost anything else in later life, or even to the standard of scholarship which the candidate may attain in later years. On the other hand, it would be perhaps of value to have some means of distinguishing publicly between a brilliant thesis for the research degree and a mediocre or poor one; at present there is none.

I am afraid that this letter has been overlong. You wanted me to write about Democracy in Universities, but I have been carried away to describe a few glimpses of an ideal university. However, you and I are not platonists; we are not going to sit back and contemplate the ideal of a university existing now and for ever in heaven. The time has come to change, not only the world, but the university with it.

Yours, etc.,

J. N.

PAVLOV AND LENIN

(Based upon an article in the Daily Worker, 1936)

On Thursday¹ the whole world of scientific workers learned with sorrow of the death of Professor Ivan Petrovitch Pavlov, at the age of eighty-six. The Soviet Union thus loses its greatest scientist, and the world as a whole loses one of the half a dozen most valuable scientific men of our time, whose names will characterise our generation in the minds of the generation yet to come. Together with such thinkers as Einstein, Freud, Frazer and Roux, Hopkins and Warburg, Sherrington and Head he has left a world fundamentally changed by his thought and his work.

It is generally understood that Pavlov was first intended by his father for the priesthood, but that, after a year of study in that direction, he found that his inclinations led him to science. So began his study of biology. How much would have been lost if this change had not been made!

About 1870, the time of the Franco-Prussian war and the Paris Commune, he published his doctor's dissertation, which was on the physiology of the common freshwater mussel. He had not yet found his life work. But soon he began to investigate the processes of digestion in the higher animals and in a long series of experiments laid the foundations of much of what we know now about the complicated secretions and ferments which convert our food into nourishment

¹ February 27, 1936. When this article was written, we did not have the advantage of the two volume *Lectures on Conditioned Reflexes* (ed. W. H. Gantt; Lawrence & Wishart, London); the second volume appeared in 1941.

needed by the body. It is difficult to imagine now what the state of ignorance was like before Pavlov's work. In all this kind of experimentation the most brilliant surgical methods were necessary as well as more ordinary technique.

Long before Pavlov, about the time of the death of Napoleon, a French-Canadian guide, Alexis St. Martin, accidentally received a gun-shot wound which healed leaving an opening between his stomach and the exterior. A young American physician, William Beaumont, was thus able to study the process of digestion in work which now ranks among the most famous pieces of biology. But what chance had provided for Beaumont, Pavlov obtained by his wonderfully skilled operations on animals, so that though causing them little inconvenience, he was able to penetrate into the obscurity of their digestive functions.

Towards 1900 he began to enter the field of the nervous system because it became clear that digestion is to some extent subject to nervous control. This gave him a means of analysing the nervous system. Many actions, as we know, are performed "automatically," that is to say, the message sent into the spinal cord from the sense-organs provokes an order to be sent out to motive organs, without the brain or consciousness being involved. The knee-jerk is an example. But these reflexes may be very complicated and may depend on the previous history of the animal, i.e. on education. Pavlov's great discovery was, therefore, that by studying the reactions of an animal associated with the taking of food, we can study the results of education and the powers of discrimination.

Food placed in the mouth causes the secretion of saliva, that is, the animal's mouth waters. This is an unconditioned reflex. Suppose, however, that every time food is given a particular sound is made; after some time it will be found that the appearance of sound alone is sufficient to make the animal's mouth water. So a "conditioned reflex" has been formed. Any type of sense, such as sight or smell, can

be made to supply the stimulus for such a conditioned reflex.

In this way it has been possible to measure to what extent a dog can tell the difference between notes of different pitch, or how long it takes an animal to forget or to alter a reflex which has been established. And it has even been possible to make animals have nervous breakdowns and afterwards to cure them again. In other words, we now have an unprecedentedly powerful means of analysing the nature of that tremendously complicated telephone exchange, the mammalian nervous system.

This leads to many important conclusions for the future of humanity. One of the commonest arguments which we hear from those who oppose the transition from an acquisitive to a co-operative form of society is that "human nature can never change." And so it is useless to expect any improvement. But, on the contrary, the nervous system is learning all the time, and far from being bound down by a sort of "original sin," it is plastic and quite able to react to the influences of a good environment instead of the predatory and possessive environment in which we live. This also destroys the basis of the religious view, so often expressed, that "you have to change human nature first, before there can be any change in society." On the contrary, some laws are better than others, and human beings, exposed to the influence of good laws, will certainly respond to them. Of course, this does not mean that no individual persuasion is necessary. But what good laws do is to reinforce the social impulses of men and discourage the anti-social ones.¹

Ivan Petrovitch, as he was called by all Russian scientists, was originally the pupil of the great German, Karl Ludwig, in whose laboratory at Leipzig he studied, side by side with our own Lauder-Brunton and Gaskell. His own pupils were almost as the sands of the sea, so widespread was his influence. Perhaps one of the greatest was Nencki, who specialised in

¹ Cf. *Lectures on Conditioned Reflexes*, vol. ii, pp. 33 and 117.

bio-chemistry, and whose name is now borne by the famous institute in Poland. Then there were Wedensky and Babinsky, two famous neurologists; Babkin and London, well-known investigators of digestion; and there is Orbeli, who now holds Pavlov's old Chair of Physiology at the renowned Military Medical Academy at Leningrad. Of the younger generation were Anrep, who had an assistant professorship at Cambridge before becoming head of the School of Physiology at the Egyptian University in Cairo; Rosenthal, Konorski and others.

Before 1917 Ivan Petrovitch had always been mildly socialist, but the disorganisation and difficulties of the time of the October Revolution turned him against the Bolshevik Party. With indomitable perseverance, he pursued his experimental work through war and civil commotion. When the lighting was cut off, the laboratory was illuminated with pinewood torches; when there was no heating, Pavlov and his collaborators worked on wearing thick overcoats and snow-boots. The experimental animals died of cold and starvation. The heroic behaviour of Pavlov and his school at this time will always remain an inspiring example to scientists whose work is of a fundamental nature, or of long-term applications, and who are therefore tempted in times of great national crisis to lay it aside. The new government, happily, were undismayed by Pavlov's often vigorously expressed criticism of their proceedings. Semashko, Lenin's medical friend, who undertook the organisation of health services, together with the rest of those who were responsible for Russian science and medicine, helped him in every way that was in their power, so that step by step on the way to socialist prosperity Pavlov was more and more fully provided for. Moreover, he came to see that the Bolsheviks meant what they had said about the utmost dissemination of medical and biological science, hygiene and child care.

Thus for the last ten years of his life he was a strong supporter of the plans of the Communist Party and he took a

large share in organising Soviet biology. Just before his death, when he revisited his birthplace, Ryazan, he spoke as follows :—

“I should like to say that representatives of science were fêted formerly too, but those celebrations were in a narrow circle of people of the same kind, so to speak—men of science. That which I see now in no way resembles those limited celebrations. In our country the whole population honours science. I saw that this morning at the railway station, on the collective farm, and on my way here. I would not be mistaken, I think, in saying that this is to the credit of the government at the helm of my country. Formerly science was divorced from life and alienated from the people, but now I see it is otherwise—the whole nation respects and appreciates science. I raise my glass and drink to the only government in the world which could bring this about, which values science so highly and supports it so fervently—to the government of my country.”

Appreciation of his work in other countries was universal. As far back as 1904, he received the Nobel prize for biology, on one of the first occasions on which it was given. The British Physiological Society elected him an Honorary Member already in 1908, and similar honours were given him by scientists in all civilised countries. At the International Physiological Congress in Edinburgh in 1923 he received a great ovation, as I myself can well remember, but it was as nothing to the stormy applause with which we greeted him, a most venerable white-haired and white-bearded figure, at the International Congress of 1935, when he addressed the delegates to the U.S.S.R. from the rostrum of the great hall in the Uritsky Palace, that same hall which eighteen years before had seen the first All-Union Congress of Soviets.

The world owes a great debt indeed to Russian thinkers, Mendeléev who set the fundamental constituents of our

universe in their due order, Metchnikov who revealed the phagocytic defenders of animal bodies, Timiriazev who explored the physiology of plants, Kropotkin who saw the part played by co-operation among the lower forms of life. All had a connection with socialism based on science, but Pavlov in a particularly intimate way. That the nervous system of the higher animals is plastic, that reflexes may be conditioned, that organisms can really *learn*, and later exhibit the good effects of their learning almost automatically, supports a more optimistic view about the possibilities latent in "human nature" as we know it today.

After all, if the greatest discovery that the marxists made was perhaps that concept of the inevitability of socialism as the continuation of the evolutionary process, this did not sap the strength of the successful builders of socialism in our time. To know that something is inevitable does not necessarily mean that we personally are not the agents destined to bring it about. To know that it can be done does not necessarily mean that its accomplishment must be the work of centuries, as if human beings were so hard to alter. And precisely this was Lenin's point of view: "It will be some weeks," he wrote, "before socialism is fully established in the Ukraine," or wherever the particular place was. Immediate consternation among the typists; a conference of secretaries; surely he meant some years, perhaps some decades? But no, it was weeks. He was not waiting for the forces of history to perform their majestic tasks in unescapable order. And on an infinitely smaller scale, we are in the same position. What each one of us does hastens or retards the liberation of mankind. Pavlov's lifework showed us how much hope there is for Lenin's hastening process.

"Red granite and black diorite, with the blue
Of the labradorite crystals gleaming like precious stones
In the light reflected from the snow, and behind them
The eternal lightning of Lenin's bones."¹

¹ Hugh McDiarmid, *The Skeleton of the Future*.

Pavlov and Lenin will be remembered as long as history lasts as Russia's gifts to the twentieth century. Giant figures—the one of Knowledge, the other of Comradeship—they point the way to the new world, the coming of which nothing shall, in the end, prevent.

THE GIST OF EVOLUTION

(Based upon a contribution to the Encyclopaedia of the Social Sciences, 1931)

“Here’s no meaning but of morning;
Naught soon of night but stars remaining
Sink lower, fade, as dark womb
Recedes, creation will step clear.”

C. Day Lewis.

The Nature of the Idea.

The word “evolution” has been applied by some writers to any process of change or becoming, but this use of the expression is not defensible. It should be restricted to cases in which two factors enter, an organism and an environment. Thus in physical cosmology we have atoms, worlds, stars, galaxies, in contrast to the universe around them, and in biology we have living creatures on the one hand, and their inorganic surroundings on the other. We can hardly speak of the evolution of the universe, but only of its flow of change.¹ Evolution, then, means primarily the passage from simplicity to complexity, from homogeneity to heterogeneity, from low to high organisation which we deduce from our empirical observation to have occurred and to be still occurring in our world.

All the difficulties which have been caused by the entry of the evolution-concept into the world-outlook of modern man, arose from one single source, namely, the fact that it

¹ Taylor, A. E., article “Evolution and Philosophy” in *Evolution in the Light of Modern Knowledge*, Blackie, London, 1925.

is a doctrine drawing its being from two distinguishable realms of human experience, science and history.¹ It is scientific in that it deals with the concrete objects of biology, and therefore speaks the language of the laboratory, but (like some parts of astronomy) it is historical in that it deals with non-repeatable occurrences, events which only happened once, and which are thus, in a sense, outside the realm of scientific investigation and experiment, though not outside that of scientific imagination and speculation. Since traditional theology had a pre-scientific cosmology of its own, evolution-theory has always had an anti-theological character. The sharp distinction between sciences that are free from historical elements (nomothetic) and those which are not (idiographic) is due largely to philosophers such as Rickert and Windelband.² It can only be overcome by a thorough-going evolutionary philosophy which seeks to interpret the factors of developmental change in human history no less than in pre-human history (i.e. the sciences of astronomy, geology, zoology and the like), and thereby to bridge the gap between history and science.

Detailed evolution must not be superficially equated with progress, unless progress be cynically defined as progress towards perfect adaptation to environment. There are numerous cases in biology of organisms which retrogress, as far as complexity is concerned, such as the sessile tunicates, which in each life-cycle lose their structural and locomotory vertebrate features, retaining only nutritive, respiratory, and generative mechanisms. The same is true of large numbers of parasites. The best adapted type at any level is not necessarily the "highest." Evolution, as a biological theory, then, must be entirely freed from ethics, and any tendency to

¹ Collingwood, R. G., *Speculum Mentis*, Oxford University Press, 1924.

² Rickert, H., *Die Grenzen d. naturwissenschaftlichen Begriffsbildung*, Tübingen, 1921.

impose moral standards on the world of living creatures must be resolutely opposed.

A cognate fallacy must also be guarded against, namely the confusion of origin with value. A product of evolution is only partially described when its specific natural history has been discovered, for the origin of what is new in it remains to be accounted for. Everything is itself and not something else, certainly not its remote ancestors; it must be judged on the basis of an inclusive philosophy, and not merely by an account of its origin. What a thing is, is not explained by saying how it has come to be there, any more than it is possible to say how it has come to be there by saying what it is.

Whether the process of evolution has taken place continuously or discontinuously is a problem which will perhaps never be settled, for continuity and discontinuity may be two alternating modes of scientific expression, dialectical contraries, neither of which is ever permanently victorious.¹ This question arose in two ways, firstly out of the psychophysical difficulty, since mind might or might not be co-extensive with life, and might or might not have evolved parallel with the physical phenomena of living things. Emergent evolutionism² and dialectical materialism³ are the principal modern representatives of the discontinuity view;

¹ Baas-Becking, L. G. M., article "Continuity and Discontinuity," *Monist*, 1931.

² Lloyd-Morgan, C., article "The Philosophy of Evolution" in *Contemporary British Philosophy*, Allen & Unwin, London, 1924; also *Emergent Evolution*, Williams & Norgate, London, 1923; also *Mind at the Crossways*, Williams & Norgate, London, 1929; Hobhouse, L. T., *Mind in Evolution*, Macmillan, London, 1926; also *Morals in Evolution*, Chapman & Hall, London, 1915; also article "Philosophy of Development" in *Contemporary British Philosophy*, Allen & Unwin, London, 1924; also *Development and Purpose*, Macmillan, London, 1927.

³ Engels, F., *The Dialectics of Nature*, Gesamtausgabe edition, Moscow, 1935, English translation, London; also *Anti-Duhring*, Lawrence, London n.d.

they speak of matter, life, mind, and society as a series of levels, rising above one another by a succession of steps. At each of these, according to the emergent evolutionists, an external creative activity injected an essentially novel element into the world. The dialectical materialists, more plausibly, see in each step the overcoming by nature of previously existing internal contradictions. Some authors, on the other hand, have regarded mind as co-extensive with life, or even with matter, in this way attaining a complete continuity, but at the cost of all plausibility.

Secondly, the question arises in more technical form, when the biologist studies the mechanism of evolution. An infinite series of infinitely small differences might give an evolution, and this was the common view in the middle of the nineteenth century, but on the other hand, evolution might occur as the result of a smaller number of appreciably large sudden jumps or mutations. In modern times this discontinuity view has been scientifically established and incorporated into the theory of the gene, by which the biology of inheritance seeks to account for evolution.

The evolution theory appeared originally, as far as we know, among the ancient Greeks,¹ but it did not succeed in taking any root in the ancient world. This is all the more peculiar in that Aristotle applied the notion of biological development to ontogeny (the development of the individual from fertilised egg-cell to adult) while quite failing to apply it to phylogeny (the sequence of adult forms in time). Two thousand years later the same position was taken up by Hegel. Perhaps both philosophers felt that things can only be understood in the light of the ends to which they are tending, and that the rational, although everywhere present and permeating everything in nature, is everywhere disguised. If the order of development from lower to higher were also the order of temporal development, this disguise would be gone. But neither Aristotle nor Hegel were able

¹ But see p. 218.

to conceive of any mutability of organic types; such a conception is essentially post-Darwinian.

On the basis laid by biological evolution, sociological evolution followed. The recognition of this continuity was the work of numerous nineteenth-century thinkers such as Auguste Comte, Herbert Spencer, Henry Drummond, etc. Today it is recognised that biological knowledge is an essential item in the data which must be before the rulers of human society, but that society has its own organisation in which the lower levels are subsumed (see the works of H. S. Jennings,¹ Mark Graubard,² Marcel Prenant,³ and H. J. Muller⁴).

History of the Idea.

The pre-Socratic Ionian philosophers in ancient Greece were led naturally to the concept of evolution by the distinction which they made between the shifting temporal flux of phenomena and the eternal changeless reality beneath.⁵ To Heracleitus, it seems, only the former existed, and even so but as a kind of chaos, but Empedocles discerned a gradual development in the processes of life and taught that imperfect forms are slowly replaced by more perfect ones. The atomists, Democritus and Epicurus, have often been claimed as evolutionists, but it is doubtful how far this claim can be substantiated. Hippocrates (c. 460-370 B.C.), so important a figure in other respects, has little of an evolutionary character, and it is not until we come to Aristotle (384-322 B.C.) that an important advance is made. Aristotle was undoubtedly

¹ Jennings, H. S., *The Biological Basis of Human Nature*, Faber & Faber, London, 1930.

² Graubard, M., *Genetics and the Social Order*, New York, 1935; *Man the Slave and Master*, London, 1938.

³ Prenant, M., *Biology and Marxism*, London, 1938.

⁴ Muller, H. J., *Out of the Night*, New York, 1935, London, 1936.

⁵ Osborn, H. F., *From the Greeks to Darwin*, Macmillan, New York, 1894.

the first great comparative biologist, the first man audacious enough to believe in the classifiability of the apparently innumerable types of living organisms.

In order to formulate their relationships he arranged them in a *scala naturae* or ladder of nature, beginning at the lower plants, going on to the higher plants, the "zoophytes," the sponges, holothurians, ascidians, etc., and so up to molluscs, crustaceans, other arthropods, fishes, and mammals. "Nature," he said, "passes from lifeless objects to the highest animals in such unbroken sequence, interposing between them beings which live and yet are not animals, so that scarcely any difference seems to exist between two neighbouring groups owing to their close proximity." For Aristotle this ladder of nature always remained temporally static, the form in which the Prime Mover had created living organisms from the beginning. Nevertheless, in his embryology, he distinguished a succession in time of ever more complicated stages, and declared himself in favour of epigenesis rather than preformation, i.e. of the production of form out of the formless rather than the mere unfolding of form present at the beginning but invisible. Furthermore, he distinguished between the vegetative, the sensitive, and the rational, soul, and asserted that the embryo was additively animated by each of these in turn as it developed.

In the great poet of the Epicurean school, Lucretius (99-50 B.C.), we find a well-developed appreciation of both biological and social evolution. He even intuitively stated the principle of natural selection:—

"cetera de genere hoc monstra ac portenta creabat,
nequiquam, quoniam natura absterruit auctum
nec potuere cupitum aetatis tangere florem
nec reperire cibum nec jungi per Veneris res."
(De Nat. Rerum, bk. V, l. 845).

"And other prodigies and monsters Earth
Was then begetting of this kind—in vain,

Since Nature banned with horror their increase,
And powerless were they to reach unto
The coveted flower of fair maturity,
Or find their nourishment, or intertwine,
In Venus' works to propagate their kind."

In China, too, in the fifth century B.C. a certain understanding of social evolution existed (see p. 218).

Alexandrian and later Hellenistic biology did not further elaborate Aristotle's rudimentary evolution-theory, nor did the mediaeval Aristotelians (such as Albertus Magnus A.D. 1206-1280). Chu Hsi in China, however (1130-1200) and Leonardo da Vinci (1452-1519), appreciated the true nature of fossils. More important were the progressive steps towards a satisfactory classification of living organisms, made by Matthias de l'Obel (1538-1616), Andrea Cesalpini (1519-1603), Joachim Jung of Hamburg (1587-1657), John Ray of Cambridge (1627-1705), and the great Swede Carolus Linnaeus (1707-1778). In the eighteenth century such writers as Charles Bonnet (1720-1793) took up again the Aristotelian ladder of nature, but gave it no temporal significance. Their insistence on a scale of infinitesimal gradations passing from inanimate matter to man was, however, of some historical importance, and led in the following generation to the "Naturphilosophie" school.¹ In the persons of the poet J. W. von Goethe (1749-1832) and Lorenz Oken (1779-1851) emphasis was chiefly laid on the idea or type common to many sub-groups of organisms but obscured in any one sub-group by special adaptations of form. Parts of the flower were found to be modifications of leaves, and missing vertebrae were located in the skull. Still, however, the conception of mutability of species was non-existent or almost so. The year 1825 is important owing to the discovery then made by M. H. Rathke (1793-1860)

¹ Russell, E. S., *Form and Function*, Murray, London, 1916.

that structures homologous with the gill-slits of fishes, exist for a time in avian and mammalian embryos.

The theoretical approach to evolution had begun somewhat earlier. G. L. Leclerc, Comte de Buffon (1707-1788), instead of being interested, like Linnaeus, in minute differences between organisms, was more impressed by their similarities. He was also the earliest eighteenth-century biologist to doubt the fixity of species, noting that animals often have parts to which no special or adequate use can be ascribed (vestigial or rudimentary organs, as we should now say). Aristotle had noticed these, but had failed to appreciate their significance. Buffon considered that some species are degenerate forms of others, the ape a degraded man, the ass a degraded horse, and so on. His ideas were examined by Erasmus Darwin (1731-1802) who held that species may undergo changes in the course of time, and that changes produced by the environment are passed on to the offspring. This was the first statement of the inheritance of acquired characters, a belief which was put forward in detail shortly afterwards by J. B. de Lamarck himself (1744-1829). Accepting as undeniable the fact that species vary under external influences and are subject to progressive development, he devoted much attention to the mechanism of these changes, and enunciated the principle of use and disuse, which ascribes changed structure to changed habits, and involves the inheritance of such acquired characters.

It is extremely interesting that at this stage what we should now call the social sciences had a profound influence on biology. Just as a botanist introduced to physics the wide range of osmotic phenomena, so the further course of the evolution-theory was guided by a sociologist. In 1798 T. R. Malthus (1766-1834), an Anglican priest, published his essay on population, in which he maintained that although populations increase geometrically, subsistence only increases arithmetically, so that periodical checks on the numbers of human groups are biologically necessary. At a time when the "rights

of man," "natural justice," the "return to nature," the "noble savage," and Franklinism, filled the intellectual atmosphere, Malthus sounded what he considered a timely warning concerning over-population. The fact that his arguments were completely vitiated by his deliberate aversion to contraception, and his failure to visualise the great increase in productivity which science would bring about, was not appreciated till many years later.¹ Both Charles Darwin (1809-1882) and A. R. Wallace (1823-1913) admitted that the essay of Malthus had introduced to their minds the idea of natural selection as an evolutionary factor. Charles Darwin, the grandson of Erasmus Darwin, published his *Origin of Species* in 1859, and his name has been so much associated with evolution-theory ever since, that to many people "Darwinism" means evolution.² This, however, is emphatically an improper view, for evolution-theory existed before Darwin, and the two questions (a) Has evolution occurred? and (b) How far can natural selection account for it? are entirely different.

"In 1838," said Darwin, "I read Malthus on population. Being prepared to appreciate the struggle for existence which goes on everywhere, it struck me that favourable variations would tend to be preserved and unfavourable ones to be destroyed. The result would be the formation of a new

¹ Those who, like Marx and Engels, realised that science would destroy the Malthusian arguments about the inevitable excess of population over the food-supply, were deeply interested in the application of biochemistry to agriculture. "The advance of science," wrote Engels in 1843, "is as limitless and at least as rapid as that of population." In 1866 Marx wrote to Engels that he had been "wading through the new agricultural chemistry in Germany, especially Liebig and Schonbein, who are more important than all the economists put together." (*Selected Correspondence*, pp. 33, 204.) Justus von Liebig's great book, *Die Chemie in ihre Anwendung auf Agrikultur*, was published in 1840 and laid the foundations of agricultural chemistry.

² Darwin, F., *Life and Letters of Charles Darwin*, Murray, London, 1887. See also several essayists in *Darwin and Modern Science*, centenary volume, Cambridge, 1909, and M. Prenant, *Darwin*, E.S.I., Paris, 1938.

species." Darwin and Wallace, having recognised each other's conclusions as fundamentally identical, published a joint essay the year before the *Origin of Species*, and this was, as Singer says,¹ the first public pronouncement in which an effective mechanism was suggested to explain the evolution of organic forms. This mechanism could be described by four propositions: (1) that gradations exist in the perfection of organs and instincts, each good of its kind, (2) that all organs and instincts are, in ever so slight a degree, variable, (3) that there is a struggle for existence leading to the preservation of each profitable deviation, and (4) that these profitable deviations are inherited. Yet Darwin's position suffered from certain inherent weaknesses. First, he believed in a continuous system of change, and argued that domestic breeds, for instance, had been obtained by the selection of very slight individual differences. Secondly, he did not account for the early stages of a favourable variation; a lung so little developed as to confer no power of breathing air, would be of no advantage. Thirdly, his conception of heredity was as crude as Lamarck's. But it is impossible to over-estimate his importance in the history of the evolution-theory.

His views were developed by T. H. Huxley (1825-1895) and Herbert Spencer (1820-1903).² Spencer was a philosopher, not a biologist, and had been advocating an abstract theory of evolution some years before the publication of Darwin's great work. Spencer's writings bear throughout a certain *a priori* quality, in contrast to the modestly presented but overwhelmingly convincing enumeration of facts, which we find in Darwin, but nevertheless Spencer exerted a powerful influence on his time. His system, constructed very

¹ Singer, C., *A Short History of Biology*, Oxford University Press, 1931; and Nordenskiöld, N.E., *History of Biology*, New York, 1928. But this latter book, owing to the faults of its translator, is so misleading that it can be recommended only to the judicious.

² Bourne, G. C., *Herbert Spencer and Animal Evolution*, Oxford, 1910.

much as might have been expected from a man who by training and temperament was an engineer, contributed enormously to the general acceptance of the concept of evolution.

More important scientifically were the writings of the Darwinian embryologists.¹ Aristotle's ladder of nature was at last to be unified with his ontogenetic succession. Fritz Müller (1821-1897) broke away from the older embryologists such as K. E. von Baer (1792-1876) who had seen in the developmental stages of the higher animal a succession comparable with the various lower animals, but had not interpreted this structural relationship as really a relationship of descent. Müller, who studied crustacean embryology, maintained that the series of developmental stages is a historical document. This in due course led to the work of Ernst Haeckel (1834-1919), to whom we owe much of our knowledge of germ-layer formation, the Russian A. Kovalevsky, the incorporator of the cell-theory into embryology (1840-1901), and F. M. Balfour of Cambridge, the first comparative embryologist (1851-1882).

The paradox by which the stimulus to Darwin's discovery of true competition in the animal world arose from a description of competitive conditions in human society, has often been remarked upon, by no one more trenchantly than F. Engels²:—

“The whole Darwinian theory of the struggle for life is simply the transference from society to nature of Hobbes' teaching of the war of each against all, the bourgeois economic theory of competition, and the Malthusian doctrine of population. That such a masterpiece is correct without reservations is still very doubtful, especially as regards the Malthusian theory; but once it

¹ Russell, E. S., *Form and Function*, Murray, London, 1916; and Needham, J., *A History of Embryology*, Cambridge, 1934.

² Engels, F., *Dialectics of Nature*, Gesamtausgabe edition, p. 641.

has become accepted, nothing is easier than to take these theories from natural history and carry them back again into society. It is a little too naïve to believe that this proves them to be the natural and eternal laws of society.

“For the sake of argument let us provisionally accept the expression ‘the struggle for life.’ The animal succeeds at most in accumulating; man produces; in the widest sense he creates means of existence which would not have existed but for him. Whence the impossibility of carrying over biological laws bag and baggage from animals into human society. The fact of production means that the supposed struggle for existence is no longer concerned solely with the means of existence as such, but more with the means of enjoyment and development. From the moment when we have the means of development produced in society, categories drawn from the animal kingdom altogether cease to apply.”

Modern Modifications of the Idea.

It has been said, not altogether wrongly, that biologists today are more certain than ever that evolution has taken place, but are not so certain as they were about the method by which it has taken place. The main influence which has acted on the modern theory of evolution has been the scientific, i.e. experimental, study of inheritance. This took two paths, one cytological, the other statistical. August Weismann and Theodor Boveri identified the cell-nucleus and the chromosomes within it as the physical basis of heredity. Gregor Mendel (1822-1884), the Augustinian Abbot of Brno in Czechoslovakia, investigated the phenomena of crosses between races (e.g. tall and dwarf peas) and explained them on the basis of hypothetical factors within the individual organism, controlling the visible characters. Each pea-plant, for instance, would possess two height-

influencing factors, both of which might be for tallness, both for shortness, or there might be one of each. Characters were divided into dominant, if only one factor was necessary, or recessive, if two were required to be present to bring about the visible effect. Mendel's work was the beginning of all modern genetics. Parallel with these tendencies went the study of discontinuous variation by William Bateson (1861-1926) and Hugo de Vries. Mutations or sudden jumps were actually observed, and these play a great part in modern genetic thought, the problem now being to ascertain in what way the genes (Mendel's factors) can be so modified as to produce a sudden change to another comparatively stable state. Most mutations are unfavourable to the organism; hence the dictum "Evolution has proceeded in the teeth of a storm of adverse mutations." With the technique of studying large populations of a quickly-reproducing animal in captivity under controlled conditions (T. H. Morgan's work on the fruit-fly, *Drosophila*),¹ it became possible to measure mutation rate quantitatively. It has been found by H. J. Muller to be greatly affected by X-rays and other forms of radiant energy, and it has been suggested that the course of evolution as a whole was due to the effects of natural radiation, either from outside the earth, or from radioactive substances in living organisms or their surroundings. Careful computations, however, have not as yet established this view.²

Indeed, neither Darwinian variation nor Mendelian mutation seems as yet quite to account for those fundamental differences on which the genera and species depend. In particular, the theory of the gene, although undoubtedly able to demonstrate the reason why one animal has a green liver and another a pink liver, simply assumes that the same

¹ Morgan, T. H., *The Theory of the Gene*, Yale, 1926; *What is Darwinism?* Norton, New York, 1929; *The Scientific Basis of Evolution*, Faber, London, 1932.

² Muller, H. J., "Radiation and Genetics," *American Naturalist*, 1930, 64, 220.

mechanisms explain why one animal has a liver at all, and another a hepatopancreas. Still less is it possible to offer an explanation for the paucity of "missing links" between the phyla of the animal kingdom, for it will hardly do now to throw all responsibility on to the imperfection of the geological record, as was the common defence in Darwin's own day. Whereas complete series of types can often be found within phyla, this is not the case between them. Some biologists have thought, therefore, that the early stages of evolution were not monophyletic, as classical theory would suppose, but polyphyletic. On this view, the phyla of today would not all arise from a common ancestor, but from a limited number of ancestors, a limited number of possible lines of evolution, into which primordial living matter separated itself as soon as it began to vary at all.¹ But it is more probable that the phyla correspond to what might be called "zones of stability" within which much variation can occur. The really revolutionary jumps would be few and far between.

The idea of fitness, only those organisms surviving which fitted themselves to their environments, while introduced by Darwin, was much elaborated by Spencer, and seemed to do away entirely with teleology, since variations would arise by chance, and what happened to fit its surroundings would be perpetuated. L. J. Henderson,² however, has shown that the relation of fitness was in reality a reciprocal one, the environment being fitted in a remarkably elaborate way to permit of the existence of life of the sort we know just as much as living organisms fit themselves to it. For example, water possesses a great number of unique or very unusual proper-

¹ Berg, L. S., *Nomogenesis*, Constable, London, 1926, Clark, A. H., *Zoogenesis*, Baillière, Tindall & Cox, London, 1930.

² Henderson, L. J., *The Fitness of the Environment*, Macmillan, New York, 1913; also *The Order of Nature*, Harvard University Press, Cambridge, Mass., 1917; see also Vernadsky, W., *La Biosphère*, Alcan, Paris, 1929.

ties, e.g. thermal, solvent, dielectric, surface-tension, etc., suitable for living organisms as we know them. So does carbon dioxide. Yet these substances, and all the others of which living organisms consist, existed in vast quantities prior to the appearance of life. Life, exactly as we know it, was therefore implicit in cosmic evolution. This is strong support for the marxist conception of the unity of cosmic, biological and social evolution.¹ A cosmic teleology has thus a sound status in philosophy, while at the same time in no way interfering with causal modes of explanation in biological science. Of these, natural selection still remains by far the most important. The calculations of A. J. Lotka,² R. A. Fisher,³ and J. B. S. Haldane⁴ show that it may be almost as important as Darwin himself thought it.⁵ On the other hand, neo-Lamarckianism, as it is called, continues to lay emphasis on the principle of use and disuse and the inheritance of acquired characters. The experimental evidence, however (e.g. Kammerer, McBride, Heslop-Harrison), which has from time to time been brought forward in support of this doctrine, has so far completely failed to survive the critical consideration of biologists. Nevertheless there are some who still believe that a biological story cannot be told

¹ The existence of nature prior to apprehending human minds in time is, as Lenin pointed out in his *Materialism and Empirio-Criticism*, pp. 140 ff., the fundamental obstacle to philosophical idealism, forcing it to have recourse to the theistic hypothesis of an eternally present consciousness, and so in effect to become politically reactionary.

² Lotka, A. J., *Physical Biology*, Williams & Wilkins, Baltimore, 1925.

³ Fisher, R. A., *The Genetical Theory of Natural Selection*, Oxford University Press, 1930.

⁴ Haldane, J. B. S., *The Causes of Evolution*, Longmans Green, London, 1932.

⁵ Among the most important modern books on genetics and evolution are C. H. Waddington's *Introduction to Modern Genetics*, Allen & Unwin, London, 1939; C. D. Darlington's *Evolution of Genetic Systems*; R. Goldschmidt's *The Mechanism of Evolution*; the Goodrich Presentation Volume *Evolution*, ed. G. R. de Beer, Oxford, 1938; and J. S. Huxley's *Evolution*, London, 1942.

save in psychological terms, and they naturally persist in holding various degrees of non-Darwinian opinion.

Evidence for the Idea.

If the present array of living organisms is the product of a long evolutionary process, we should expect to find some indication of the fact in fossil remains. Geologists have long been able to ascribe more or less accurate dates to the various strata in the earth's crust, and it has been by examination of the animal and plant remains at different depths that an enormous amount of evidence in favour of evolution has been accumulated.¹ The primary fact is that the oldest deposits of rock contain the simplest forms, and that the nearer we approach modern times, the more complicated and specialised the remains become.² Thus in the rocks of the Cambrian period, the characteristic kinds of animals are lower invertebrates, molluscs, trilobites, and corals; in the Silurian period, the fishes with cartilaginous skeletons predominate, in the Permian and Triassic, the reptiles and primitive mammals. Primates begin to appear in the Miocene, and eventually the bones of intermediate forms between apes and men appear.³ In certain cases the series of related animals can be traced through closely similar stages through long periods of time; thus the origin of the horse from its five-toed ancestor can be observed in detail. One of the most fascinating problems of evolution is involved in the disappearance of dominant types, such as the reptiles, which were once the supreme terrestrial group and only after a very considerable time yielded their place to the mammals and birds.

The arguments for evolution from morphology are all

¹ Lankester, Sir Ray, *Extinct Animals*, Constable, London, 1905.

² Holmes, S. J., *Life and Evolution*, Black, London, 1931; Bradley, J. H., *Parade of the Living*, Routledge, London, 1931.

³ Keith, Sir Arthur, *New Discoveries relating to the Antiquity of Man*, Williams & Norgate, London, 1931.

based on the resemblances between the structure of different animals and the ability of the theory to explain these as due to derivation from a common ancestor.¹ The members of any great group possess a common ground-plan. Thus the crustacea have a certain number of appendages, some modified for swimming, others for egg-carrying, walking, prehension, mastication, smell, and touch. The more locomotory appendages there are, the fewer the nutritive ones, but there seems no reason why this should be so except that the ancestor had a limited number, and the descendants have specialised in various directions. Again, the limbs of vertebrates show a common plan of structure with diverse modifications; thus the wings of bat, bird, and pterodactyl are all variations on the theme of the pentadactyl limb. Rudimentary or vestigial organs, inexplicable save on some theory of descent, occur very frequently in animals and plants, e.g. the semilunar fold of the human eye, the mammalian pineal gland, the limbs of whales, or, to take botanical examples, the leaves of the parasitic dodder, reduced to tiny scales, and the staminodes or functionless stamens of many flowers. The fact that animals fall naturally into a group-within-group classification, which may be compared to the branching of a tree, although established by systematists long before Darwin, did not receive its logical explanation until it was interpreted as the result of gradual divergence and descent from common ancestors.

In the embryonic development of all vertebrates there appear on the sides of the neck region a series of slits which in fishes and amphibia join up with corresponding slits pushed out from the pharyngeal wall. This is the origin of the gills. But, although the slits are formed in reptiles, birds, and mammals, their development is for the most part cut

¹ Wiedersheim, R., *The Structure of Man an Index to his Past History* Macmillan, London, 1895; Lull, R. S., *Organic Evolution*, Macmillan, New York, 1917; Dendy, A., *Outlines of Evolutionary Biology*, Constable, London, 1919.

short, though the Eustachian tube in man is derived from one of them. Generally speaking, all traces of gill-slits disappear in the adult mammal. But still more remarkable, the arterial system of the human embryo develops exactly as if it were planned to supply blood to the gills of a fish, and only later becomes modified into the permanent vascular system. Again, the limbless amphibia have complete limbs while still in the embryonic state; the "flat" pleuronectid teleostean fish has one eye on each side of its head before it hatches; the crab at the megalopa larval stage just after hatching has an abdomen as large as that of a lobster or a prawn; and many blind cave-animals have well-formed eyes when embryos. The collar-bone is absent in sheep, deer, and many other ruminants, but in the embryo sheep it is completely formed. Embryos thus betray the ancestry of their species.¹ But with exactly what degree of clearness they betray it has been much discussed among embryologists, and in maintaining that ancestral *adult* stages, rather than ancestral embryonic ones, could be described from the appearances of embryos, Haeckel has not been followed by the majority of investigators.² Yet on the fundamental thesis that embryonic development is a historical document, there is no disagreement.

The further question then arises, whether there are not to be found in human childhood traces of sub-human ancestry

¹ Balfour, F. M., *Comparative Embryology*, Macmillan, London, 1881; Franz, V., *Ontogenie und Phylogenie*, Springer, Berlin, 1927; Hertwig, O., "Über die Stellung der vergleichenden Entwicklungslehre zur vergleichenden Anatomie, zur Systematik, und Deszendenztheorie," in *Handbuch d. vergleichenden und experimentellen Entwicklungslehre d. Wirbeltiere*, Jena, 1906, III, **3**, 194; Sedgwick, A., "On the law of development commonly known as von Baer's law, and on the significance of ancestral rudiments in embryonic development," *Quart. Journ. Mic. Sci.*, 1894, **36**, 35.

² de Beer, G. R., *Embryology and Evolution*, Oxford University Press, 1930; enlarged edition, *Embryos and Ancestors*, 1940; Garstang, W., "The Theory of Recapitulation," *Journ. Linn. Soc. Lond. (Zool. Sect.)*, 1933, **35**, 81.

on the mental level. Certain physiological characters point to this,¹ and where anthropology and psychology have joined hands, as in the work of Freud, it appears that children recapitulate primitive mentality in the ambivalence of their attitude to precious objects.²

Chemical, as well as morphological, tests of genetic relation exist. The blood of animals responds to the introduction of foreign proteins, such as are contained in the blood of another species, by the production of antibodies and precipitins. Although sensitised blood-serum reacts most strongly by precipitation to the blood of the animal used in producing the sensitised condition, it also reacts more or less to the blood of related species. It has been found that the degree of reaction runs roughly parallel with the degree of structural similarity, and in this way affinities of descent may be charted out. Thus human blood reacts most strongly with the blood of anthropoid apes, next with that of Old-world monkeys, next with New-world monkeys, and least strongly with that of lemurs.³

Again, mammalian blood, as has long been known, is rather similar to sea-water in the composition of its ash. The probable changes in the composition of the ocean during geological time being known, it is possible to obtain a picture of the evolution of terrestrial forms by comparing their blood with sea-water.⁴ Chemical phenomena of recapitulation are also seen in the appearance and disappearance of certain enzymes and metabolic processes during embryonic development.⁵ The course of evolution must have been largely conditioned by chemical factors; thus it has been said that mammals would have been impossible without the

¹ Hrdlicka, A., *Children who Run on All-Fours*, New York, 1931.

² Freud, Sigmund, *Totem and Tabu*.

³ Nuttall, G. H. F., *Blood Immunity and Blood Relationships*, Cambridge University Press, 1904.

⁴ MacCallum, A. B., *Physiological Reviews*, 1926, **6**, 316.

⁵ Needham, J., *Science Progress*, 1923, **18**, 97, *Science Progress*, 1929, **23**, 633; *Science Progress*, 1930, **25**, 251; *Biological Reviews*, 1930, **5**, 142.

blood-pigment, haemoglobin, and the terrestrial oviparous animals without uric acid.¹ There are even chemical phenomena corresponding to vestigial structures, substances which give evidence of evolutionary affinity, such as the phosphagens in vertebrates and invertebrates.²

Reactions of the Idea with other Ideas in the Nineteenth Century.

The most immediate impact of the evolution-concept in the last century on other concepts, was its effect on theological authority. The doctrine of special creation, and even of the immutability of species, was embedded in the Old Testament, and since the automatic-writing view of the scriptures, i.e. the belief in literal inspiration, was widely dominant, trouble was bound to occur. The defenders of the book of Genesis were perfectly logical in wishing to exclude the sacred writings from all criticism, for they realised, perhaps unconsciously, that criticism would not stop there, and that the historians and anthropologists were only waiting to attack the New Testament until the biologists had finished with the Old. The whole extraordinary story of the South African Bishop Colenso, whose mild emendations provoked such fury, is well worth reading as a view of the temper of the time.³ Other excellent accounts may be found in Gosse⁴ (from the point of view of an English layman) and in Houtin⁵ (from the point of view of a French priest). The modern world, which would not dream of denying a com-

¹ Barcroft, J., *The Respiratory Function of the Blood*, Cambridge University Press, 1928, also *Features in the Architecture of Physiological Function*, Cambridge, 1934; and Baldwin, E. H. F., *Introduction to Comparative Biochemistry*, Cambridge, 1937; Lucas, K., Article "On the Evolution of Animal Function" in *Science Progress*, 1908, **3**.

² Needham, J., & Needham, D. M., *Science Progress*, 1932, **26**, 626.

³ Cox, G. W., *Life of John William Colenso, Bishop of Natal*, London, 1888.

⁴ Gosse, Sir Edmund, *Father and Son*, Heinemann, London, 1925.

⁵ Houtin, *La Question Biblique chez les catholiques de France aux XIX^e Siècle*, Paris, 1902; also *Mes Difficultés avec mon Evêque*, Paris, 1903.

pletely free hand to the scientific criticism of the biblical corpus, and which finds historical events themselves much less important than the ideas and concepts which they involve, understands only with difficulty the bitter atmosphere of nineteenth-century polemics.

In part, no doubt, the opposition to evolution-theory was connected with that general aversion to scientific investigation which has been present in all epochs, but which attaches itself now to one, now to another, form of scientific progress. Thus in the middle ages, chemistry was invested with an unholy glamour, and the opposition to biological evolution-theory in the last century was later transferred to psychology, a science often regarded as unearthing many things which it would be better for us to know nothing about. Such opposition, however, only stimulated the tendency to exalt natural science into a philosophy, and mechanical materialism found in evolution-theory one of its principal pillars. The world, consisting wholly of matter, and fundamentally a fortuitous concourse of hard round ultra-microscopic billiard-balls, had come into existence by chance and certainly not as the result of any intelligent design. Life, originally produced by some haphazard collocation of carbon compounds and the colloidal state, had obeyed a law of increasing heterogeneity, and had produced an infinite number of forms, most of which had been destroyed in the course of evolution. The Darwinian hypothesis of natural selection fitted in well enough with this world-outlook, for in abolishing purposiveness in biology, either individual, on the part of the animals (as in Lamarckianism), or general, on the part of the whole process, it seemed to make biology safe for the physicist, and opened a magnificent vista (which is not yet, nor likely to be, closed) in which physics and biology are seen to be one science.

Difficulties arose, however, when it was sought to substantiate the view that biological phenomena could fully explain the phenomena of mind and society, and could in their turn themselves be fully explained by the phenomena

of chemistry and physics. Only after the lapse of fifty years was it realised that Marx and Engels, the neglected contemporaries of Darwin and Spencer, had been perfectly correct in distinguishing between matter, life, mind, and society as a series of levels of organisation, none of which are wholly reducible to lower levels, but none of which are in the least inscrutable.

Mechanical materialism suffered, moreover, from one fatal defect, namely, that as a theory at all, it was a product of mind, and for mind it must account. Biological evolution-theory, while at first seeming to support mechanical materialism, was presently seen to be deserting to another camp. If mind was a product of biological evolution, some argued, it would probably be better adapted for practical and mundane uses than for grasping absolute truth. From this consideration there arose a wide anti-intellectualist movement, mainly represented by Bergson¹ and the pragmatists, and chronicled by Aliotta.² What Ward³ and Bradley⁴ had been unable to do by attacking mechanical materialism from the front on the basis of idealist metaphysics, was essayed by Mach,⁵ Avenarius,⁶ and Bergson, through the anti-intellectualist back door. These thinkers were, however, demolished by the continuator of dialectical materialism, V. I. Lenin⁷ in his *Materialism and Empirio-Criticism*. Mind is indeed the product of evolution, but an inability to grasp absolute truth is a fault of slight significance to man in his daily practical and theoretical contact with nature. Man's reason may be imperfect, but it is the only

¹ Bergson, H., *Creative Evolution*, Macmillan, London, 1913.

² Aliotta, A., *The Idealistic Reaction against Science*, Macmillan, London, 1914; also Article "Science and Religion in the Nineteenth Century" in *Science, Religion, and Reality*, London, 1925., New York, 1928.

³ Ward, J., *Naturalism and Agnosticism*, Black, London, 1915.

⁴ Bradley, F. H., *Appearance and Reality*, Oxford, 1930.

⁵ Mach, E., *Analysis of Sensations*, London, 1914.

⁶ Avenarius, R., *Kritik d. reinen Erfahrung*, Leipzig, 1888.

⁷ Lenin, V. I., *Materialism and Empirio-Criticism*.

tool he has. A réalist metaphysics, joined with a clear understanding of the successive stages of evolutionary levels of organisation, in which mind is seen as originating, like any other natural phenomenon, at a definite point in the history of the world, proved in the end to be a far better philosophy than either mechanical materialism or metaphysical idealism.

Other important effects of the evolution-concept were largely psychological. The biology of the nineteenth century was no longer content, like that of the previous century, to dwell largely on the more edifying aspects of living organisms; on the contrary, it faced all the facts it could, and described calmly such phenomena as parasitism, putrefaction, and the struggle for existence. This raised the problem of evil, that perennial difficulty of theistic thought, in an acute form, and biologists such as Romanes particularly emphasised the universality of disease, pain, and death, although it is certain that he enormously over-estimated the importance of pain in organisms with relatively primitive nervous systems.¹ Nevertheless the issues raised by biology forced the philosophers to reconsider their positions from yet another angle. Such a book as the autobiography of Henry Adams shows how the theory of evolution entered into the thought of every man who lived in the intellectual climate of his period.²

Another psychological result of evolution-theory was the undue insistence on origins which characterised the end of the nineteenth and the beginning of the twentieth century. The origins of religion from primitive animism, of episcopal mitres from Mithraic hats, of social altruism from sublimated sex-instinct, etc., etc., were urged in a sense derogatory to these end-products as they exist at the present day, and at first it was insufficiently realised that origin is essentially irrelevant to questions of value. Against these attacks there

¹ Romanes, J. G., *Thoughts on Religion*, Longmans Green, London, 1913.

² Adams, H., *The Education of Henry Adams*, Massachusetts Historical Society.

was' little defence. "The apparatus of theology," as Balfour put it,¹ "is much better contrived for dealing with the points upon which theologians differ, than for defending against a common enemy the points upon which theologians are for the most part agreed." For this and other reasons the early victories of scientific naturalism led to a philosophical stampede, but this was not lasting, and modern philosophy is united in acceptance of evolution though not, of course, admitting the mechanical materialist claim, which used to be allied with it, that the scientific method is alone competent to acquaint us with the nature of the world in which we find ourselves. It has been suggested that an insufficient appreciation of the distinction between these two issues was largely the cause of such strange phenomena as the fundamentalism of the Southern States of America. In opposing evolution, the "fundamentalist" was fighting an impossible battle, largely against facts, but in so far as he was opposing mechanical materialism, he was contending against a false philosophy.² He had a zeal, but not according to knowledge.

Philosophical examination of the nature of scientific law has also led to a great difference between our outlook and that of the last century, for no small part of the Victorian polemics was due to a mistaken conception of scientific "law" as juridical. Regularities which we observe in nature are by no means the same thing as regularities imposed upon nature by some external creative force. This was a concept taken out of jurisprudence and misapplied in science.³ Even more numerous were the concepts taken out of natural science and misapplied in the social sciences. Thus while evolutionary continuity was used by some writers as an

¹ Balfour, A. J., *Foundations of Belief*, Longmans Green, London, 1895.

² Fletcher, J. M., "The Philosophy of Nothing-But," *Hibbert Journal*, 1931, 29, 239.

³ Cf. M. Ginsberg on the concepts of juridical and scientific law, *Politica*, 1939, 4, 1.

argument for slow social development and parliamentary methods, evolutionary discontinuity was also used as an argument for revolutionary changes. Since both occur in nature, we are not much further on. Social selection in human communities has been identified with natural selection, and the "survival of the fittest" was constantly used by capitalist writers as a rationalisation for *laissez-faire* doctrines.

To sum up, it is quite clear that human thought will never again be as it was before the facts of evolution became known to us. With this advance, man became conscious of his own origins, and all static conceptions of society went into liquidation. Evolution is not yet completed; human society has not yet attained its full development; man may perhaps now learn to control his further evolution. The world about him is real. It existed long before him, and before all life of any kind, but eventually, like a child growing up, he became conscious of it. The value of his highest ideals and actions is indeed independent of their origin, but only in the light of their origin could they attain their highest dignity, and be vested with an evolutionary authority securer than any supernaturalism, the measure of his greatness now and the guarantee of untold greatness to come.

9

SCIENCE, CAPITALISM AND FASCISM

(A broadcast talk from London, 1942)

Other talks in this series have described the early origins of science and how man embarked upon the long adventure of acquiring control over his environment. Here we may begin with the statement, which is now generally accepted, that the beginnings of modern science in Western Europe corresponded with the transition from the feudal economic system of the middle ages to the capitalist economic system of subsequent times. Both these changes, moreover, corresponded roughly in time with the change in religious thought and feeling known as the Reformation, and with the change in cultural and artistic values known as the Renaissance.

The feudal economic system was one in which industrial production existed only to a very small extent; agriculture was dominant, transport and intercommunications very poor, and society could be represented as a pyramid of landowners, from the king and his barons at the top, down to the little local knights and squires, with the peasantry beneath them carrying out the actual work of cultivation. In return for this, the feudal aristocracy was supposed to be entrusted with the defence of the country and people, each landowner arming a little group of able-bodied men and going with them to join the king's forces. Earliest capitalism seems to have arisen from two foci, seaport towns and mines. Towns had always stood somewhat outside the feudal system, but their guilds of master-workmen and journeymen were for generations very static. Nevertheless they provided the nucleus from which industrialism, with its factories, could

develop, and of course as this long process went on there was a vast movement of population from the countryside into the towns, destroying the ancient feudal peasantry and creating the new landless urban proletariat. Seaport towns, however, had a special position, for it seems that perhaps the earliest form of capitalism was, in a sense, maritime transport and commerce. The ship on its voyages transcended the narrow boundaries of an area in which theologians could (as they always claimed to) regulate prices and mercantile law. The shipman's trade, on account of its dangers, demanded, from the outset, technological advances and inventions—applied science. The demand for metal parts of ships reacted, in its turn, on the industry of the miners, who themselves also, perhaps because of the wild and arid areas in which they had to carry out their operations, had stood somewhat outside the feudal system. Hence it is no coincidence that in all our history, the breath of the sea is symbolic of freedom, and that one may still find inns designated by the sign of "The Freeborn Miner."

The question has often been raised—and indeed it is one of the deepest historical questions that can be raised—why the body of systematised knowledge and theory about Nature which we call science did not develop also in India or China. In China especially, it might have been expected, in view of the great empirical discoveries which the Chinese made centuries before. It may be that the answer is partly geographical. Europe is a continent so intersected by inland seas, such as the Baltic, the Mediterranean and the Adriatic, and with such an indented coast-line, that it constitutes an archipelago of islands rather than a solid continent such as India or Eastern Asia. Europe is also rich in mineral wealth, from the mercury of Spain to the coal of Northumberland and the iron of northern Sweden. Conditions were favourable, therefore, for the development of mercantile, and later of industrial, capitalism.

There can be no question that so long as capitalism was

growing and expanding it exerted a great stimulus upon science, and was indeed a fundamentally progressive force. The typical seventeenth-century business man was a Puritan, and if with one voice he described the investigation of Nature as the study of God's works to His greater Glory, with another voice he emphasised the extreme importance which such studies had for the general "improvement of trades and husbandry." Throughout the fifteenth and sixteenth centuries the capitalist development of industry was making headway, but the Civil War in seventeenth-century England was its first decisive victory, and after the Restoration, when the power of the City of London had by Cromwell's military rule been firmly established, science became fashionable, and "the noise of mechanick engines was heard in Whitehall itself." The new King gave his patronage to science in transforming a group of scientists which had been meeting since 1646 into "The Royal Society of London, for the improving of natural knowledge," in 1663. Business had become respectable, and Science with it.

We know that these early Fellows of the Royal Society were nearly all men of Puritan affiliations, who must have sympathised with the revolutionary Puritan Parliamentary side in the Civil War. In coming together to discuss scientific matters openly, and to publish their discoveries abroad in the first scientific journals, they were breaking a tradition of centuries, the tradition associated with the alchemists and adepts, of secrecy and individual transmission of knowledge about natural phenomena. They were particularly interested in practical applications of scientific knowledge, and the early numbers of their journal, the famous *Philosophical Transactions*, are more concerned with what we should nowadays call "applied science" than with pure science. Later, however, this interest shifted to other centres, probably because the centre of gravity of British industry shifted. In the eighteenth century the Lunar Society at Birmingham, and the men associated with the youthful chemical industry

of Scotland, took up the tale. It is interesting, nevertheless, that the association between science and revolutionary politics still persisted, since the Birmingham group, which included among others Priestley, the discoverer of oxygen, welcomed the French Revolution, and sent representatives over to France to study it at close quarters. Nor must we forget to refer to such a key figure as Franklin, the man "who snatched the lightning from heaven and the sceptres from the hands of tyrants," and who was typical of the "Enlightenment" period; the prototype of the American business man, and at the same time a friend to the Revolutions both in America and France.

The nineteenth century, in its first half, may perhaps be regarded as the flowering time of classical capitalism. As throughout its history, it continued to have the effect of greatly increasing the standard of life of the people as a whole, even though in certain areas it ground down working populations into the grimmest poverty and misery. Its effect upon scientific research continued favourable, so long as human knowledge had not gone past the point at which fundamental results could be obtained by scientists working alone or with few helpers, and with no need for very expensive apparatus. When a Faraday could construct his apparatus himself out of wire, sealing-wax and string; or a McMunn could investigate the pigments of animals in a greenhouse at the bottom of his garden in the intervals of medical practice; or a Thudichum penetrate the secrets of the chemistry of the brain in a domestic cellar; serious problems of scientific co-operation and financial support could hardly arise. But as scientific knowledge grew, its social nature became more obvious. Experimental procedures became so complex, and the necessary apparatus so expensive, that valuable results could no longer be obtained by isolated men, but rather by teams of workers, backed by substantial funds.

Immediately the limitations of capitalism began to appear. In some countries, where the State was reluctant to interfere,

science lagged a good deal behind, and so after the First World War, when it was felt in England that something drastic would have to be done, Research Associations were set up for each industry, textiles, leather, ceramics, and the like, to carry out fundamental research, the results of which would be at the disposal of each firm in the industry which contributed financially to the support of the Association. This scheme, though it worked passably well in some cases, was never really a success. Firms were naturally much more interested in information which their competitors in the industry would *not* share, than in information which was common to everybody. This was quite natural, since the first duty of a firm under capitalism is to its shareholders and its directing oligarchy, and not to the public as a whole.

Meanwhile, however, the nature of capitalism itself had not been unchanging. Throughout the latter part of the nineteenth century the movement towards monopoly capitalism had been getting under way. The smaller firms in an industry were being bought up and squeezed out, and the whole industry was being organised as a single trust, cartel, or unit, by a series of what on the other side of the Atlantic we call "nationwide mergers." Such a development has been by no means unwelcome to sociologists, for it represents a step forward in the organisation of human society. One of the greatest of Americans, Henry Adams, in his autobiography, notes the failure of "trust-busting politics," together with the victory of the North over the South in the American Civil War, as the two great processes in his lifetime which convinced him that humanity does move towards greater and more highly organised aggregates. Indeed, the present war between the United Nations and the nazi-fascist powers may be regarded as a "secessionism" on the part of the latter, a secession from the World-State of humanity as a whole. Although this State or Union has not as yet come into existence, the revolution which science has brought about in the means of transport and communication,

and the economic interdependence of all human groups, indicates that we are on the threshold of it. All theories of racial superiority, whether German or Japanese, deny this unity of humanity.

There is nothing wrong with the size or the high degree of internal organisation of the Trust, Cartel, or Monopoly. What is wrong with it is that in the last analysis it is responsible not to the public as a whole, but to its own shareholders, and really to its governing directorate. Science under monopoly capitalism is therefore in a curious position. In some cases, monopolies may set up vast research institutions, and in some cases these may be run in a very enlightened way, involving the prosecution of all kinds of scientific research, pure or applied, with elaborate groups of workers with full financial backing. But since the monopoly has no real public responsibility, it may be, and often is, unwilling to encourage fundamental research if cheaper methods can be found for achieving what remains, after all, the principal end of the whole institution, the winning of substantial profits. Advertising has not infrequently been found to be such a cheaper method. Furthermore, although under the Trust system the scientific research department is no longer dependent for its financial support on the grudging participation of a number of small firms each competing with the rest, a new difficulty arises. The Trust or monopoly is in the position of being able to stop research and development altogether; it can "freeze" new discoveries and inventions at will, if from its own point of view, lacking public responsibility, it considers that such new developments are undesirable for its own *internal* economy. It was this point of view which led the late Sir Josiah Stamp, for example, to call for a "moratorium on invention," i.e. to demand that the onward progress of discovery and invention should cease or be suppressed for a time.

Thus the profit-making motive acted for three or four hundred years as the most powerful stimulus and support

for scientific research. But in the end the scientific method bursts these limitations. Not only does it improve the making of old-established things which men want, and introduce many new things; it also eventually shows us how a high degree of universal mental and physical well-being may be achieved. In so doing, it goes beyond what any private group can make use of in profit-making enterprises, and demands recognition and application by the People and their State.

When we come to Nazism and Fascism, we see that these doctrines have taken one of the two alternative ways lying before our modern society. Instead of retaining and furthering democracy by modifying capitalism, or replacing it by making industry, as in socialist planning, responsible to the public; they abandon democracy altogether, destroy it, and introduce the authoritarian rule of the great monopolies. They stabilise existing class differentiations. They abolish, in order to support capitalism, the liberal ideas of freedom and democracy which grew up with it and were once its justification. And to reconcile the German, Italian and Japanese peoples to this industrial dictatorship at home, they carry to a fantastic extreme, and with demoniacal pertinacity, the ideas of nationalism which had their first origin at the time when the modern nations were differentiating, in capitalism's earliest days, out of the formless mass of feudal Europe.

Science under Nazi-Fascism finds itself in a worse position than in any previous form of society. The militaristic character of the government means that science is only valued in so far as it can produce results of military interest. Thus chemistry continues to be supported to some extent, since it can make poison-gases and agricultural fertilisers, but other sciences, especially physics and certain branches of biology, such as embryology, have practically died out altogether in Germany since 1933, and most of their representatives are now in exile. Scientific anthropology, again, has been largely suppressed. Pursuing their aim of welding

a nation of automatons, wielders of machines of attack who should be unconscious of their common brotherhood with men of other peoples, the Nazi gangster leaders developed old theories of racial superiority which have no shred of scientific justification and which constitute the greatest scientific quackery propaganda to which the innocent masses have as yet been subjected in human history. German anthropologists were thus presented with the choice of proclaiming what they knew to be false, or of leaving their jobs. Furthermore, the racialist theories were soon applied within science, and a flood of rubbish about the difference between the scientific work of Jewish and non-Jewish colleagues was poured out. The Jewish scientists were expelled, much to the benefit of other countries. True scientists know that a scientific fact stands or falls with the accuracy of its observation, and a scientific theory stands or falls by the efficiency with which it explains facts and coheres with the rest of our knowledge about Nature—not by whether it was observed or proposed by a man or a woman, a Jew or a Greek, or a human being of skin-colour brown, black, yellow, or white. The conception of the “leader-principle,” again, is basically opposed to the scientific valuation of man. Nature’s behaviour is not revealed to self-appointed “leaders,” but to him who can see through a brick wall further than most of his fellows. Men are not animals to be herded about in flocks, but thinking and rational beings, able to co-operate spontaneously in the good society.

Our conclusion is, therefore, that although science grew up along with capitalism, capitalism came in the end to be a brake upon its further progress. With fascism it comes almost to a full stop. For further progress we need the international outlook, the socialisation of industry and research, and a firm belief in the unity of mankind. When the Axis dictatorships have been overcome, we shall not go wrong if we adhere to these watchwords.

IO

THE NAZI ATTACK ON INTERNATIONAL SCIENCE

(Schiff Lecture at Cornell University, 1940; subsequently published as an R.P.A. war pamphlet)

“ . . . Out of Europe comes a Voice
Compelling all to make their choice,
A theologian who denies
What more than twenty centuries
Of Europe have assumed to be
The basis of civility;
Our evil Daimon to express
In all its ugly nakedness
What none before dared say aloud,
The metaphysics of the Crowd,
The Immanent Imperative
By which the lost and injured live
In mechanised societies
Where natural intuition dies,
The international result
Of Industry's Quicunque Vult,
The hitherto-unconscious creed
Of little men who half succeed.”

Auden's New Year Letter.

For the past eight years international science, that great movement of scientific thought which began on the continent of Europe about the fifteenth century, has been facing the gravest crisis of its history, and on the continent of its birth. It was to the accompaniment of scientific advances that the old Christian Middle Ages disappeared, and now there threatens a new Middle Ages, not rude, peasant, and religious; but highly technical, urban, and based on the paganism of

the newspaper reader who wants to be taken out of himself by some great movement, no matter what. In this new Dark Age, superstition will triumph over reason, science will be retained only in so far as it is necessary for a narrow technology, and this technology will be applied not for the common good of humanity, but for the domination of power-seeking groups by force of terrible armaments.

The Development of Modern Science.

It will be generally allowed that all the nations of Europe have contributed in turn to the development of modern science. In the fifteenth and sixteenth centuries it was mainly the Italians and the Hollanders who set the ball rolling, the former by the discoveries of a Leonardo or a Galileo no less than by the Lombard invention of banking and financial techniques; the latter by the free atmosphere which the early capitalist centres such as Antwerp provided, both for trade and scientific invention. In the seventeenth century the English made perhaps their greatest contribution; it was the century of Harvey and Newton, and it saw the foundation of the greatest of all scientific societies, the Invisible College of 1649 which later became the Royal Society of London. The early Fellows of that Society were nearly all, as has been shown, of Puritan connections, and this, like the fact that the University of Cambridge was on the Parliamentary side during the English civil war, was no coincidence, for that war can only be understood as the first triumph of the rising capitalist middle class over the feudal aristocracy and the mediaeval religious conceptions of society. Science and the improvement of trade and husbandry were growing up together. When, however, we come to the eighteenth century, the English movement had spent its force, and the spirit passed to France, where the Encyclopaedists and other writers of the enlightenment period prepared the way not only for the further political advances of the French revolution (analogous to the English civil war) but also for the

great achievements of French science. Biologists like Bonnet, Buffon, Trembley, Lamarck and Cuvier, astronomers like Laplace, were able to say of their sciences, what the great Lavoisier (though himself a victim of revolution) said of his: "La revolution en chimie est faite." Then in the second half of the nineteenth century German science produced its best contributions. In every field, in chemistry and medicine and biology, in physics and engineering, German genius powerfully set its stamp on international science. The names of Roux and Koch, of Helmholtz and Röntgen, of Müller and Liebig and Kekule, to mention no more, suffice to illustrate this.

It is worth while pointing out these historical facts, partly because the present racial prejudices of the nazis go entirely counter to them, and partly also because enmity to the governments at present in power in Germany and Italy is not enmity to German and Italian culture in themselves. On the contrary everyone must deeply admire these achievements, and hope that after the present nightmare is over, their peoples will be restored to the proper inheritance of them. I was myself once a student at the University of Freiburg in Breisgau, indeed I think the first English student to reach there after the war of 1914-18. The subject in which I am primarily interested, experimental morphology and embryology, has a German name, given it by its first founder, Wilhelm Roux, "Entwicklungs-mechanik," which we always affectionately retain. The great traditions of German culture are among the greatest of Europe. Nor, on the other hand, will this paper constitute any defence of British Imperialism. All my political life in England has been in association with the Labour movement, and as such in complete opposition to traditional imperialist sentiments and politics. Like many members of the Labour movement in England, I hope to see much closer contact between the British democracies and the United States. I believe it would be greatly to the benefit of both, and I hope that when the

present danger has passed we shall not again succumb to the old centrifugal tendency and go our separate ways. Anglo-American democracy is historically a unity, and the close reassociation of its parts can only be for the good of the whole world.

The purpose of the present paper is to examine the nature of nazism, especially in regard to its attack upon international science and learning. In probing the facts about the persecution, and exiling, and even murder, of men of learning on account of their race, their faith, or their political beliefs; the suppression of Universities and intellectual centres; the abolition of free thought and research; and the concentration of intellectual effort on destructive ends; it is necessary to see what are the statements of the theoreticians of régimes which have put and are actually putting this across. Only in this way can we understand the full force of the evil power which has come into the world. Such an examination cannot be made without certain difficulties, because only a very small part of the writings of the nazi theorists are available in English translation, and their statements are little better known in England than they are in the United States.¹

The Development of Nazism and Fascism.

The first problem which confronts us, therefore, is the intimate nature of nazism and fascism. Without some definite conception of this, we can hardly hope to analyse the nature of their attack on science and learning. Now it would seem

¹ There are certain useful books which summarise them, such as Aurel Kolnai's *The War against the West* (London, 1938), but even those concentrate on the sociological and philosophical side, neglecting the distortions of scientific presentation which the nazis have brought to such perfection. See also K. Obermann in *Zeitschr. f. freie deutsch. Forschung*, Paris, July, 1938; E. Unger in *Universities Review*, 1940, **12**, p. 53; and V. J. McGill in *Science and Society*, 1940, **4**, 12. Unless otherwise given, references to books of authors quoted in what follows will be found in Kolnai's book.

that nazi-fascism is essentially a by-product of a vast transition which is going on all around us, a transition from individualistic capitalist economics and all that that implies, to some form of collectivism, whether closely modelled on present conceptions of socialism or communism we do not know. It is hardly deniable that we are in the midst of a secular trend towards a more highly integrated and organised form of society. And just as the transition from feudal aristocracy and kingship to capitalist democracy with its republican forms was accompanied, during the three centuries which it took to accomplish itself, by a number of violent wars and upheavals—the peasant wars in Germany and Bohemia, the Thirty Years' War, the English civil war, and the French revolution—so we could hardly expect that so great an economic and social transition as we are envisaging could take place without analogous disturbances and social earthquakes.¹

Now nazism might well be termed the apotheosis of gangsterism, the colossal prototype of all those systems which make hay for themselves while the sun shines. There are those in Europe who erroneously suppose that gangsterism was an American invention. Against this it may be pointed out that the Greek city-states and the towns of the Italian renaissance probably knew a thing or two about gangsterism. As a social phenomenon it is like those biological phenomena which always or often appear when external conditions, such as temperature and moisture, are just right. The conditions for its appearance on a colossal scale in the history of Europe are those which govern all racketeering, namely the presence of two relatively powerful groups between whom exist relations of mutual fear. In such a situation the racketeer can enter between them and make his money or other benefits by playing off one against the other. Some such situation has surely been true both in the

¹ This point of view has long been familiar, but a striking statement of it was made by Margaret Cole in the first issue of *Fact* (April, 1937).

Labour movement rackets and the Prohibition rackets in the United States. In the former case the mutual suspicion and fear between Capital and Labour provided all the necessary conditions, while in the latter case the Government on the one hand had the armed police forces, while the people on the other hand had the inextinguishable intention of paying for a million drinks whatever the mechanism of their supply might be. And then just as there are parasites on parasites, so there were racketeers who exploited racketeers, and so on.

Hitler's unique political genius (whether conscious or not is perhaps uncertain) lay, therefore, in playing on the mutual fear of those over whom he intended to tyrannise.¹ In the early days of the nazi movement some of the party speakers got the big business men into the big hotels and said to them, "We alone can guarantee to save you from Bolshevism," while others went among the working masses and said, "Only by following us will you get socialism in this century in Germany." After all, I saw it with my own eyes. Working at the Kaiser-Wilhelm Institut für Biologie in Dahlem in Berlin in 1933, I saw on the first nazi May Day the banners going by with inscriptions such as "Nur ein starkes Deutschland kann Arbeit und Brot geben." One might have thought that the world co-operative commonwealth would best give all of us bread and work, but for Germans it had to be a strong Germany, and hence a miserable everybody else.

The question of exactly how far the promise to the working masses has been broken by the nazis is an interesting one, but most economists consider that no true socialist measures have been introduced in Germany. Regulation of profits is not much of a step towards the nationalisation of essential industries when profits are guaranteed at the same time. The "Kraft durch Freude" and similar movements are

¹ Long after this was written I found that it had the concurrence of Stalin himself; see his speech on the October anniversary, 1941 (*World News and Views*, 1941, 21, 722).

little more than a meaningless façade when the only openings for men are in the army and for the women the slavery of the munitions-factory or domestic service. But the significant thing is that in the twentieth century, in order to succeed in their aim of winning power in Germany, the nazis had to adopt, at any rate, socialist phraseology and an appearance of socialist propaganda.

What had been so successful in the internal situation was then applied to the international one. Just as the nazis rose to power within Germany by playing on the mutual fear of the capitalist classes and the working masses, so the same policy was possible as between nations, and the nazis faithfully carried it out. To the capitalist democracies of the west their propaganda took the line, "We are your only possible bulwark against the barbarous Mongolian Bolshevik Asiatics" and to the Kremlin they privately said, "You had better play ball with us if you want to see Franco-British capitalism in serious trouble in the near future." It must by now be fairly clear that the reason why the French and British peoples went into the present war in so great a state of unpreparedness was because the former Governments of Daladier and Chamberlain never for a moment believed that Hitler would attack the West; they expected him to attack the U.S.S.R. and indeed gave him considerable help from time to time on that supposition without even taking out the obvious insurance policy. And the conclusion emerges that nazi-fascism could not have preceded the establishment of socialism in the Soviet Union, not because it borrowed certain minor techniques and certain floutings of traditional morality from communist theory, but because unless there had been a sociological magnetic pole in the east to match the magnetic pole in the west, there would have been no opportunity for the colossal racket which has captured the machinery of government in Germany and Italy at least as effectively as any racketeers in the bad old days captured the municipal machinery of any American city.

So much for the mechanism whereby nazi-fascism has come into existence. Its existence seems to be a function of the "fear-field" of "social magnetism" between the two poles of the socialist future (so much of which our civilisation needs) and the capitalist past (so much of whose democratic individual freedom we must seek to retain). Its initial and continuing impetus we cannot attribute to any thing other than the will-to-power of the ruling nazi group, Hitler and his immediate gang. Its total motive power derives, of course, from many sources, e.g. from the natural development of monopoly capitalism, from the failure of the democracies to act in a friendly way towards the Weimar government, from the long standing incapacity of the German people (possibly because of the fact that they were never a part of the Roman Empire) to fit in with the Latin-Slav civilisation of the rest of Europe, and from the old-established urge towards a socialism in Germany which forgets that the ideals of a socialist state matter no less than its internal structure.

A Nation of Automata.

The essential problem facing the nazi-fascist rulers after attaining power was how to obtain a nation of tools sharpened to subserve their ends of world domination.¹ Everything that they have done to science and learning in Europe can be derived from this one aim, pursued with maniacal perseverance and absolute ruthlessness. In the first place, *Anti-Intellectualism*, the fight against all scientific scepticism and rational judgment; for when a régime has ends not susceptible of rational formulation, it must needs have recourse to the intuitional, the emotional, and the anti-intellectual.² Then *Racialism* in all its aspects; the belief, commended to the German people by every artifice known to the modern

¹ "A program of power masquerading as a social ideal." M. Oakeshott, *Social and Political Doctrines of Contemporary Europe*, p. xxii.

² Cf. A. M. Deborin in *Marxism and Modern Thought*, p. 110.

technique of propaganda, that there are pure human races of varying abilities, that some of these are "natural" subject-races, and that the dominant master-race is German. A more shameless flying in the face of established scientific fact has never been known in human history. There follows *Wehrwissenschaft*, the imprisonment of science within the sharp bounds of what is of military value, and the discouragement of all pure research and free scientific speculation. Finally, the *Führerprinzip*, the doctrine that men are neither morally nor intellectually capable of independent action, but must always accept the orders of some few of their number who are born endowed with such gifts of leadership as to require absolute obedience. It is worth while to take up each of these trends in turn, listening to what the apologists of the nazis have to say, and viewing the effect that they have had on international science.

Anti-Intellectualism.

Naturally anti-intellectualism has always been the enemy of science.¹ In modern thought it has had plenty of representatives in non-nazi regions, such as the theological absolutism of Karl Barth (himself later an exile from nazi oppression) and the cult of the solar plexus publicised by that eccentric genius, D. H. Lawrence. But the nazis have brought it to its highest point. "The moral laws of God for the tribe," says Stapel, "successfully resist all efforts to make them into any rational system." "The (National Socialist) revolution of the people is *pure* eruption (*Aufbruch*), *pure*

¹ This statement requires qualification. In the sixteenth and seventeenth centuries in Europe, there was a certain alliance between the mystical theologians and the early scientists, with the traditional Aristotelians and the scholastics, by then somewhat petrified, in another camp. But this alliance, which arose because the mystical theologians were prepared to accept the possibility of magic, and hence that certain effects could be produced by *doing* things manually while the rational theologians were not, was only temporary.

process," wrote Freyer, of which statement it has been remarked that no better designation could be imagined for a process designed to make the mighty mightier than before. In such Universities as have continued to function in Nazi Germany, disparagement of the intellect is officially undertaken. Here is an extract from a speech by the Rector of Frankfurt University, Krieck, in 1935:—

"Blood and soil, as fundamental forces of life, are the symbols of the national-political point of view, and the heroic style of life. By them the ground is prepared for a new form of education. What does blood mean to us? We cannot rest satisfied with the teachings of physics, chemistry or medicine. From the earliest dawn of the race, this blood, this shadowy stream of life, has had a symbolic significance, and leads us into the realms of metaphysics. Blood is the builder of the body and the source of the spirit of the race. In blood lurks our ancestral inheritance, in blood is embodied the race, from blood arises the character and destiny of man; blood is to man the hidden undercurrent, the symbol of the stream of life from which man can arise and ascend to the regions of light, of spirit, and of knowledge."

In all the pronouncements of Nazi writers, this sinister and empty rhetoric¹ replaces the exhortations to that brotherly investigation of nature which is the hallmark of "places of sound learning and religious education." In his own book Hitler wrote:—

"The state must throw the whole weight of its intellectual machinery not into pumping children full of knowledge, but into the production of bodies absolutely healthy. The development of mental capacity is only of secondary importance. Our first aim must be the

¹ Cf. A. Rosenberg, *Blut und Ehre*, 1937, as an example.

development of character, especially of will-power, and a readiness to take responsibility; scientific training should follow far behind." (*Mein Kampf*.)

"What is the purpose of University education?" wrote Krieck in another place. "It is not objective science, which was formerly the purpose of University training, but the heroic science of the soldier, the militant and fighting science."

In succeeding paragraphs we shall find many further examples of the fight of the nazis against reason. Its origin is plainly due to the impossibility of stating the aims of nazi imperialism in rational terms. Ideals of human community, of the right to work and play at peace with one's fellow-men, these have a rational appeal; not so the ideal of throwing away one's life in battle for some insubstantial glorification of Germany, or the leader's honour, or the domination of one's people over other peoples in no way obviously inferior or objectionable. Where rational persuasion is impossible, recourse must be had to the "dark destiny incarnated in the blood of the master-race" or some such emotional fetish. But this is by no means a bad sign. For all history shows that rationalism has been the tool and armour of rising social classes, and the very fact that the nazis operate with its antithesis reveals their intrinsic despair, reveals that time is not on their side.¹ The devil rages, as it says in scripture, "for he knoweth that he hath but a short time."

The Chinese—Our Intellectual Allies.

A point not generally recognised which arises here is that the struggle of China against Japanese aggression is basically identical with that of western democratic thought against nazi-fascism.² Chinese civilisation, which owes its unique

¹ Cf. F. Foldes, "The Ideological Role of Racism," *Modern Quarterly*, 1939, 3, 262.

² See the books of Lin Yu-Tang, e.g. *My Country and My People*, and Hu Shih, *Forum*, December, 1936.

qualities to its wonderful combination of the romantic and the rational, is based on the sincerely philanthropic rationalism of Confucius (overlaid though this was in later ages by Buddhist pessimism and Taoist magic). The Chinese are defending the rationality of man against a mystical racial-national spirit quite akin to the spirit of nazism but equipped with a special religious system of indigenous origin. The notorious persecution of liberal Japanese scholars who have dared to venture the doubt whether the Japanese Emperor is really descended from the sun, is quite analogous to events in Germany. And we may perhaps glimpse the cynical nature of the system if we remember that the Japanese Emperor is no demi-god but a marine biologist, who would ask nothing better than to be left in peace to his studies. The value of Japanese irrationalism is fully appreciated at the western end of the Axis, as witness the following quotation from Ludendorff:—

“The peoples which have been christianised no longer find themselves in the happy position, like the Japanese people, of possessing a specifically racial religion such as Shintoism, founded in the cohesion of government and people, of people and army, and of the whole of ethnic life.” (*Totalitarian War*.)

Racialism.

Since racialism rests on a basis devoid of scientific support, it might be regarded as a department of anti-intellectualism. Its historical rôle has always been similar. In 1853 Gobineau, a disgruntled aristocrat, conceived that a body of racialist theory would strengthen the hands of what remained of feudal aristocracy (which was not so much as he thought) against the forces of bourgeois capitalism.¹ In our own time

¹ It is interesting that Gobineau was opposed in his own day both by the eminent pathologist Rudolf Virchow and by John Stuart Mill, whose observations on him demand quotation: “Of all the vulgar modes of

the same set of ideas has arisen to aid in stabilising the present economic system of Germany while the nazi leaders assure their world-domination.

Here it will hardly be necessary to devote any space to a consideration of the scientific refutation of racialism, since this has been very well done in books such as *We Europeans* by Huxley, Haddon and Carr-Saunders. It must suffice to say that the idea that modern nations are biological "races," and that conflicts between these national unities are "biologically inevitable," possesses not a shred of scientific justification. The christian aphorism, "He hath made of one blood all nations that are upon the earth," is abundantly supported by all that modern science has discovered, whether in palaeontology, archaeology, ethnology, the study of blood-groups and other physical and chemical genetic characteristics, or all the various departments of anthropology. That there are differences between different human groups is of course undeniable, but the infinite overlapping of characteristics makes it sure that there are no "pure" groups to be found anywhere in the world. We do not yet know enough to say whether there are really any differences in intelligence, assuming perfect equality of opportunity, and until we have positive evidence that all groups are not equally able to make valuable contributions to the benefit of humanity, we must act on the assumption that all the groups are, in order to provide the best conditions for getting them. In those parts of the world, indeed, where races meet in conditions of almost absolute educational equality, such as Trinidad, experienced teachers will freely admit that there are no detectable differences between the performances of Whites, Chinese, Indians, Negroes and Caribs.¹ The bestiality of the attacks of the nazis upon the

escaping from the consideration of the effect of social and moral influences on the human mind, the most vulgar is that of attributing the diversities of conduct and character to inherent natural differences."

¹ The work of the Swedish ethnologist W. W. Krauss on race-crossing

Jews and of the Japanese upon the Chinese, especially when it is remembered that these things have been done as part of a policy of terrorism and smoke-screening, can only be regarded as a demonstration of the results of fostering the evil in man's nature instead of sublimating it to socially valuable ends. The trouble about the eugenic movement, upon the ideas of which much of Nazi racialism at first claimed to be based, is that even when it has been decided just what physical type is desired, there remains the impossibility of breeding for it in human society while retaining any liberty of choice in sex relations; and little or nothing is known about the inheritance of mental characteristics, which are much more important for society anyway. Moreover, the sterilisation of the feeble-minded and other defectives cannot achieve anything very rapidly, since the great majority of these arise not from former defectives, but from socially valuable people who happen to be carrying the genes for the abnormalities. Above all, the introduction of sterilisation in a society still based on privilege of cash and class amounts to "monkeying with the works." Biological engineering in an unstable and unhealthy social order is a very dangerous game.

Nazi writers affect to take the idea of the Nordic, Germanic, or "Aryan" race with great seriousness, but this has not prevented the conferring of certificates of "honorary Aryan-ship" upon certain men of Jewish or partly Jewish origin whom it was important for them to retain in Germany under conditions of more or less tolerable existence.¹

in Hawaii is particularly striking in this connection (see especially his well-illustrated paper in *Journ. Heredity*, 1941, **32**, 371). Under good social conditions, crossing between Northwest Europeans, Spaniards, Portuguese and Puerto Ricans, Chinese, Japanese, Koreans, Filipinos and Hawaiians leads to excellent results.

¹ On the other hand, Jewish men of science, or even those who support theories proposed by Jewish men of science (i.e. "Jews in the

Nor did it hinder the proclamation that the Japanese were to be regarded as "Aryans" within the meaning of the Act. Political necessity is seen again in the fact that typical books of elementary biology, such as Karl Brohmer's *Grundriss einer national-socialistischen Biologie*, implicitly assume through-

Nuremberg sense") have been expelled from the German scientific societies. Here are transcriptions of actual letters connected with this:—

"Gottingen,
1st Dec., 1938.

To all full Members, Foreign Members, and Corresponding Members of the Academy of Sciences at Gottingen, within the German Reich.

In the following we beg to submit to your attention part of a decree of Reichsminister f. Wissenschaft, Erziehung, u. Volksbildung (WE Nr. 2633, dated 15th Nov., 1938). According to this, Jews, persons of mixed blood, as defined by the Reich's citizenship law, and lastly any persons having any relationships to Jews, can no longer remain Members of the Academy. We ask you therefore, to send in, if necessary, the declarations mentioned below.

The Secretary of the
Math.-Physical Section

The Secretary of the
Philol.-Historical Section

(Signed) Rein.

(Signed) Kees."

[Copy]

"By introducing into the Statutes the Regulation that none but Reich citizens shall be full members, a guarantee will be established that Jews, by the definition of the Reich citizenship law, can not in future be elected. It is clear that the same principle should be observed in electing corresponding and honorary members. For my part I (the Reichskultuminister) will in the same way not confirm the election of a member of non-German nationality if he is a Jew by definition of the law.

"As far as the present body of members is concerned, the aim should be that full and honorary members who do not satisfy the said conditions should be removed from the roll of the Academy. At first those few Jews who are still members should be urged in the appropriate way to declare their membership ended of their own accord. I wish the same measure to be taken with the Jewish corresponding members in so far as they are Reich subjects. It is in accordance with basic philosophic ('weltanschaulichen') principles

out that the highest social entities conceivable by man are the national states of today, especially Germany. The analogy of the ant-hill and the hive of bees is constantly referred to, in utter disregard of the enormous differences between the nervous organisation of the colonial insects and the social primates (ourselves).

Germans must think with their Blood.

Nothing can exceed the presumption of the nazi writers in regarding German culture as the greatest contribution ever made to human thought and science.

“The blood substance of the German race,” wrote Frank (as quoted in the Times, October 10, 1937), “constitutes so pre-eminent and unique an asset to the world, that we should be justified in counting it the duty of the entire human race, in gratitude, to safeguard the Germanic element.”

But while they all agree about this, they at once begin to disagree when, applying their racialism to the scientists themselves, they try to define in what way non-German science is so inferior and German science so pre-eminent. They are all at one in stating that “science is a product of Blood” (Rosenberg) and that “We do not know Science, but only that science which is valid for us Nazis” (Krieck), or

“The achievements of science are not to be judged by the abstract ideal of the discovery of truth, but by their value for the German people. The principle of Science for Life’s sake, which is opposed to liberalism, must replace the principle of Science for the sake of know-

that persons of mixed blood and members having relationship to Jews (‘judisch versippt’) should be eliminated in the same way.”

And this for a scientific Academy of old and illustrious traditions to which, before the nazi age, election had been purely on grounds of scientific attainments and service.

- ledge. The concept that twice two make four is somehow differently tinged in the minds of a German, a Frenchman or a Negro." (Hommes.) Or "It becomes more and more urgent to lay the foundations of a race-bound ('artsgemäss') scientific knowledge." (Schulze-Soelde.)

But exactly what they are fighting *against* in science, and what its characteristics are, is by no means clear.

The Renegade Physicist of Heidelberg.

P. Lenard, the Heidelberg physicist, is one of the very few formerly eminent scientists who have ardently supported the nazi movement.¹ "As a thinker," says Rosenberg (quoted in *Nature*, June 12, 1937, p. 983), "Professor Lenard has taught that all knowledge is not the same, but that souls of alien races produce bodies of knowledge of quite different spiritual content." Lenard has frequently declared that "The Jews are absolutely unsuited for science" (e.g. in the introduction to his book *Deutsche Physik*)—and this although more than 25 per cent of Germany's Nobel Prizewinners were Jews—and elsewhere, "Science has never started except from a basis of knowledge gained by Aryans." But in his dedication speech at the Physics Institute at Heidelberg in 1935, he said, "I hope that this Institute may long stand as a battle-flag against the Asiatic spirit in Science," apparently a hit at the barbarous Mongolians of Moscow, whose output of first-class physics was by that year beginning to command world-wide admiration. One of the writers on race-bound science, Jaensch, has attempted to describe the qualities of "Modern or French," "Jewish," "English" and "German" science. "Modern or French" science he characterises as "mechanistic, Cartesian and dualistic" (neglecting certain inconvenient witnesses such as Bichat and Bergson). "Jewish" science is, according to him, "mathematical, full of non-

¹ See, e.g., his *Der deutsche Naturforscher, sein Kampf um nordische Forschung*, 1937.

material spirituality, purely intellectual, idealistic, projectionist" (though there has always been much materialism associated with the Jewish tradition, and Kant, Hegel and Berkeley were not Jews). Typical "English" science he described as a "conglomeration of unrelated theories" (an odd designation for the stock which contributed Clerk-Maxwell, Charles Darwin, and Willard Gibbs). Finally, "German" science is vitalistic, organicistic, absorptive, and empirical, keeping right down close to the Blood and Soil. With this description Lenard in general agrees; for him the Aryan spirit is "empirical, anti-theoretical, fact-accumulating, unspeculative, unmathematical, averse from paradox, etc., etc." But the other two greatest self-constituted experts on racialism in science, H. Gunther and F. L. Clauss, make science "in the genuine, creative sense of the term, the exclusive privilege of the eruptive, extensive, plastic soul inherent in the Nordic race. Its dull, nondescript, counter-type, the 'Turanian' or 'Ostic' race, is passive, torpid, immobile, introverted, and can only produce scientists of the fact-collecting, filing, labelling sort, useful in their way, but devoid of speculative genius." Since experts differ so diametrically in the reasons they give for believing German science to be so pre-eminent we are led to the conclusion that they knew beforehand the results at which they were going to arrive, and that so long as they produce what is essentially propaganda for the nazi system, it does not much matter what exactly they say. The tragedy lies in the condition of a great nation which can allow such men to be its mouth-pieces.

The whole development of civilisation hitherto has proceeded on the assumption, tested a million times, that a fact of nature is a fact, if well and truly observed, whatever may be the race, colour or creed, of the observer, and a scientific hypothesis is a good one, if it is found to help in the correlation of facts, whatever may be the race, colour, or creed of the framer of it. Science is thus, and always will be, inter-

national, rational, impartial, autonomous, independent, and truly totalitarian. Against this fundamental truth the nazis foam with all the weapons of insane nationalism.

"Living in the consciousness of one's nation," writes Moeller-Brück, "means living in consciousness of its values. The Tribe is our Universe. The proletariat must adjust its revolutionary dynamics to the iron truth that on this earth one nation is the other's 'natural enemy.' What we must keep out at all cost is the formation of an International in which all differences are dissolved, a world-wide fraternity of the intellectuals of all countries, of all scientific, and of course, of all moral, authorities, on earth."

And Hommes writes, "The only test of scientific truth is the firm shape of popular life which, reflected in the consciousness of the Folk . . . needs no corroboration or justification by the persuasion of the individual intellect."

Thus the nazis furiously rage together against all three Internationals, the Black, the Red and the White. But ultimately none of these can be overthrown. The Black International of the Church rests, it is true, primarily upon certain beliefs, but these have arisen in history from the very nature of man himself, and so can never disappear, however different the forms may be in which they manifest themselves. The Red International of Labour has been based on the existence of deep-lying forces of social evolution, glimpsed, as it were, by social astronomers, and never to be overcome by fascist ranting, however desperate. But above all, the White International of Science is founded in the ever-changing ever-constant rock of Nature herself, and is impregnable thereon.

We have already mentioned "German Biology" and "German Physics"; there is also "German Mathematics." A periodical under this title (*Deutsche Mathematik*) was

founded in 1936, the editorial of which stated that "we see everything from the point of view of the mathematical achievement of our people," and went on to say that the relativity theory was intended only to spread bolshevism and immorality. A curious attitude regarding mathematics was that revealed in Lenard's comments on Heinrich Hertz' *Mechanics*.

"The publication of this work, which I saw to after Hertz' death, often gave me great difficulties, as I could follow his trains of thought only with an effort. I did not recognise until later that they were the trains of thought of an alien race, and so necessarily different from my own."

Many of us have had the experience of being able to follow the trains of thought of masters of our subject only with great difficulty, but in civilised countries this is more usually put down to the inadequacies of the reader rather than to the racial deficiencies of the writer. It is sad to see how these noxious ideas penetrate throughout the world. Even in New York City, in bookshops not far from 3rd Avenue and 68th Street, the whole gamut of race-hatred propaganda can be purchased, though no doubt few people ever buy it.

So bankrupt is the racial conception in science that besides the Jewish scientists themselves, it has been necessary to invent a new category, that of the "White Jews," namely non-Jewish scientists who support theories proposed by Jews. This was the theme of an editorial in the organ of the Black-Guards, *Das Schwarze Korps*, on July 15, 1937 (see *Nature* for that year):—

"There is one sphere in particular where we meet the spirit of the White Jews in its most intensive form, namely in science. To purge science of this Jewish spirit is our most urgent task. For science represents the key position from which intellectual Judaism can

- always regain a significant influence on all spheres of national life."

The eminent physicists Jordan, Heisenberg and Sommerfeld, were all at the same time denounced as "white Jews."

We may conclude this anthology with a few passages taken from the introduction to Lenard's *Deutsche Physik*, valuable because they were not written by some paid hanger-on of Dr. Goebbels' Ministry, but by a man who formerly enjoyed a more or less well-deserved international scientific reputation. A certain amount of heckling in the manner of Thomas Carlyle is irresistible here.

"In order to characterise Jewish Physics," he says, "one may be justified in recalling the activity of its most outstanding representative, the probably pure-blooded Jew, A. Einstein. His relativity theories were intended to reshape and rule the whole of physics. Confronted with reality they have now completely broken down." (Only in Professor Lenard's imagination.) "Probably they were never even intended to be true. The Jew conspicuously lacks an understanding for truth, for a more than merely apparent agreement with that reality which exists independently of human thinking, and in this he finds himself in contrast with the will for truth of the Aryan scholar, which is as boundless as it is painstaking."

"Strangely enough, truth and reality seem to the Jew not to have a particular meaning or to differ from untruth, but they are to him rather one of the many existing different possibilities of human thought." (Was it not Eddington, a "full-blooded Aryan," who pointed out that the method of science is to explore all theoretical possibilities, not only those which seem actually to be realised in Nature?) "The impertinence of the unrestrained Jew" (continues this unrestrained Aryan) "taken

together with the clever help of his co-racials" (in Lenard's case, the Gestapo) "made possible the construction of a large body of Jewish physics which already fills libraries. The eagerness to make public untested thought, characteristic of the Jewish mentality" (and also, one would have thought, of ambitious young scientists the world over) "proved contagious. Not only did it produce personal advantages, such as priority claims and Jewish applause for Jews, but in sum it lowered the level of German science." (We shall shortly discuss whether nazism has raised its level.) "The great Aryan scientists, on the other hand (modest heroes), test their new ideas on reality quietly so as to produce established facts rather than suppositions. In this way, rich new bodies of fact came to be published, each of which was a milestone in the advance of science. In Jewish physics every hypothesis which was afterwards shown to be not quite inadequate, was regarded as a milestone. This nullified the Aryan type of activity and did great harm. The alien mentality is paralysing. Everything racially alien is obnoxious to the German people."

Much more could be quoted, but the material is its own condemnation. Stark, Lenard, and the rest never attack the quantum theory or relativity concretely and directly, but content themselves with denunciations and anathemas.

Japanese Copyists of the German Model.

So far the Japanese position-hunters have lagged considerably behind their colleagues at the western end of the triple Axis, but a biologist intimately known to me, who recently occupied a visiting professorship in Japan, informs me that the Japanese Government has appointed a committee of scientists who themselves have never received any foreign training, to rewrite scientific books more in accordance with

Nippon's racial-national spirit. It will be interesting to see what kind of rubbish they produce. As I shall not have occasion to refer again here to the Japanese, I will only add that (although there are some excellent scientific men among them) I found it necessary in a rather comprehensive scientific monograph which I recently completed, to discard on account of its poor quality some 70 per cent of the relevant Japanese literature, while on the contrary I did not come across one single Chinese paper which was not worth while, whether as regards the value of the problem undertaken, the internal coherence of the results, or the convincingness of the argument and the conclusions.

Hitler as a Biologist.

Returning now to nazi Germany, it is sometimes urged that the racialist writers quoted above have little or no significance. But the movement which they represent has always been an integral part of the nazi program. It has been so because Hitler himself designed that it should be so. No reader of *Mein Kampf* can fail to see that racialism was the foundation-stone of the nazi State. Here is a quotation from Oakeshott's analysis of the racialistic parts of the book:—

“The whole doctrine of national socialism appears, for Hitler, to be a superstructure built upon the foundation of what he calls ‘the iron logic of Nature.’ Others have sought to found national socialism on the alleged chaos, political and economic, of contemporary Western Europe; they represent it as, primarily, an answer to a contemporary situation. But with Hitler this is not so; for him the true foundation is the law of nature which decrees ‘the internal exclusiveness of the species of all living beings upon earth,’ which decrees that ‘each beast mates only with a companion of the same species.’ The argument by means of which we pass from this ‘obvious truth’ to the more complex and sophisticated

truths of national socialist society is, in places, obscure; but it appears to run on these lines. Each beast normally mates with a companion of its own species, but when this is not so (in abnormal circumstances) Nature resists by endowing the offspring with inferior strength and inferior powers of reproduction. This observation leads to the conclusion that the purest stock is always the strongest, and the strongest always the most pure. Both the crossing of species and the mating of 'two creatures of unequal stock' produce inferior offspring. But Nature's will is the continual improvement of all life, and consequently her law is the continuous victory of the stronger species over the weaker species, the stronger elements of a stock over the weaker, the stronger over the weaker race. All crossing of species, stocks, or races results in weakness; so the law of Nature is against the contamination of species, stocks and races." (*Social and Political Doctrines of Contemporary Europe*, p. 198.)

Thus nothing could exceed the confusion of ideas in Hitler's mind on the subject of race and racial intermixture. He would appear to be denying that man forms one single animal species, for only between species is crossing impossible, or if brought about artificially does early death occur. There is absolutely no scientific reason for regarding *Homo sapiens* as other than a single biological species. Certainly Hitler is entirely ignorant of the procedures of those practical geneticists who have obtained by crossing new varieties of plants, such as the rustless wheats, of basic importance for the welfare of mankind. Evidently he has never heard of the common biological phenomenon of "hybrid vigour." He does not realise that the only meaning one can attach to the appearance of sex in evolution is that it increased the possibilities of variation by better shuffling of the cards in each mating. He seems unaware that inbreeding is likely to produce much more regrettable effects than the

widest inter-racial mixture. The logical conclusion of his ideas would be that once the essential "pure" blond blue-eyed Nordic Aryan had been found, he should revert to coelenterate habits and reproduce further only by budding. But all stocks of mankind are equally "pure," or rather, equally "impure." It is hard to avoid the conclusion that we have here a case for the psycho-analyst rather than for the teacher of elementary biology.¹

The Havoc in German Science.

No, racialism is essential in the nazi programme, and it is only in the light of it that we can appreciate the dismissal and exiling of eighteen hundred and eighty scientific men of first-class distinction from the Universities of Germany and Austria between 1933 and the spring of 1938. The number has since then considerably increased. But nazi Germany has not only turned out the good—the bad have been put in instead. Dr. Krieck, whose words have already been quoted, and other Rectors of formerly great Universities such as Heidelberg and Frankfurt, were eccentric country school-masters called to power by the party which had satisfied their psychological needs. With my own eyes I saw the once-famous Veterinary College in Berlin stripped of its brilliant staff and reduced to a level of unbelievable incompetence. By the law of February, 1934, candidates for teaching posts have to satisfy standards of national consciousness, of physical, moral, political and racial fitness, so if these are the qualifications required for the teaching of crystallography or immunology, we can hardly expect that the standards will be maintained. This point is worth while examining further, and as the time has long gone by for mincing matters, I shall mention names.

Whole laboratories have been completely dispersed, for example the enzyme chemistry institute of Rona, the tissue-

¹ Cf. G. M. Morant, "The Racial Doctrine of *Mein Kampf*," *Modern Quarterly*, 1939, 3, 248.

culture and experimental morphology institute of Erdmann, and the world-famous department of muscle physiology presided over by Meyerhof. Some of Meyerhof's best colleagues, such as Lohmann, have remained in Germany, but have published nothing for years. The great subject of "Entwicklungsmechanik" or experimental embryology, founded by a German, Wilhelm Roux, and of the greatest theoretical importance for biology, is today a ruin in the country of its origin. Its most outstanding representatives in the younger generation are without exception in exile, or building a new life in the U.S.A., and the chair of Spemann, the doyen of the science, at Freiburg, is occupied by a man who, though formerly a good embryologist, is now mainly interested in military aviation. Only one school of experimental embryology of any importance remains in Germany, that of Seidel on insect development; a shocking decline from the great days of Roux and His, of Haeckel and Rathke.¹ Furthermore, the work now being produced in Germany, in such fields as I am in a position to criticise, is not worthy of the best German traditions. Men locally in important positions, such as Schenck in biochemistry, Druckrey and Brock in cell-physiology, Heidermann in comparative physiology, or Ries and Gersch in experimental zoology, all of whose work is representative enough, are

¹ This question can not be passed over without a reference to the curious fact that Russia, the last country which, on conventionally accepted ideas, would be expected to be interested in a science which has no immediate practical applications, has fostered "Entwicklungsmechanik" as fast as it has declined in Germany. Guided by a few older men, such as Balinsky, Schmalhausen and Filatov, a large band of younger investigators have made this science into a Russian contribution of first-rate importance to world biology. Soviet confidence in apparently purely theoretical studies has, at any rate in this case, been rewarded by a useful discovery, namely that it is possible to replace the cornea of a person suffering from certain types of blindness by the cornea of a dead person who has no further use for it; (see the discussion of the work of the ophthalmologist Filatov in *Modern Trends in Ophthalmology*, by F. Ridley & A. Sorsby, London, 1940, p. 582).

not producing scientific work of calibre equal to that which was normal in their country before 1933. They must not, however, be judged too harshly, for we have to remember the poor conditions under which they are working; this we shall return to in a moment.

The scientific journals are, of course, the best test of what has been happening. In size, the *Biochemische Zeitschrift*, the *Zeitschrift f. physiologische Chemie* and the *Archiv. f. Entwicklungsmechanik* (to name three examples from my own field), even before the war, shrank in some issues to a fifth or less of their former size, and their standard would have fallen far lower than it has if the policy of their editors for years past had not been to include contributions regularly from Scandinavia, Switzerland, the Netherlands, Russia, Portugal, and even Palestine.¹ In other sciences the decline is not so obvious; for example the bulk of the *Berichte d. deutsch. Chemischen Gesellschaft* has been well maintained, presumably because much of it comes from industrial laboratories, and because the spirit of chemistry is *persona grata* with the nazi General Staff on account of her connection with gas warfare.

It seems that few statistics of the decline in German science have been published, so I shall add here some observations of my own on a typical German scientific journal of high reputation, the *Biochemische Zeitschrift*. The number of volumes published annually began to fall as soon as the nazi regime was established, and is still falling.

Year	No. of Volumes	Year	No. of Volumes
1927	13	1933	11
1928	12	1934	9
1929	15	1935	8
1930	13	1936	6
1931	14	1937	6
1932	13	1938	5
		1939	2

¹ Striking indications that the nazis can forget about racial differences when it serves their purpose to do so.

The figures show, furthermore, that even of the work actually published during the nazi period, a good deal less than before was German, and a good deal more was non-German. If we take two volumes of the journal at random for the year 1930 and two for the year 1938, we find the following:—

	1930	1938
Number of volumes published	13	5
In two volumes:—		
Number of German papers	55	39
Number of non-German papers	47	47
Non-German papers divided as follows:—		
Austria	5	7
Chile	2	
Czechoslovakia	1	
Denmark	3	2
Holland		3
Hungary	4	8
India		3
Italy		1
Japan	1	8
Latvia		1
Palestine	1	
Poland		5
Portugal	1	
Sweden	1	4
Switzerland	6	3
U.S.A.	1	1
U.S.S.R.	10	
Yugoslavia		1

Thus in the sample taken, the number of non-German papers remained the same, while the number of German papers declined to below the non-German level. It must be remembered that the total number published, as shown in the decrease in number of volumes appearing, was by 1938 reduced to half its previous value. Biochemists in the smaller European countries tended to send papers rather to the U.S.A. or British journals, or to publish them in the journals of local, sometimes not very widely known, learned societies.

For physics the same is true as for the biochemical and biological sciences—A recent article¹ has reckoned that the *Zeitschrift f. Physik* published, in 1930, 700 scientific papers, of which 280 were non-German and 80 Soviet; in 1938, just before the war, only 150, of which 50 were non-German and none Soviet. Correspondingly, the number of issues per year fell from 7 in the twenties to 2½ in 1938. The decline in value of the work may perhaps be gauged by the fact that in 1932 35 % of all references in the American *Physical Review* were German; in 1939 only 15 %.

The detailed study of the decline of German Science, as demonstrated by the periodical publications, is a sociological study of pressing need—the figures given above are only the result of an afternoon's work in the library of the author's own laboratory. Nor do they give any assessment of the decline in the quality of the work. It might be added that in recent years, some of the German scientific journals have adopted some peculiar conventions, such as the separate listing of references to papers by Jewish and non-Jewish scientists.

The Mass Dismissals.

Among men of established scientific reputation in Germany, some 18 per cent were dismissed, though in certain Universities the figure rose as high as 32 per cent, while many men were compulsorily retired "for political or moral reasons." The total number of scientific men of first-class reputation exiled from Germany and Austria up to the end of 1938 was 1,880, from Italy 225,² from Spain 103, from Czechoslovakia 160, and smaller numbers' from other

¹ Science, 1941, **94**, 488.

² Cf. for the Italian fascist attack on science and learning M. Ascoli's article in *Journ. American University Teachers*, 1940, p. 50, and G. Savemini's book *Under the Axe of Fascism*, London, 1936. Among the eminent physicists exiled from Italy we have the names of Fermi, Rossi, Rossetti, Segré, etc.

countries such as Poland and Hungary. The organisation which sprang up in England to meet the need for rehabilitation of these men, at first called the Academic Assistance Council, and later the Society for the Protection of Science and Learning, has achieved a very important place in English intellectual life. It was presided over, until his death, by Lord Rutherford, the physicist; it numbered on its governing council the names of all the most prominent of Britain's older intellectual leaders; and it succeeded in collecting very considerable sums of money with which to place the refugees in temporary or permanent positions.¹ Those permanently placed were distributed in almost equal numbers between Britain and the United States. It would be superfluous here to mention their names in great detail, but we cannot overlook the following—more than 25 per cent of Germany's Nobel Prizewinners—in Physics, Schrödinger, Einstein, Franck, Hertz, Born and Hess; in Chemistry, Höber; in Physiology, Meyerhof; and in Pharmacology, Loewi. Other famous scholars and scientists who passed through England

¹ The following quotation from its report gives a good idea of the functioning of the S.P.S.L.

"The office keeps an up-to-date dossier for each displaced scholar, whether he is in foreign refuge or still in his country of origin; files for employment opportunities, and information about the possibilities of assistance in various countries and professions. It thus acts as an international scientific employment exchange. If a South American Government requires the services of a census statistician, or an Australian University needs a colloid chemist, the Society's officers can, from this central register, supply lists of candidates, selected by experts, with full particulars of their academic and personal qualifications. If a displaced scholar needs advice about the cost of living in India or about the qualifications called for in the education service of one of the Dominions, the information service enables the officers to supply the information or to put the enquirer in touch with the source from which it can be most readily obtained. Negotiations on behalf of displaced scholars can be initiated by the submission of select lists to appropriate institutions."

to the United States are Fajans and Freundlich (Chemistry), Stern (Physics), Courant, Menger, von Mises and Zygmund (Mathematics), Horkheimer (Law), Lederer (Economics), Panovsky (Art History), Spitzer (Philology), Tillich (Philosophy), and Köhler (Psychology). There are of course many eminent medical men, including a large proportion of the famous Vienna School of medicine. The establishment of the New School for Social Research in New York after 1933 absorbed many German, and later Austrian, economists, lawyers, and sociologists.

In Great Britain many have also been established, e.g. Born and Simon (Physics), Freud (Psychology), Freundlich (Astronomy), M. Polanyi (Chemistry), Fraenkel (Philology), Friedmann and Krebs (Biochemistry), Hortege (Physiology), Castillejo and Kantorowicz (Law), Wellesz (Music), Mannheim (Sociology), etc., etc. In 1934 the well-known Warburg Institute of the History of Thought and Art was transferred from Hamburg to London, bringing with it a most valuable contribution to scholarship. The standards of the members of the Warburg Institute are of the highest, and their presence in England, and the lectures they organised, proved an extraordinary stimulus to museums, the Courtauld Institute of Art, and to individual scholars.

The question arises here whether German technique will long be able to maintain the high standard which it has hitherto enjoyed now that its tap-root (pure science) has been so thoroughly cut and poisoned. Any answer to this must at present be quite speculative, but there are many who fully expect that should the present war last four or five years we shall have many examples of serious failures of the German war machine due to inadequate technical backing. It is quite possible that this failure will occur first in the field of public health and epidemiology, for the medical training in Germany has been curtailed for some time by two years, and in accordance with the "folky" tendency in nazi ideology, "faith- and nature-healers" of various kinds

were granted licence to practise medicine at about the same time as the use of vivisection methods was prohibited by law.¹

Science the Slave of Nazi Militarism.

What, then, is the direct cause of this decline in German science? It may be summed up in the one word "Wehrwissenschaft"—the valuation of science only as it can contribute to military efficiency. The nazi-fascist glorification of war is a sufficiently well-known and obvious propaganda trend arising out of the aims of the nazi leaders, but a few examples may be added to the anthology.

"War alone brings up to their highest tension all human energies and puts the stamp of nobility on the peoples who have the courage to meet it." (Mussolini in *Enciclopedia Italiana*.)

"Not a 'community of men of free will' but victorious war, is the true social ideal. It is in war that the state displays its true nature." (E. Kaufmann.)

"War provides the ground on which the human soul may manifest itself at its fullest heights, in richer forms, and surging from more profound springs, than in any scientific or artistic exploit as such. War is a purifying bath of steel." (Banse.)

"It merely matters how, and not for what purpose, we fight." (W. Best.)

"The order of human relationships upon earth cannot be kept up except by the struggle, fundamentally tragic, of national egoisms bent on self-assertion." (Haiser.)

What is fundamentally tragic here is rather the acceptance, by intellectuals and writers, of places on the nazi dictator's military bandwagon, whether on account of their own egoism or not we may leave to their consciences.

¹ Cf. J. Schrapel, *Kommt d. volkstümliche Biologie*, 1937.

The Attack on the Schools and Universities.

The rot thus begins in the schools. "The School is the preparation for the Army" (Rust). The periodical *Wehrerziehung* (Education for Arms) wrote in November, 1935:—

"Teaching in school can give the young Bearer of Race ('Rassenträger') something that will later be useful to him as Bearer of Arms. Tables can be learnt with horseshoe nails. Logarithms find their most beautiful application in the science of ballistics (artillery). In geography the world war can come into its own limitless rights. History is full to overflowing with instances of war politics. Chemistry has as much application in the military struggle with poison-gas as in the fight for daily bread. Physics problems can best be explained by aid of a motor or a tank. Biological lessons can be taught by the wanderings of peoples in the past and the forcible constitutions of states. The teaching of foreign languages is particularly bound up with military-political explanations. And in German lessons, the great Moltke must be cited no less than Grimm."

After this kind of preparation it can hardly be thought surprising that the young are not interested in science and learning and the arts of peace. But even should a desire be expressed for University training, there are great obstacles in the way. The American statistician, E. Y. Hartshorne, investigated the changes in the student population in Germany between 1933 and 1937, with the following results¹:—

						<i>No. of Students in 1937 in Percentage of the figure for 1932</i>
Total average	..	..	..	..	..	57·8
Mathematics and natural sciences	..	..	..	..	..	35·6
Classics	..	..	..	..	..	25·1
Modern languages	..	..	..	..	..	23·4
Medicine	..	..	..	..	..	70·2
Journalism	..	..	..	..	..	169·7
Education	..	..	..	..	..	142·5

¹ Nature, 1938, 142, 175, July 23rd.

Thus after five years of nazi rule the number of students in German Universities had dropped to about half its original value, and those studying science to about one-third. Medical education was not quite so seriously affected, being down to two-thirds, but the enrolment in journalism and education, no doubt owing to the demand caused by Dr. Goebbels' activities, had arisen by about a half.

One can see how serious the effect of this trend would be on the flow of young men and women into scientific research. All scientific exiles from Germany tell of the widespread reduction in research facilities and financial support, the withdrawal of technical aid, and the impossibility of getting graduate students to carry on the work. Even those students who remained were constantly harassed by "Kameradschaften," work-camp duty, and the like. And other, more mature, workers, in considerable numbers, must have been tempted away from pure research by threats, promises of better pay, etc., in recent years to join the technical research departments of the General Staff. Nor has the atmosphere in German Universities been for many years past one in which free scientific thought is possible. It is easy to talk about the suppression of freedom of thought, and difficult to find concrete instances of what may be meant by it, but perhaps the following quotation from Reichsminister Franck, Leader of the German Jurists, in a speech made by him at Tübingen in 1936, crystallises the situation as well as anything else I have found.

"The ideas of Adolf Hitler," he said, "contain the final truths of every possible scientific knowledge. Nazism provided the only remaining possibility of doing scientific work in Germany. In our opinion there can be only one starting-point for the German historian of law, as for all scientists, namely the duty to conceive of German history as nothing but the pre-history of German Nazism. We believe that every scientific work (whose purpose is after all to serve the investigation of

- truth) must coincide in its results with the starting-point of nazism. The programme of the nazi party has consequently become the only basis for all scientific investigation. The true Front spirit is more important than scientific discussion."

With such an attitude there can be no argument. German scientists and scholars had only two choices, to stay and accept an intellectual tyranny never before approached, or to quit and seek haven elsewhere. The multitude of those who chose the latter course will always remain one of the brightest features in the crown of true German culture, as Germans of future generations will be among the first to recognise.

Nazi Tribal Mysticism.

The apotheosis of Tribalism in nazi ideology has become apparent from what has already been said. Man is considered essentially tribal, amoral, and non-economic. The tribe's affairs are to be settled, not in the distinctly democratic way in which the affairs of most primitive peoples (contrary to popular belief) were and are settled, but by divinely appointed leaders, having the right to unquestioning obedience from the rank and file. There can be "no allegiance of any kind to a higher unit than the tribe" (Brohmer). This is the Leadership principle ("Führerprinzip"). It might well, like the racialist set of ideas, be classified as a separate department of the anti-rational front, for the relationship between Leader and Followers ("Führer-Gefolgschaft Beziehung") is expressed in the most mystical terms. According to its exponents (e.g. Marr, Stonner, Jung and Bluher) the blood-tie is mystically holy.¹ The leader is a kind of racial genius ("Artsgemäss") who personifies the absorption of individual wills into the will of the state, as if he had the souls of all the individual citizens or folk-comrades ("Volksgenossen") inside him. He

¹ An amusing example of this is the volume entitled *Das Volksbuch vom Hitler*, i.e. "von dem," equivalent to "le Christ."

is each one's mystical self. This is indeed leadership from *above*, as opposed to the christian principle, not often formulated in the past but now to some extent embodied in socialist practice, of leadership from *within*.

Nazi Distortions of Science.

The aim of the leader will be, of course, the success of the predatory tribe in aggrandising itself in military domination, and in obtaining (as Ley, the Labour Front boss, has recently reminded us; *Angriff*, January, 1940) more food, more clothing, more of every human commodity, than the subject races brought under its heel. In the various arguments brought forward to justify such ideas, there are detectable at least two basic distortions of scientific theory. In the first place, the so-called Darwinian doctrine of the struggle for existence is appealed to as justifying the belief that wars between nations as we know them today are for ever inevitable. Thus Ludendorff, in his book *Totalitarian War*,¹ writes:—

“The people ought to know what constitutes the essence of their *struggle for existence*, and this will not be done by indigestible scientific works on the subject of warfare, but by brief and understandable booklets.”

Or:—

“No doubt the bombing of populations of open towns is not according to the usages prescribed by the rights of nations, where only the bombing of fortified towns is allowed. But in the *struggle for existence*, a people cannot renounce the use of means which are used by their opponents, and the destruction of the enemy's war industries is certainly perfectly legal. Inevitably some of the civilian population will suffer in the process, but this is the case in any purely military operations.”

English edition *The Nation at War*, 1936.

In the use of these loose phrases, none of the German writers ever stop to think what could be meant by "competition." They speak of "fitness," but of fitness for what? They overlook the immediately obvious distinction between *interspecific* and *intraspecific* competition, although it is a truism in biology that during the course of evolution excessive intraspecific competition has frequently led to the very extinction of the species in question. Thus it is certainly right for man to war incessantly with the forces of nature which oppose his will and with the lower animals which interfere with his business or his well-being, but it is not biologically right for him to engage in internecine war. As for fitness, the only way in which the concept was used by Darwin was to indicate such organisms as left the greatest number of offspring to perpetuate their type in posterity. But as we have seen, there are no rationally valid grounds for thinking that any one type of mankind is more desirable than any other, and it is therefore clear that when the world's surface has reached an optimum saturation with human beings of diverse types and colours, the time will have come to fix an optimum rate of reproduction. Humanity alone is capable of such conscious action, for only man's highly developed nervous system is capable of the conscious control of the environment. The wild reproduction urged by the nazi-fascist dictators, who at one and the same time make birth-control knowledge illegal and do all that they can to provide the conditions for making cannon-fodder of the children produced, is analogous to the lemmings of Norway. In these small mammals (and the process happens also in other animal species) fertility and reproduction periodically reach unimaginably high levels, with the result that the balance of nature reasserts itself in the destruction of the animal hordes by epidemic diseases, or in the case of the lemmings, by what seems to be an instinct to march in the search for food over hill and dale down to the shore and, like the Gadarene swine, right into the sea. Nazi population

policy looks remarkably like this. In Robert Bridges' description:—

“There is no tradition among the lemmings of Norway
How their progenitors, when their offspring increased
Bravely forsook their crowded nests in the snow,
Swarming upon the plains to ravage field and farm,
And in unswerving course ate their way to the coast,
Where plunging down the rocks they swam in the salt sea
To drowning death; nor have they in acting thus today
Any plan for their journey or prospect in the event.”¹

But man is above all a planner.

The deleterious results of excessive intraspecific competition have been underlined by many of the best students of evolution. For example, when polygamy or promiscuity prevails, as Huxley has pointed out, the selective advantage conferred by characters which promote mating success will be very high. Females will tend to choose the most conspicuous or peculiar male at the mating time. For instance, in animals such as the peacocks or the Argus pheasants there are male characters of the most bizarre sort which, while advantaging their possessor in the struggle for reproduction, must be a real handicap to him in the struggle for individual existence in competition with other animals. In such a case, of course, a balance will eventually be struck at which the favourable slightly outweighs the unfavourable, but extinction may be the fate of such precariously balanced organisms if conditions should rapidly change. Again, the over-production of pollen by anemophilous plants is due to intraspecific competition between pollen-grains. And in the extinct reptiles and in mammals intraspecific competition has led to unwieldy size, over-developed weapons or threat-organs, and over-developed devices of protection. Intraspecific competition among parasites, too, has led to monstrous exaggerations of fertility and complications of the reproductive cycle.

¹ *The Testament of Beauty.*

Thus species are pushed by excessive intraspecific competition ever further along their line of evolution until they balance precariously upon the edge of extinction.

Another important biological fallacy which underlies the nazi conception of the state is the age-old analogy between the social organism and the animal body with its various members. Just as the animal or man has a brain, a stomach, and feet, so there must be in the social organism thinking parts, digestive parts, and locomotory or defensive parts. The comparison occurs in Pliny, is found poetically expressed in *Coriolanus*, used with some caution by Herbert Spencer and Bagehot, and carried to the pinnacle of absurdity by Morley Roberts in his book *Bio-Politics*. It has, of course, the effect, and was always intended to have the effect, of impressing upon the worker that his servile position was an inescapable part of the order of nature; hence its value to nazi writers today. Its futility arises from the fact that associations of organisms with nervous systems capable of rational thought and action, can not be treated in the same way as associations of living cells, which, though of course enormously complicated as compared with simple molecules or atoms, have nevertheless only the primitive properties of assimilation, excretion, contraction, and the like, even though their normal work is in many cases highly specialised.

Indeed the fallacy (I would almost say, the heresy, in view of its far-reaching evil effects) which underlies the whole nazi approach to man's estate, may be summed up in the word "Biologism." There are in the world—it is the clearest of the principles which science has established during the past five centuries—a succession of levels of organisation, not only appearing successively in time (as we learn from the evolution of the world) but now enclosed within each other in successive envelopes.¹ There are the levels of the

¹ For a fuller discussion of this, see the present writer's Herbert Spencer Lecture at Oxford, 1937: *Integrative Levels; a Revaluation of the Idea of Progress*, reprinted in *Time: The Refreshing River*, Allen & Unwin,

atom, the molecule, the colloidal particle, the micelle, the organelle, the living cell, the tissue or organ, the body of plant or animal, and the association in which the animal lives, and there are associations of associations. The psychological and the sociological levels seem to be parallel, and there are reasons for thinking that they may be identical. During the development of human society the associations are constantly increasing in size, tribes giving place to states and states to federations and empires. But now it follows from this that sociological evolution is continuous with biological evolution, and the highly organised state of human society to which we all look forward is not a Utopia, but a necessary consequence of all that has gone before. In so far as the nazis are developing new forms of genuine social organisation, they are contributing, in spite of themselves, to this evolutionary trend, but unfortunately their tribalist psychosis is their utter ruin. We have an unshakable guarantee of their ultimate failure in the belief (based, as I have shown, on the whole course of the world's development through geological as well as pre-historical and historical time) that however tribal leaders may rave, humanity *will* unite. From this point of view, the Church, covered with cobwebs though in the imagination of many it is, is and always will be right, for the world's greatest religious leaders have been what they were precisely because they understood the trend of humanity towards union. "All under heaven are brothers," said the East, and the West, in its better moods, has replied, "He hath made of one blood all nations upon earth."

Furthermore, from the scientific point of view, the nazi mistake essentially is to suppose that higher levels of organisation can be explained and handled in terms of lower levels. They try to reduce the human sociological to the zoological.¹

London, 1942; and Sir Charles Sherrington's Gifford Lectures, *Man on his Nature*, Cambridge, 1940.

¹ N. Berdyaev, too, emphasizes this, cf. *The Fate of Man in the Modern World*, 1935, p. 82.

Though boasting so much of their "vitalism," they are strictly analogous to the mechanist biologists of the past, who maintained that all the phenomena of life will some day be explained in terms of the physics and chemistry of the inorganic world. This completely neglected the essential thing that distinguishes living from non-living things, namely, the presence of a higher form of organisation, more complex, more integrated, the nature of which is the fundamental problem of biology. It is not inscrutable by any means, but it is not reducible to the lower levels of organisation. Nor is that high level of organisation which we call human society reducible to lower levels of life—it has its own laws and regularities which must be elucidated on their own level. But this is what the nazis say: "Infra-human Nature is the prototype of all Life, appropriate Order, and true Community" (Prinzhorn). "Man is nothing but a beast of prey" (Spengler), "the 'royal' idea of property implies the extreme degree and necessity of fighting, conquering, annihilating self-assertion." One assumes that this is not intended to apply to the followers: that would be somewhat inconvenient for the divinely appointed leader.

Such poisonous rubbish would meet with its own condemnation if nazi writers were only to read the best that has been written about those organisations which they so much admire, the ant-hill and the termite colony. In what was perhaps the most profound essay of that modern Aristotle, William Morton Wheeler of Harvard, it is pointed out that the main problem which all communities of social insects had to solve was the socialisation of male aggressiveness. Bees and ants, in general, solved it by restricting the male members to reproductive functions only and even "liquidating" them when these were accomplished, but the termites, by a process we do not as yet understand, succeeded in producing a form of society in which each different caste (worker, soldier, nasute, reproductive, etc.) is about equally

composed of male and female organisms.¹ Thus the termite kingdom of heaven, inherited by the meek (which we may translate, co-operative), has an important lesson for man, as is brought out by another of Wheeler's essays, *Termitodoxa*.

So also Robert Bridges, in his long poem, *The Testament of Beauty*, where, though more consistently taking hold of the wrong end of the philosophical stick, in my opinion, than any other modern poet, he sometimes has a fine and applicable passage:—

“Nay, some I have seen will choose a beehive for their sign
And gloss their soul-delusion with a muddled thought,
Picturing a skep of straw, the beekeeper's device,
A millowner's workshop, for totem of their tribe;
Not knowing the high goal of our great endeavour
Is spiritual attainment, individual worth,
At all cost to be sought and at all cost pursued,
To be won at all cost and at all cost assured.”

But this high development of the individual can be attained only within a collectivism which ensures its possibility for every man capable of it, and only by an extraverted selflessness on the part of the individual which puts the kingdom first and private interests afterwards. In no case are we to model ourselves on the social insects, or on any other animal prototype; man in his society constitutes a new and higher level of social evolution with its own laws and regularities. The nazis have not discovered them.

Science in the Dominated Countries.

What of the Universities in those countries which have fallen under the yoke of the nazi dictatorship? In certain

¹ Cf. the remark of S. D. Schmalhausen, *The New Road to Progress* (London, 1935), p. 175:—

“The murderous masculinity which has been superstitiously set up as an ideal of vigour and excellence in society must be completely dethroned from the minds of men.”

cases there can be no question that the nazis have used their utmost efforts to destroy and stamp out Universities, just as the Japanese did in their invasion of China, and probably for the same reasons, namely, that intellectual centres are certain to be foci for the maintenance and advance of culturally nationalist feeling, whether in language, literature, or scientific traditions. This has been particularly true in Poland where the buildings were destroyed and the staff dispersed at Warsaw and Poznan, while at Cracow the faculty, including a number of aged men of the highest international distinction, was imprisoned almost to a man in nazi concentration-camps.¹ It was not long before the deaths of at least sixteen of these men were announced (see *Nature* for 1939), among them the well-known biologist, Siedlecki, and the historian, Chrzanowski. In Czechoslovakia, the treatment given to the Universities was not quite so brutal, but the University of Prague has been closed indefinitely.

Very little information is as yet available about the condition of Universities and research institutes in the captured countries. Not a few German and Austrian exiles were working in laboratories in Norway, Holland, Denmark, Belgium and France, and of their fate nothing is known. It is, however, known that some of the more important laboratories of chemistry and physics in Paris are filled with

¹ What happened to the Polish Universities which came under Russian control stands in sharp contrast to the above. I happen to know Poland better than most English scientists, and lectured there a few years ago in all their Universities for the Polskie Towarzystwo Biologicznej. We have long been in close touch with the biochemical laboratory at Lwow, presided over by one of the three leading world authorities on muscle biochemistry. Numerous letters were received from him and his colleagues after the fall of Poland, indicating that the position at Lwow was very satisfactory. Polish scientists were even invited on lecture-tours in other parts of the Soviet Union. Other friends, intimately known to me, after seeing the destruction of their laboratory in the Nencki Institute at Warsaw by the German bombardment, succeeded in escaping over the Russian frontier, and were given every assistance as well as posts suitable for their qualifications.

German scientists, who are said to be trying (with what success it is difficult to imagine) to force the French scientists to carry out research work for them. Men of world-wide reputation such as Langevin and Lapicque have been imprisoned. In this connection, it is very regrettable that more active steps were not taken both by England and the U.S.A. to get the most valuable scientists out of France, after the military collapse and the establishment of the puppet government at Vichy, for such men can do little or nothing now in their own country, and would have powerfully aided the war effort of the democracies. As regards the Universities in the Scandinavian countries and in Holland and Belgium, a number of indications have come through that in Bergen, Oslo, Copenhagen, Utrecht, Brussels, etc., they are working on, though under difficulties. Any optimism about their future would, however, in my opinion, be entirely out of place. At the present moment Leviathan has other things on his mind, but at any moment which suits him, he has only to turn and put out those candles on the continent of Europe. There is nothing in this record to permit of any hope of permanent safety for them, short of his own utter destruction.

Nazism as the Attempt to Reverse Social Evolution.

K. Polanyi, in his essay in *Christianity and the Social Revolution*, has made one of the acutest characterisations of the nazi mentality:—

“Socialism and Fascism take alternative roads to conditions of closer human community. But the nazi-fascist road is illusionist. It involves Regression, but regression how far back?

“The German Nationalists, reacting against the treaty of Versailles, proposed to go back beyond 1918. Reactionary romantics like Moeller-Brück, decrying the principles of the French Revolution, proposed to go back beyond 1789. Spann and the ‘German Christians’

so-called, proclaimed a Counter-Renaissance, thus extending the regression to half a millennium, and introducing a new mediaevalism in the name of Organismic Totality ('Ganzheit'). The German Faith Movement, wholly rejecting christianity, realised that unless we put the clock back by full two thousand years, there is neither safety nor permanence in reaction. It was left to Klages to show that the mere destruction of christianity is not enough. In his Vitalism he melts body and soul into one and casts mind out altogether, making the human individual melt into the animal tribe, and achieving a regression of at least ten thousand years."

But social evolution is not a reversible process, and those who try to reverse it will break their necks.

Enough has now been said to show that the nazi movement, inspired by Adolf Hitler, has been forced, in the pursuit of his aim of irrational world domination, only possible at this particular stage of the world's history, to attack the great international movement of science and scholarship with such fury that it now faces the gravest crisis of its history. German science has been largely destroyed or at least severely damaged, how long will it be before the rest of intellectual Europe has likewise been made desolate?

Should the nazis be defeated, our watch will indeed not be over, since fascist ideas in other guise may spring up where we would least be expecting them, on our own side of the lines, and in our own democratic countries. But should the nazis be victorious, science in Europe may disappear for several generations, and all social progress with it.

II

THE LIQUIDATION OF FORM AND MATTER

(Contribution to a symposium, "This Changing World," in World Review, 1941)

Today we are living in a revolutionary age. The great political and social upheavals of the time are mirrored by vast changes in our conceptions of the fundamental nature of the world we live in, and all its multitudinous contents. This is an exciting age. England knows no longer the slothful peace of the eighteenth century, but resembles more the active times of the Commonwealth, when all ideas were in a ferment, when everything was questioned and weighed in the balance, and when the great movement of organised science began.

One of the least generally recognised revolutions in our thought is that which concerns Matter and Form, and hence everything to do with Life. As in many other things, ideas of western civilised man derive here from the Greeks, especially Aristotle (fourth century, B.C.), who tended to look at everything in terms of their greatest national art, sculpture. From this point of view, there was on the one hand *matter*, chaotic, homogeneous, the same all through, like marble or cheese; and on the other hand there was *form*, the form, for example, of a beautiful man or woman, existing as it were beforehand in the mind of the sculptor, and to be impressed upon the brute matter by him with hard toil and creative labour. Form was thus felt to be much more important than matter, and even all change was thought of as the taking away from matter of one set of forms and the imposition on it of another. True, forms did

not seem to be capable of existing without matter, except, it was supposed, in the case of the gods themselves.

The preoccupation of the Greeks with form was of course a very beneficial thing for biology. The Greek vase-painters were accustomed, from an early date, to drawing all sorts of fishes and other beasts with exquisite accuracy. The great audacity of Aristotle lay in the belief that if one set about it the right way, the infinite muddle of animals and plants could be reduced to some sort of order. The first classifiers were indeed courageous men.

The old ideas of form and matter ruled human thought long after the Greeks had gone, and long after the end of the Roman empire, right through the middle ages. They can still be found in our own thought, if we look carefully for them. They gave rise to such mediaeval church disputes as those about transubstantiation. And they are exemplified in the ancient notion of how the embryo is formed in animal development. Aristotle thought that it was like a statue being made, the matter of it being represented by blood, and the shaping influence by the seed. I looked through many a mediaeval manuscript to find a picture of this, but eventually I found it in a *Women's Book* of Jacob Rueff, written in 1554. The whole process in his illustrations is entirely imaginary, but it is amusing to see how starting from a system of blood-vessels radiating from the heart (like a chick embryo's circulation) he reaches an outline of the child, sitting like a cherub in clouds. It was our own English anatomist, the great William Harvey, who exploded these notions, by opening the wombs of animals killed in the chase, and finding nothing inside. Nothing, that is, that he could see; for he had no microscope in 1640. to show him the minute egg, embedded in the wall of the womb, and destined to grow and differentiate into the future animal.

What is wrong, then, with the old idea of matter? Why can we not think of the matter of which living things are composed—your arm, for instance, as you read this article—

as simple, like marble or cheese? Because it is unbelievably complicated. It is wheels within wheels, envelopes within envelopes, a fantastic box of tricks. Like those wooden dolls that come in two, revealing another smaller one inside, and then again another, living matter leads you on and down. The living body is "composed of" myriads and myriads of ultimate particles, electrons, and protons, indeed; but they are *arranged* and *organised* in an order far exceeding that of the simple matter of a statue, or even of a complicated and beautiful crystal. And the point is that there is nowhere you can put your finger on and say, "Here Form ends and Matter begins."

This wants elaborating a little more. At the upper coarser end are the forms we know so familiarly, the different shapes of animals and plants, and just below this level, the different shapes of the organs into which we may dissect them using no more than the powers of the unaided human eye. At the microscopic level we stand on the threshold of a new world; the first observers with microscopes, in the seventeenth century, certainly agreed with Sir Thomas Browne: "We carry with us the wonders that we seek outside us; there is all Africa and her prodigies in us." The tissues and organs of the body are built of millions of living cells, cells, as we now know, with a considerable capacity for individual life separated from the whole. Digging further down, we find that each cell is built up of smaller entities, the form of which may be apparently unimportant (such as that of fat globules), or certainly very important (such as that of the chromosomes in the cell-nucleus, which bears the keys of the inherited qualities).

And so at last we arrive at the molecular level. The level where we are face to face with the molecules themselves, built up of orderly patterns and arrangements of atoms, each atom a miniature solar system, with the protons and electrons circling like the heavenly bodies in their necessary orbits. This is an important transition, for several reasons.

In the first place only in comparatively recent years have we felt quite certain that the chemical molecules have shape. Up to about the end of the First World War it was open to some scientists to say, as they did, that our chemical "formulae," or molecular plans, were true only in our own imagination, and corresponded to nothing in nature. But when the study of "monomolecular films" (i.e. films of substances so thin as to have only one layer of molecules) was pushed forward by Langmuir and Harkins in America and by Hardy and Adam in England, it became certain that our formulae *do* represent reality. Long hydrocarbon chains really are long; on a water surface the chain of a fatty acid does really stick up while its acidic group is "dissolved" in the water below. Boxlike molecules behave as such. And all this was greatly strengthened when other scientists applied X-rays to the problem (Laue, Ewald, the Braggs), and showed the actual existence of the patterns of atoms which had previously been deduced by purely chemical experiments.

Form, therefore, is still with us. At the level of the atom, it becomes indistinguishable from order, from whatever the forces are that hold the spinning groups of ultimate particles together in their apparent solidity. And now that we are at the atomic level, we find, too, that modern physics has recognised that these ultimate particles are primarily electrical charges, and that mass is therefore a manifestation of energy. This has often been misinterpreted by idealists as meaning that matter has somehow been magicked away as if by a conjuror's wand. But nothing could be more untrue. As a philosophical friend of mine once said: "You can't turn matter into spirit just by making it thin." Of course, matter remains just as hard and material as it was when Dr. Johnson kicked a piece of it and remarked of Bishop Berkeley's views "Sir, they admit of no refutation, but carry no conviction." But all the same, something *has* happened to matter. It was only separated from form in bygone days because it seemed so simple; now we realise—and this is a revolutionary

change—that we cannot separate them, and that it is not simple. Form, or rather Organisation, as we might now call it, is present everywhere, at all levels, wherever we look, and the only other fundamental idea that we need is that of Energy. We can stop speaking of Form and Matter altogether if we begin thinking of Organisation and Energy.

Another reason why the transition between the level of the largest molecule we know and the smallest living particles we know, is so important, is that they actually *overlap*. Here again is a revolutionary discovery of the past twenty years. The largest known molecules are those of the proteins, some of which are several million times as heavy as the hydrogen atom, our fundamental unit of molecule weights. The proteins are the most important chemical structures out of which all living things are built up; they are essentially long chains or folded rings of carbon, nitrogen and oxygen atoms, like backbones, with side-chains of carbon, nitrogen and hydrogen like arms or ribs. Now during the last twenty years intensive study has been made of the infective agents responsible for many diseases of plants, animals and man, which are known as viruses. Tobacco-plant rot, foot-and-mouth disease in cattle, and measles in ourselves, are all due to these living particles far smaller than the smallest bacteria which we can see through the microscope. But the interesting thing is that these “living” particles are so small that they are smaller than many of the larger “dead” particles or molecules of isolated protein. Their constitution must therefore be very much simpler than what we have been accustomed to imagine is required by living organisms.

At this wonderful borderline it is as difficult to distinguish Life from Death as Form from Matter. When do we say that a thing is alive? Presumably when it breathes, when it moves by itself, and above all, when it reproduces its like. The virus particles do not move by themselves, but then most plants and bacteria do not; whether the virus particles respire is also doubtful, but many seeds and germs respire

very little. At any rate, the viruses are extremely efficient at reproducing themselves. Inoculate a plant with a very small quantity of a plant-virus, and before long you will be able to isolate large amounts of the virus, while in the meantime the plant has become diseased and perhaps wilted, probably because nutritive material which ought to have gone to build more plant, has gone into the virus instead.

Here, then, we have to deal with something living indeed but so small that it is smaller than many chemical molecules. Between the living and the dead there is no sharp borderline. Until recently particles of viruses were so small as to be far beyond the reach of our vision, even with the microscope or the ultra-microscope, but quite recently a new device, based on new principles, and called the electron-microscope, has been brought into use, and by its aid it has been possible to take photographs of molecular particles and of the viruses themselves. Thus the particles of tobacco mosaic disease virus seem to be rod-shaped. By making them "transparent" with X-rays their regular internal structure is being elucidated.

Here there comes another surprise. If you talk to a biochemist about rod-shaped particles, he will be on the look-out for some odd goings-on. While particles like little balls clump together to form ordinary crystals, rod-shaped particles have a habit of clumping together to form "liquid crystals." At first sight, a liquid crystal is a contradiction in terms, for the sort of crystals that most people know about are those of sugar or washing-soda, semi-transparent, and solid, as hard as anything could be. But there are many chemical substances known which form regular arrangements not rigid in all three dimensions but rigid only in one or in two, the particles being arranged in various combinations of randomness and order. They may, for instance, slip over one another if squeezed; or their orientation may be upset by the passage of some foreign body between them, yet after it has gone through they form up behind it again like a

squad of soldiers re-forming after letting a truck through their ranks. Sometimes a crystal, instead of melting directly to give a true liquid when heated, will pass through a whole succession of intermediate forms, getting less and less strictly oriented as the temperature increases, until at last a true liquid is reached, where the molecules are all flying about at random like the crowd at Paddington Station when you look down on it from an office window high up near the roof. To continue the analogy, the crowd is rather like a liquid crystal in that it is free to move up and down along the platforms, but only within those limits, so that it has a certain structure. To imitate the true rigid crystal, it would have to stop dead, each person at a definite distance from the nearest other persons.

The viruses seem to be particularly prone to form liquid crystals. Looked at through certain optical apparatus, liquid crystals, when made to flow, show a bright flash of light. Some biochemists working on plant viruses made the striking experiment of putting a gold-fish in a virus solution, and letting it swim about under this apparatus. Wherever it went its tail was followed by the bright flashes of light caused by the liquid crystalline virus being temporarily disarranged. Some viruses may also form true solid crystals.

What holds good for the viruses also holds good for many of the proteins and other substances which form the chemical basis of animals and plants. We know that these fibre-molecules and liquid crystal states occur in the living cells of the body, and a great deal of work is now being directed to analysing them. They help us to understand a little of the extraordinary qualities of symmetry and polarity which animal and plant forms possess. How, for instance, does an egg know which of its ends is which; which end is to be the front of the future animal and which end the back? If a transparent egg of a sea-urchin, for example, is centrifuged, i.e. subjected to a very strong force like that

which carries a tin can round at the end of a string when a boy swings it, the contents of the egg are largely stratified, different sorts of fat, granules, etc., coming together in layers. Yet the further development is not in the least affected. The egg will shortly afterwards bud forth its new small cells in exactly the same place as it would if nothing had been done to it. It "knows" which end is which, and your throwing things about inside it has not in the least confused it. It looks as if it had a "crystal lattice" inside it, like one of those rigid cat's-cradles of coloured balls which you can see in the South Kensington museums. But it is obviously not crystalline in the ordinary sense because you can squash it like pulp. Knowledge of liquid crystals is therefore what we need more than anything else to enable us to understand the extremely subtle forms of rigidity possessed by animal and plant organisms.

The fact that fibre-molecules build up living structures explains a good many of the properties we associate with them in ordinary handling. The fibrousness of hair and the stringiness of muscle (meat) for example. Such fibres contract and expand. The shrinking of a pair of flannel trousers is closely connected with the contraction of a muscle. But whereas trousers and indiarubber bands have an inert springiness, the muscle has what we might call an "ert" springiness—it is the basis of all animal movement.

Another insight which the virus has given us into the essence of life is the emphasis on the reduplication of protein molecules. How on earth does this mass-production of standard protein molecules occur? It must be something very specific, for we know that every animal species, and perhaps every individual, has protein of its own kind, and other kinds will not do. Sheep or crab protein, if it gets into our blood circulation or our cells, upsets us very much. That is why we have our elaborate digestion system, which unpacks the protein molecules that we eat in our food, and provides the "building-stones" for us to build our own

protein with. If we knew the method whereby new protein molecules are mass-produced, all in the image of those that went before, we should have the key to all growth, all reproduction, and perhaps to evolution too.

One thing more. A great discovery of the last thirty years has been that there is not just one standard sort of carbon atom, but several standard sorts, all recognisably carbon, but differing slightly in weight. The same is true of many other elements, such as nitrogen and hydrogen. Quite apart from the great importance of this knowledge for physics, it has enabled biologists to use these elements as "tracers" since such atoms are, as it were, labelled, and can be followed around in the body once they have been introduced into it. In this way it has been found that a labelled atom of phosphorus or nitrogen, for instance, only a few minutes after entering the body, will enter into the structure of some of the protein of the brain or muscles, which, one would have thought, was absolutely fixed, supporting the living organism in an architectural way or playing its part in the great telephone exchange of the nervous system. Now this rapid interchange does not take place between the labelled atoms and "dead" protein isolated from the living body. It must therefore mean that in the living body, atoms are constantly "stepping out to lunch," as it were, from the molecules of which they are a part, while others step in to hold the fort. In this ceaseless interchange the pattern of the body is fully maintained. Such a co-operation, even though far down at the molecular level, cannot but remind us of the voluntary co-operation of individual human beings in maintaining patterns of society at levels of organisation far higher.

This thought brings me to some general conclusions. That the old distinction between Form and Matter has gone for ever, and that the new collaboration of Organisation and Energy has come, is indeed a revolutionary thing. But there is more to say than this. People are far too ready to

think of human society as if it were in some sort of vacuum, as if it had had no origin nor any connections with the non-human universe. Theologians often seem to be thinking in this way. It is not just a question of whether man is the central thing in the universe or not; mediaeval ideas on this did not survive the Copernican Revolution, except in "fundamentalist" circles. It is a question of what is the guiding thread which we can see through all these levels of organisation.

In an imaginative synthesis of the living body, we come up from the ultimate particles, the protons and electrons, to atoms, from atoms to molecules, from molecules to the tiniest living particles, from these to cell-constituents, from cell-constituents to cells, from cells to organs, from organ to whole animals or to the whole human body. But why stop there? Still further up there are the conjoint realms of human mind, and of human society, with all its complex associations, reaching up from the family to the whole unity of mankind. So we recount our levels of organisation. Each is larger than the one before, but also essentially more complex and more highly organised. In terms of space, each contains the smaller ones within itself.

But space cannot stand without time. In every individual development, that of man no less than the meanest of them, the new individual starts at a low level, and climbs up to its perfection. It begins as a single cell, and its organs and structures and patterns are only gradually formed. That is the subject which embryologists study, and many a lifetime would not be enough to penetrate far into its mysteries. But this is a small matter compared with evolution itself. We know without shadow of doubt that there has been, roughly speaking, in time, a development of stages of complexity and organisation similar to those stages which we see as we reflect on the make-up of the highest organisms. There was inorganic matter before there were worlds. There were worlds before there was life. There was some sort of primitive

life (perhaps not unrelated to the viruses we are now studying) before there were plants, and there were plants before there were animals. There were animals before there were men, and there were men before there were those social organisms which we know as families and tribes. Then there came barbarous nations and more civilised city-states, and finally the national states that we know today.

After reflecting on this almost incredible rise in level of organisation through millions of years, could anyone be so blind, so provincial, so audaciously foolish, as to imagine that the present condition of human society is the crown of the ages, the last and finest perfection of which Nature is capable? Admirers of past ages, refugees from our time who like to bury themselves in the classics or the eighteenth century, sometimes talk as if they did. Humanity, they will tell you, has decayed rather than progressed, since Plato. Considered in terms of evolutionary time, Plato is almost a contemporary of ours. The wonder is rather that civilised man has been able to accomplish so much since the days of the sages of Greece, China, Egypt and India. And so in considering where lies the true line of advance in our own days, we have only to look for whatever forces there may be which are making for greater and better organisation, not a mechanical organisation as such, which Nature never deals in, though fascists may, but organisation built upon and growing out of the full nature of human beings at their best. Hence the world co-operative commonwealth is not, as so many people seem to think, a wild preposterous optimistic dream; it is a certain resolution of our difficulties, having the full authority of evolution behind it. This is the faith, if faith it can be called, by which socialists should be sustained. Whatever defeats the cause of human unity may in our time receive, the socialist, grounded in these facts, will always be able to say, with Galileo before the Inquisition, "It does move, all the same." Whatever force hinders the coming of the world co-operative commonwealth, where all

human races will live in harmony together, and where the old maxim will be true, "from each according to his capacities, to each according to his needs"; that force is ultimately doomed. Against the world-process no force can in the end succeed. The tasks of Energy and Organisation in the making of our universe are still far from ended.

ASPECTS OF THE WORLD MIND IN TIME AND SPACE

(An address to the 1941 meeting of the Social and International Relations Division of the British Association, under the chairmanship of H. G. Wells, on "Science and the World Mind")

The view of the world which modern science has disclosed to us embodies what at first sight seems a curious contradiction. The collective work of physicists and chemists, of astronomers and engineers over more than two centuries has given us, among certain other fundamental natural laws, the great generalisation known as the law of entropy. The universe, or at any rate the parts nearest to us, are continually passing from more improbable to more probable states, free energy is constantly decreasing and entropy (or bound energy) increasing, and it would seem that we are slowly approaching a condition of thermal equilibrium in which no further utilisation of energy can occur. They expound this as meaning that the order in the universe is continually decreasing and the disorder continually increasing. Thinkers with theological axes to grind have embraced this doctrine with enthusiasm, some because the prospect of the "heavens waxing old as doth a garment" seems to them to justify an appeal to neo-platonic other-worldly mysticism, others because the apparent original winding-up of the universe seems to restore a Creator to the necessities of thought. The ever-present possibilities of cyclical trends, however, or a continuous flow of energy through the universe, render their enthusiasm premature.

Side by side with the law of entropy, however, the chemists,

geologists, biologists and sociologists, had been laying the foundations of the law of evolution. For us, the inheritors of the work of the great popular exponents of the Victorian period, the knowledge of the evolutionary development of the world is the permanent background of our thinking. We know that the original chaos of physical particles gradually gave place to the chemical elements as we see them today, including those with highly complex atomic structures; we know how these slowly aggregated into molecules and these in turn into the very well-ordered crystals and paracrystals. We recognise that in this milieu when the stage of complexity of protein molecules was reached, life appeared, and from then on, through the simplest living cells to the most complicated and organised beings such as ourselves, the line runs clear. Nor can we exempt from this process the development of human societies, themselves in a social evolution attaining ever greater and greater complexity, passing through primitive tribalism, civilised forms of economic association such as feudalism and capitalism, and pointing forward to the world socialism of the future. The only guiding thread we have is the increase and development of organisation.

There is no reason for thinking that this organisation may not be measurable, just as entropy is. Embryologists have long needed a measure of differentiation during development of the individual. If we could have such a measure of increasing organisation during evolution, we might be able to assess the progress of human societies in concrete terms.

Here there is no opportunity to discuss how this seeming contradiction between physics and death on the one hand, psychology and life on the other, may be resolved. It is probable that the physicist's concept of order means only separatedness. Mixed-upness may be patterned as well as chaotic. It may be best to say that the world is passing from universal order to general disorder plus local, though ever higher, states of organisation. Of these we ourselves form

part. The order regnant when free energy was at its maximum might thus almost be considered as the necessary precursor of biological order, and the world-process as a vast metamorphosis, for which we might find a metaphor in the changes undergone by developing animals such as sea-urchin plutei and butterfly larvae.

For man as a social being, however, the essential thing is that he stands at the growing point of a vast evolutionary process, the characteristics of which we can see pretty well. The march of living organisation, the progress of the world mind, will not stand still where it is today. For us at this middle point of time, the first duty is to appraise the social forces at work around us to see in what direction they are leading. Which of them make for higher social organisation, greater human unity, community and solidarity; which of them seek to perpetuate lower stages of evolution, of the horde, of the tribe, of primitive man or even of animal life? The answer is not in doubt; fascist philosophers stand self-condemned. This is the point of view from which we should approach traditional systems of morality. Morality needs no supernatural sanctions; its function is to state the means whereby human beings may live in harmony together, pooling their talents for the general good and collectively relieving their shortcomings. Since human beings are themselves, as units, the most highly organised living organisms known to us, they cannot be treated as if they were machines or as if they were animals, and any social philosophy which attempts to do so is ultimately doomed, even if, for a while, it should flourish like the green bay tree.

The social significance of science is indeed inescapable. It fundamentally rests on the checking and rechecking of observations of external nature made by countless human investigators. Their race, colour, religion or nationality is irrelevant to this function. Moreover, science alone, because of the ever-increasing precision and factual content of her language, has discovered how to attain substantially complete com-

municability between observers. This essentially social structure of science mirrors the oneness of humanity in other affairs, in artistic and religious experience (where communicability is far less) and in the production and exchange of commodities. Science is already a "communitas," a "commune"; it will never be free to exert its full power in the benefaction of mankind until the social structure of mankind is also a "commune." Who has better recognised this than our chairman, H. G. Wells? It was the basic assumption of all his "utopias."

The founders of "scientific socialism" called it so because they recognised the rising tide of organisation in the age-old evolutionary process, and they thought that that was a better foundation for a faith in coming human community than the deepest religious aspirations. But there is a further significance in the phrase. Freedom and Authority is an ancient antinomy indeed; social philosophers have ever wrestled with it and theologians have filled a multitude of books with discussions of it. But science is perhaps the only form of human activity in which the clue to its resolution has been found. The scientific view of the world forms a structure on the knowledge of which we have to act, but it is always open to anyone to upset as much of it as he possibly can, and no scientific training is any good unless it encourages the young scientist to question the fundamentals and to believe that facts may force him to demand their radical modification.¹ Practical authority exists well enough, therefore, but the possibility of a Harvey or an Einstein has always to be taken into consideration, and freedom therefore exists too. It is true that recognition of the ideas of an unorthodox questioner may not come in his own lifetime, but that is a small matter where saecular trends are concerned.

If society, therefore, were to be so based on principles of

¹ The modesty and humility of older scientists worth their salt towards the young is charmingly depicted in a botanist's autobiography, "A Naturalist in the City," by D. C. Peattie, *Atlantic Monthly*, 1941, 167, 498.

reason and of ascertained social fact; if the exploitation of men were replaced by the administration of things, it would always be open for improvers to demand radical modification if they could show just cause. No ruling class in history has ever yet dared to face social criticism. Since its material interests are involved, it reacts with police measures, until at length when criticism has become too overwhelming it resorts to civil war and itself passes into the museum of history. But in the classless state, towards which, as the profoundest analysis of social evolution shows us, we must look, the scientific administrators of government should be in the same position as the scientific investigators of nature. Here is a structure, examine it through and through, investigate and assemble your facts, make your proposals for improvement, *if you can*.¹ To have attained this state of social rationality would be to have passed from the necessities of social conflict into the freedom of a realm where man could plan his own destiny.

At what is, in some sense, an international gathering, it is

¹ This thought found expression as far back as the seventeenth century. J. A. Komensky (Comenius), the illustrious Czech educationalist and pioneer of the organisation of science, dedicated a book, *Via Lucis*, to the newly formed Royal Society in 1668, from Amsterdam, though parts of it had been written many years earlier, when he was in London in 1641 on that visit which had stimulated the Royal Society's foundation.

"Let your researches into natural objects," he said, "be so well established that if a man desires not merely to contemplate your work but even to try its accuracy with the most exacting tests of his own device, he shall be certain to find that the facts are precisely what you have shown them to be. This will be an admirable precedent, and will encourage those who are at the helm of human society in the State, or of men's consciences in the Church, to act in the same way, following indeed the example of the Apostles who did not fear to submit all their doctrines to the scrutiny and judgment of the world." (*Via Lucis*, English translation by E. T. Campagnac, Liverpool, 1938.) Cf. *The Teacher of Nations*, essays in honour of Comenius, Cambridge, 1942.

fitting that we should take some account of contributions made to human thought by civilisations other than our own. So far we have been considering the time-process; what of other spatial regions of our world? The very words "social rationality" call to mind a civilisation, far older than that of these western islands, which has contributed far more than is often supposed to philosophical and scientific thought. For present purposes we may roughly divide the types of civilisation (excluding abortive Aztec and African upsurges) into the Semitic-Occidental, to which we ourselves belong, the Indian, and the Chinese. It has been said that whenever modern man climbs to the top of some newly-conquered mountain of intellectual achievement, he finds that the Greeks had shot an arrow there two thousand years before.¹ Those of us who are acquainted with Chinese culture would add that when he looks again he finds a Chinese arrow too. I cannot claim to have anything of value to say on ancient Indian contributions, but I know that a progressive study of the course of Chinese philosophical thought filled me step by step with amazement and delight that in that ancient system, perhaps the only one comparable with the occidental system in richness and variety, so many ideas had found another expression, as if in a symphony on the same themes by another composer. Writing to Lorenzo de Medici in 1515 from China, Andreas Corsalis described the Chinese as "*di nostra qualità*," of the same stuff as ourselves. It was a compliment to us.

In the first place, China's greatest ethical philosopher, Kung-fu-tze (Confucius) was a moralist without supernaturalism. Long ages before anyone could have expected to see, as we do today, how ethics could arise as a social product within a natural evolutionary process when social man had arisen, he put human relationships first and supernatural religion a poor second. What are we to do, his disciples were always asking him, about the gods and demons?

¹ St. L. Strachey, *The River of Life*, p. 298.

"Respect them from a distance," was his answer, "but have as little to do with them as possible. First study how you may live with your fellow-men in peace, justice and love, then, when you have discovered that, you may ask me again concerning the gods and demons." When irresponsible ascetics taunted him with his mundane interests he said, "I cannot live with animals. If I am not to live with my fellow-men, whom am I to live with? If society were as it ought to be, I should not be wanting to change it." When asked what he would do first for the people, he replied, "Feed and enrich them"; what next, he replied, "Educate them." Confucian naturalist ethics, scientific in spirit long before science, reached Europe in the eighteenth century; they produced a deep impression on the scholars of the time. In Chinese culture the romantic and the rational have always been successfully blended. Its fight today against an imperialistic and irrational mysticism is identical with ours.

The greatest disciple of Confucius, Mêng-tze (Mencius), was extremely important on account of his view that man's nature is fundamentally good. Unlike the west, where Augustine was orthodox and Pelagius heretical, in China Mencius was orthodox and Hsün-tze unorthodox. This belief too reached Europe in the eighteenth century, and we know that it profoundly influenced the thinkers of the Encyclopaedia movement, who laid the theoretical foundations of the French Revolution and of all subsequent progressive naturalist thought.

Later Confucian thought became petrified into something of a scholasticism, and it was against this that Taoism reacted. Taoism represented to some degree the desire of the human mind to return from the ordering of human society to the contemplation of nature. Lao-tze's diatribes against "knowledge" were directed rather against Confucian scholasticism; and the Taoists, like the mystical theologians of our own renaissance, believed in the efficacy of manual operative arts. Many historians of science find that alchemy had its

origin in Taoist magic; the search for the pill of immortality. A similar, but more theoretical, tendency, is seen in the clear statement of relativity by the philosopher Chuang-tze. Particularly interesting is the relation between the Taoist concept of *chêng ching* (serenity of mind) which bears a close resemblance to the Epicurean *ἀταραξία* (ataraxia). This peace of mind, which comes from an intellectual contemplation of the works of nature, and a resignation to, because an appreciation of, the manifold kaleidoscope of the atoms, is still today a factor in the scientific world-view. By denuding the unknown of its terrors, it paves the way for the investigation of the unknown, and eventually the control of the known.

Lastly, the statement has often been heard that Chinese culture has been essentially stagnant, that it contained, unlike Greek thought, no germ of the understanding of evolution. This statement is wrong. In the "Great Appendix" to the I-Ching, one of the Chinese classics, dating from the fifth century B.C., there is an extremely clear account of three phases of human social evolution. The first phase is described in detail as primitive barbarism; the second (the period of the "Lesser Tranquillity"; *hsiao an*) is an era of private property, coercive government, social cataclysms and war. The third (the period of "Great Togetherness"; *ta tung*) is no more and no less than the communal ownership of the means of production. Unfortunately we are still at the second stage today. I do not know of any parallel account of social evolution in Greek philosophy. It is true that Aeschylus, Hippocrates, Epicurus and Moschion did envisage the origin of human society from primitive barbarism, but they had little to say of the future, and most of the Greeks were dominated by the idea of cyclical recurrence or even of degeneration from a golden age. As for the causes which prevented the appearance of systematically organised science in China; that is a subject demanding much research and probably not to be solved without a corresponding under-

standing of how Chinese differs from occidental economic history.

Summing up this contribution, then, we have seen that although physical order is everywhere decreasing, biological and social organisation is everywhere increasing. The human social organisation into which we were born has yet far to go towards its ultimate triumphs. The whole enterprise of science is a manifestation of this social organisation, itself the product of evolution and the guarantee of further evolution. Our business is to find out how we may best make ourselves efficacious instruments of the cosmic process as it manifests itself in evolving human society, not caring if we perish in this cause, a holy and living sacrifice, seeing how much we ourselves have benefited from the acts of the martyrs and ancestors from the beginning of the world. And not only is this cloud of witnesses about us in the time-process but also, as has been shown, there come from the other side of the world ancient men, men of another colour, but our brothers and kinsmen, witnessing to the truth of human solidarity and the unity of the world mind.

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