AFRICAN TRADITIONAL THOUGHT AND WESTERN SCIENCE

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PART II. THE 'CLOSED' AND 'OPEN' PREDICAMENTS

IN Part I of this paper, I pushed as far as it would go the thesis that important continuities link the religious thinking of traditional Africa and the theoretical thinking of the modern West. I showed how this view helps us to make sense of many otherwise puzzling features of traditional religious thinking. I also showed how it helps us to avoid certain rather troublesome red herrings which lie across the path towards understanding the crucial differences between the traditional and the scientific outlook.

In Part II, I shall concentrate on these differences. I shall start by isolating one which strikes me as the key to all the others, and will then go on to suggest how the latter flow from it.

What I take to be the key difference is a very simple one. It is that in traditional cultures there is no developed awareness of alternatives to the established body of theoretical tenets; whereas in scientifically oriented cultures, such an awareness is highly developed. It is this difference we refer to when we say that traditional cultures are 'closed' and scientifically oriented cultures 'open'.[1]

One important consequence of the lack of awareness of alternatives is very clearly spelled out by Evans-Pritchard in his pioneering work on Azande witchcraft beliefs. Thus he says:

> I have attempted to show how rhythm, mode of utterance, content of prophecies, and so forth, assist in creating faith in witch-doctors, but these are only some of the ways in which faith is supported, and do not entirely explain belief. Weight of tradition alone can do that. . . . There is no incentive to agnosticism. All their beliefs hang together, and were a Zande to give up faith in witch-doctorhood, he would have to surrender equally his faith in witchcraft and oracles. . . . In this web of belief every strand depends upon every other strand, *and a Zande cannot get out of its meshes because it is the only world he knows. The web is not an external structure in which he is enclosed. It is the texture of his thought and he cannot think that his thought is wrong.*[2]

And again:

> And yet Azande do not see that their oracles tell them nothing! Their blindness is not due to stupidity, for they display great ingenuity in explaining away the failures and in-

[1] Philosophically minded readers will notice here some affinities with Karl Popper, who also makes the transition from a 'closed' to an 'open' predicament crucial for the take-off from tradition to science. For me, however, Popper obscures the issue by packing too many contrasts into his definitions of 'closed' and 'open'. Thus, for him, the transition from one predicament to the other implies not just a growth in the awareness of alternatives, but also a transition from communalism to individualism, and from ascribed status to achieved status. But as I hope to show in this essay, it is the awareness of alternatives which is crucial for the take-off into science. Not individualism or achieved status: for there are lots of societies where both of the latter are well developed, but which show no signs whatever of take-off. In the present context, therefore, my own narrower definition of 'closed' and 'open' seems more appropriate.

[2] Evans-Pritchard, 1936, p. 194.

equalities of the poison oracle and experimental keenness in testing it. It is due rather to the fact that their intellectual ingenuity and experimental keenness are conditioned by patterns of ritual behaviour and mystical belief. Within the limits set by these patterns, they show great intelligence, but it cannot operate beyond these limits. Or, to put it in another way; *they reason excellently in the idiom of their beliefs, but they cannot reason outside, or against their beliefs because they have no other idiom in which to express their thoughts.*[1]

Yet again, writing more generally of ' closed ' societies in a recent book, he says:

> Everyone has the same sort of religious beliefs and practices, and their generality, or collectivity, gives them an objectivity which places them over and above the psychological experience of any individual, or indeed of all individuals. . . . *Apart from positive and negative sanctions, the mere fact that religion is general means, again in a closed society, that it is obligatory, for even if there is no coercion, a man has no option but to accept what everybody gives assent to, because he has no choice, any more than of what language he speaks. Even were he to be a sceptic, he could express his doubts only in terms of the beliefs held by all around him.*[2]

In other words, absence of any awareness of alternatives makes for an absolute acceptance of the established theoretical tenets, and removes any possibility of questioning them. In these circumstances, the established tenets invest the believer with a compelling force. It is this force which we refer to when we talk of such tenets as sacred.

A second important consequence of lack of awareness of alternatives is vividly illustrated by the reaction of an Ijo man to a missionary who told him to throw away his old gods. He said: ' Does your God really want us to climb to the top of a tall palm tree, then take off our hands and let ourselves fall? ' Where the established tenets have an absolute and exclusive validity for those who hold them, any challenge to them is a threat of chaos, of the cosmic abyss, and therefore evokes intense anxiety.

With developing awareness of alternatives, the established theoretical tenets come to seem less absolute in their validity, and lose something of their sacredness. At the same time, a challenge to these tenets is no longer a horrific threat of chaos. For just as the tenets themselves have lost some of their absolute validity, a challenge to them is no longer a threat of absolute calamity. It can now be seen as nothing more threatening than an intimation that new tenets might profitably be tried. Where these conditions begin to prevail, the stage is set for change from a traditional to a scientific outlook.

Here, then, we have two basic predicaments: the ' closed '—characterized by lack of awareness of alternatives, sacredness of beliefs, and anxiety about threats to them; and the ' open '—characterized by awareness of alternatives, diminished sacredness of beliefs, and diminished anxiety about threats to them.

Now, as I have said, I believe all the major differences between traditional and scientific outlooks can be understood in terms of these two predicaments. In substantiating this, I should like to divide the differences into two groups: A, those directly connected with the presence or absence of a vision of alternatives; and B, those directly connected with the presence or absence of anxiety about threats to the established beliefs.

[1] Ibid., p. 338.

[2] Evans-Pritchard, 1965, p. 55.

A. Differences Connected with the Presence or Absence of a Vision of Alternatives

1. *Magical versus non-magical attitude to words*

A central characteristic of nearly all the traditional African world-views we know of is an assumption about the power of words, uttered under appropriate circumstances, to bring into being the events or states they stand for.

The most striking examples of this assumption are to be found in creation mythologies where the supreme being is said to have formed the world out of chaos by uttering the names of all things in it. Such mythologies occur most notably in Ancient Egypt and among the peoples of the Western Sudan.

In the acts of creation which the supreme being has left to man, the mere uttering of words is seldom thought to have the same unconditional efficacy. Thus, so far as we know, there are no traditional cultures which credit man with the ability to create new things just by uttering new words. In most such cultures, nevertheless, the words of men are granted a certain measure of control over the situations they refer to. Often there is a technical process which has to be carried out in order to achieve a certain result; but for success, this has to be completed by a properly framed spell or incantation foreshadowing the result. Such a situation is vividly described by the Guinean novelist Camara Laye. His father was a goldsmith, and in describing the old man at work, he says:

> Although my father spoke no word aloud, I know very well that he was thinking them from within. I read it from his lips, which were moving while he bent over the vessel. He kept mixing gold and coal with a wooden stick which would blaze up every now and then and constantly had to be replaced. What sort of words were those that my father was silently forming? I don't know—at least I don't know exactly. Nothing was ever confided to me about that. But what could these words be but incantations?

Beside the old man worked a sorcerer:

> Throughout the whole process his speech became more and more rapid, his rhythms more urgent, and as the ornament took shape, his panegyrics and flatteries increased in vehemence and raised my father's skill to the heavens. In a peculiar, I would almost say immediate and effective, way the sorcerer did in truth take part in the work. He too was drunk with the joy of creation, and loudly proclaimed his joy: enthusiastically he snatched the strings, became inflamed, as if he himself were the craftsman, as if he himself were my father, as if the ornament were coming from his own hands.[1]

In traditional African cultures, to know the name of a being or thing is to have some degree of control over it. In the invocation of spirits, it is essential to call their names correctly; and the control which such correct calling gives is one reason why the true or 'deep' names of gods are often withheld from strangers, and their utterance forbidden to all but a few whose business it is to use them in ritual. Similar

[1] Laye, 1965. Quoted in Jahn, 1961 (p. 125). As an attempt to make an inventory of distinctive and universal features of African culture, Jahn's book seems to me highly tendentious. But its imaginative sketch of the assumptions underlying magical beliefs and practices is one of the most suggestive treatments of the subject I have seen.

ideas lie behind the very widespread traditional practice of using euphemisms to refer to such things as dangerous diseases and wild animals: for it is thought that use of the real names might secure their presence. Yet again, it is widely believed that harm can be done to a man by various operations performed on his name—for instance, by writing his name on a piece of paper and burning it.

This last example carries me on to an observation that at first sight contradicts what we have said so far: the observation that in a great deal of African magic, it is non-verbal symbols rather than words that are thought to have a direct influence over the situations they represent. Bodily movements, bits of plants, organs of animals, stones, earth, water, spittle, domestic utensils, statuettes—a whole host of actions, objects, and artefacts play a vital part in the performances of traditional magic. But as we look deeper the contradiction seems more apparent than real. For several studies of African magic suggest that its instruments become symbols through being verbally designated as such. In his study of Zande magic, for instance, Evans-Pritchard describes how magical medicines made from plants and other natural objects are given direction by the use of verbal spells. Thus:

> The tall grass *bingba*, which grows profusely on cultivated ground and has feather-like, branching stems, is known to all as medicine for the oil-bearing plant *kpagu*. A man throws the grass like a dart and transfixes the broad leaves of the plant. Before throwing it, he says something of this sort: ' You are melons, you be very fruitful like *bingba* with much fruit.' Or ' You are *bingba*; may the melons flourish like *bingba*. My melons, you be very fruitful. May you not refuse.'[1]

My own field-work in Kalabari constantly unearthed similar examples of non-verbal symbols being given direction and significance by verbal spells. My favourite example is taken from the preparation of a medicine designed to bring clients to an unsuccessful spirit medium. One of the important ingredients of this medicine was the beak of the voracious, mud-dredging muscovy duck—an item which the doctor put into the medicine with the succinct comment: ' Muscovy Duck; you who are always eating.'

Amongst the most important non-verbal magical symbols in Kalabari culture are the statuettes designed to ' fix ' the various spirits at times of ritual. Of these, several Kalabari said: ' They are, as it were, the names of the spirits.' Explaining their use, one old man said: 'It is in their names that the spirits stay and come.' It is by being named that the sculpture comes to represent the spirit and to exert influence over it.[2]

In a recent essay on Malagasy magic,[3] Henri Lavondes discusses similar examples of the direction of magical objects by verbal spells. He shows how the various ingredients of a compound medicine are severally related by these spells to the various aspects of the end desired. And, following Mauss, he goes on to suggest that the function of the spell is to convert material objects into *mots realisés* or concrete words. In being given verbal labels, the objects themselves become a form of language.

This interpretation, which reduces all forms of African magic to a verbal base, fits the facts rather well. One may still ask, however, why magicians spend so much time choosing objects and actions as surrogate words, when spoken words themselves are believed to have a magical potential. The answer, I would suggest, is that speech is an ephemeral form of words, and one which does not lend itself to a great variety

[1] Evans-Pritchard, 1936, p. 449. [2] Horton, 1965. [3] Lavondes, 1963.

of manipulations. Verbal designation of material objects converts them into a more permanent and more readily manipulable form of words. As Lavondes puts it:

> Le message verbal est susceptible de davantage de précision que le message figuré. Mais le second a sur le premier l'avantage de sa permanence et de sa matérialité, qui font qu'il reste toujours disponible et qu'il est possible de s'en pénétrer et de le répandre par d'autres voies que celle du langage articulé (par absorption, par onction, par aspersion).[1]

Considered in this light, magical objects are the preliterate equivalents of the written incantations which are so commonly found as charms and talismans in literate but prescientific cultural milieux.

Through a very wide range of traditional African belief and activity, then, it is possible to see an implicit assumption as to the magical power of words.

Now if we take into account what I have called the basic predicament of the traditional thinker, we can begin to see why this assumption should be so deeply entrenched in his daily life and thought. Briefly, no man can make contact with reality save through a screen of words. Hence no man can escape the tendency to see a unique and intimate link between words and things. For the traditional thinker this tendency has an overwhelming power. Since he can imagine no alternatives to his established system of concepts and words, the latter appear bound to reality in an absolute fashion. There is no way at all in which they can be seen as varying independently of the segments of reality they stand for. Hence they appear so integrally involved with their referents that any manipulation of the one self-evidently affects the other.

The scientist's attitude to words is, of course, quite opposite. He dismisses contemptuously any suggestion that words could have an immediate, magical power over the things they stand for. Indeed, he finds magical notions amongst the most absurd and alien trappings of traditional thought. Though he grants an enormous power to words, it is the indirect one of bringing control over things through the functions of explanation and prediction. Words are tools in the service of these functions—tools which like all others are to be cared for as long as they are useful, but which are to be ruthlessly scrapped as soon as they outlive their usefulness.

Why does the scientist reject the magician's view of words? One easy answer is that he has come to know better: magical behaviour has been found not to produce the results it claims to. Perhaps. But what scientist has ever bothered to put magic to the test? The answer is, none; because there are deeper grounds for rejection—grounds which make the idea of testing beside the point.

To see what these grounds are, let us return to the scientist's basic predicament—to his awareness of alternative idea-systems whose ways of classifying and interpreting the world are very different from his own. Now this changed awareness gives him two intellectual possibilities. Both are eminently thinkable; but one is intolerable, the other hopeful.

The first possibility is simply a continuance of the magical world-view. If ideas and words are inextricably bound up with reality, and if indeed they shape it and control it, then, a multiplicity of idea-systems means a multiplicity of realities, and a change of ideas means a change of things. But whereas there is nothing particularly

[1] Ibid., p. 115.

absurd or inconsistent about this view, it is clearly intolerable in the extreme. For it means that the world is in the last analysis dependent on human whim, that the search for order is a folly, and that human beings can expect to find no sort of anchor in reality.

The second possibility takes hold as an escape from this horrific prospect. It is based on the faith that while ideas and words change, there must be some anchor, some constant reality. This faith leads to the modern view of words and reality as independent variables. With its advent, words come ' unstuck from ' reality and are no longer seen as acting magically upon it. Intellectually, this second possibility is neither more nor less respectable than the first. But it has the great advantage of being tolerable whilst the first is horrific.

That the outlook behind magic still remains an intellectual possibility in the scientifically oriented cultures of the modern West can be seen from its survival as a nagging undercurrent in the last 300 years of Western philosophy. This undercurrent generally goes under the labels of ' Idealism ' and ' Solipsism '; and under these labels it is not immediately recognizable. But a deeper scrutiny reveals that the old outlook is there all right—albeit in a strange guise. True, Idealism does not say that words create, sustain, and have power over that which they represent. Rather, it says that material things are ' in the mind '. That is, the mind creates, sustains, and has power over matter. But the second view is little more than a post-Cartesian transposition of the first. Let me elaborate. Both in traditional African cosmologies and in European cosmologies before Descartes, the modern distinction between ' mind ' and ' matter ' does not appear. Although everything in the universe is underpinned by spiritual forces, what moderns would call ' mental activities ' and ' material things ' are both part of a single reality, neither material nor immaterial. Thinking, conceiving, saying, etc. are described in terms of organs like heart and brain and actions like the uttering of words. Now when Descartes wrote his philosophical works, he crystallized a half-way phase in the transition from a personal to an impersonal cosmological idiom. Whilst ' higher ' human activities still remained under the aegis of a personalized theory, physical and biological events were brought under the aegis of impersonal theory. Hence thinking, conceiving, saying, etc. became manifestations of ' mind ', whilst all other happenings became manifestations of ' matter '. Hence, whereas before Descartes we have ' words over things ', after him we have ' mind over matter '—just a new disguise for the old view.

What I have said about this view being intellectually respectable but emotionally intolerable is borne out by the attitude to it of modern Western philosophers. Since they are duty bound to explore all the alternative possibilities of thought that lie within the grasp of their imaginations, these philosophers mention, nay even expound, the doctrines of Idealism and Solipsism. Invariably, too, they follow up their expositions with attempts at refutation. But such attempts are, just as invariably, at farce. Their character is summed up in G. E. Moore's desperate gesture, when challenged to prove the existence of a world outside his mind, of banging his hand with his fist and exclaiming: ' It is there! ' A gesture of faith rather than of reason, if ever there was one!

With the change from the ' closed ' to the ' open ' predicament, then, the outlook behind magic becomes intolerable; and to escape from it people espouse the view that

words vary independently of reality. Smug rationalists who congratulate themselves on their freedom from magical thinking would do well to reflect on the nature of this freedom!

2. *Ideas-bound-to-occasions versus ideas-bound-to-ideas*

Many commentators on the idea-systems of traditional African cultures have stressed that, for members of these cultures, their thought does not appear as something distinct from and opposable to the realities that call it into action. Rather, particular passages of thought are bound to the particular occasions that evoke them.

Let us take an example. Someone becomes sick. The sickness proves intractable and the relatives call a diviner. The latter says the sickess is due to an ancestor who has been angered by the patient's bad behaviour toward his kinsmen. The diviner prescribes placatory offerings to the spirit and reconciliation with the kinsmen, and the patient is eventually cured. Now while this emergency is on, both the diviner and the patient's relatives may justify what they are doing by reference to some general statements about the kinds of circumstance which arouse ancestors to cause sickness. And it is when he is lucky to be around on such occasions that the anthropologist picks up most of his hard-earned information about traditional theories of the world and its working. But theoretical statements of this kind are very much matters of occasion, not likely to be heard out of context or as part of a general discussion of ' what we believe '. Indeed, the anthropologist has learned by bitter experience that, in traditional Africa, the generalized, ' what do you chaps believe? ' approach gets one exactly nowhere.[1]

If ideas in traditional culture are seen as bound to occasions rather than to other ideas, the reason is one that we have already given in our discussion of magic. Since the member of such a culture can imagine no alternatives to his established system of ideas, the latter appear inexorably bound to the portions of reality they stand for. They cannot be seen as in any way opposable to reality.

In a scientifically oriented culture such as that of the Western anthropologist, things are very different. The very word ' idea ' has the connotation of something opposed to reality. Nor is it entirely coincidental that in such a culture the historian of ideas is considered to be the most unrealistic kind of historian. Not only are ideas dissociated in people's minds from the reality that occasions them: they are bound to other ideas, to form wholes and systems perceived as such. Belief-systems take shape not only as abstractions in the minds of anthropologists, but also as totalities in the minds of believers.

Here again, this change can be readily understood in terms of a change from the ' closed ' to the ' open ' predicament. A vision of alternative possibilities forces men to the faith that ideas somehow vary whilst reality remains constant. Ideas thus become detached from reality—nay, even in a sense opposed to it. Furthermore, such

[1] From the piecemeal, situation-bound character of traditional idea-systems, some have been led to infer that the anthropologist must analyse them in an equally piecemeal, situational manner, and not as systems. Thus in her recent *Purity and Danger* (1966), Mary Douglas talks about the error of pinning out entire traditional idea-systems like Lepidoptera, in abstraction from the real-life situations in which their various fragments actually occur. But abstraction is as abstraction does. Provided that comparison of total idea-systems leads to interesting results, it is surely as justifiable as any other kind of comparison. After all, what about the abstraction and comparison of social structures?

a vision, by giving the thinker an opportunity to ' get outside ' his own system, offers him a possibility of his coming to see it *as a system*.

3. *Unreflective versus reflective thinking*

At this stage of the analysis there is no need for me to insist further on the essential rationality of traditional thought. In Part I, indeed, I have already made it out far too rational for the taste of most social anthropologists. And yet, there is a sense in which this thought includes among its accomplishments neither Logic nor Philosophy.

Let me explain this, at first sight, rather shocking statement. It is true that most African traditional world-views are logically elaborated to a high degree. It is also true that, because of their eminently rational character, they are appropriately called ' philosophies '. But here I am using ' Logic ' and ' Philosophy ' in a more exact sense. By Logic, I mean thinking directed to answering the question: ' What are the general rules by which we can distinguish good arguments from bad ones? ' And by Philosophy, I mean thinking directed to answering the question: ' On what grounds can we ever claim to know anything about the world? ' Now Logic and Philosophy, in these restricted senses, are poorly developed in traditional Africa. Despite its elaborate and often penetrating cosmological, sociological, and psychological speculations, traditional thought has tended to get on with the work of explanation, without pausing for reflection upon the nature or rules of this work. Thinking once more of the ' closed ' predicament, we can readily see why these second-order intellectual activities should be virtually absent from traditional cultures. Briefly, the traditional thinker, because he is unable to imagine possible alternatives to his established theories and classifications, can never start to formulate generalized norms of reasoning and knowing. For only where there are alternatives can there be choice, and only where there is choice can there be norms governing it. As they are characteristically absent in traditional cultures, so Logic and Philosophy are characteristically present in all scientifically oriented cultures. Just as the ' closed ' predicament makes it impossible for them to appear, so the ' open ' predicament makes it inevitable that they must appear. For where the thinker can see the possibility of alternatives to his established idea-system, the question of choice at once arises, and the development of norms governing such choice cannot be far behind.[1]

4. *Mixed versus segregated motives*

This contrast is very closely related to the preceding one. As I stressed in Part I of this essay, the goals of explanation and prediction are as powerfully present in traditional African cultures as they are in cultures where science has become institutionalized. In the absence of explicit norms of thought, however, we find them vigorously pursued but not explicitly reflected upon and defined. In these circumstances, there is little thought about their consistency or inconsistency with other goals and motives. Hence wherever we find a theoretical system with explanatory and predictive functions, we find other motives entering in and contributing to its development.

Despite their cognitive preoccupations, most African religious systems are powerfully influenced by what are commonly called ' emotional needs '—i.e. needs for

[1] See Gellner, 1964, for a similar point exemplified in the Philosophy of Descartes (p. 105).

certain kinds of personal relationship. In Africa, as elsewhere, all social systems stimulate in their members a considerable diversity of such needs; but, having stimulated them, they often prove unwilling or unable to allow them full opportunities for satisfaction. In such situations the spirits function not only as theoretical entities but as surrogate people providing opportunities for the formation of ties forbidden in the purely human social field. The latter function they discharge in two ways. First, by providing non-human partners with whom people can take up relationships forbidden with other human beings. Second, through the mechanism of possession, by allowing people to ' become ' spirits and so to play roles *vis-à-vis* their fellow men which they are debarred from playing as ordinary human beings.

Examples of the first kind occur very commonly in association with the need for dependence created in children by the circumstances of their family upbringing. In some African societies male children are required to make an abrupt switch from dependence to independence as soon as they reach puberty. A prominent feature of the rites aimed at achieving this switch is the dramatic induction of the candidates into a relation of dependence with a powerful spiritual agency. The latter can be seen as a surrogate for the parents with whom the candidates are no longer allowed to continue their dependent relationships, and hence as a means of freeing the candidates for the exercise of adult independence and responsibility. This appears to be the basic significance of secret society initiations among the peoples of the Congo and the Western Guinea Coast. In other traditional societies, the early relation of dependence on parents is allowed to continue so long as the parents are still alive; and an abrupt switch to independence and responsibility has to be made on their death. Here, it is the dead parent, translated into ancestorhood, who provides for the continuance of a relationship which has had to be abruptly and traumatically discontinued in the purely human social field. This sequence, with its culmination in a highly devout worship of patrilineal ancestors, has been vividly described by Fortes in some of his writings on the Tallensi of Northern Ghana.[1]

Examples of the second kind occur more commonly in association with the need for dominance. Most societies stimulate this need more widely than they grant it satisfaction. In traditional African societies, women are the most common sufferers from this; and it is no accident that in the numerous spirit-possession cults that flourish up and down the continent women are generally rather more prominent than men. For in the male-authority roles which they tend to assume in possession, they gain access to a whole area of role-playing normally forbidden them.

Aesthetic motives, too, play an important part in moulding and sustaining traditional religious systems. This is especially true of West Africa, where narrative, poetry, song, dance, music, sculpture, and even architecture use the spirits and their characters as a framework upon which to develop their various forms. These arts in turn influence the direction in which ideas about the spirits develop. In my own field-work on Kalabari religion, I have found a gradual shading of the cognitive into the aesthetic which can at times be most confusing. In oral tradition, for example, serious myths intended to throw light on the part played by the gods in founding social institutions shade into tales which, although their characters are also gods, are told for sheer entertainment. And although Kalabari do make a distinction between

[1] See, for instance, Fortes, 1961.

serious myth and light tale, there are many pieces which they themselves hestitate to place on one side or the other. Belief shades through half-belief into suspended belief. In ritual, again, dramatic representations of the gods carried out in order to dispose them favourably and secure the benefits which, as cosmic forces, they control, are usually found highly enjoyable in themselves. And they shade off into representations carried out almost solely for their aesthetic appeal. In the Kalabari water-spirit masquerades, for instance, religion seems to have become the servant of art.[1]

There is little doubt that because the theoretical entities of traditional thought happen to be people, they give particular scope for the working of emotional and aesthetic motives. Here, perhaps, we do have something about the personal idiom in theory that does militate indirectly against the taking up of a scientific attitude; for where there are powerful emotional and aesthetic loadings on a particular theoretical scheme, these must add to the difficulties of abandoning this scheme when cognitive goals press toward doing so. Once again, I should like to stress that the mere fact of switching from a personal to an impersonal idiom does not make anyone a scientist, and that one can be unscientific or scientific in either idiom. In this respect, nevertheless, the personal idiom does seem to present certain difficulties for the scientific attitude which the impersonal idiom does not.

Where the possibility of choice has stimulated the development of Logic, Philosophy, and norms of thought generally, the situation undergoes radical change. One theory is judged better than another with explicit reference to its efficacy in explanation and prediction. And as these ends become more clearly defined, it gets increasingly evident that no other ends are compatible with them. People come to see that if ideas are to be used as efficient tools of explanation and prediction, they must not be allowed to become tools of anything else. (This, of course, is the essence of the ideal of ' objectivity '.) Hence there grows up a great watchfulness against seduction by the emotional or aesthetic appeal of a theory—a watchfulness which in twentieth-century Europe sometimes takes extreme forms such as the suspicion of any research publication not written out in a positively indigestible style. Also there appears an insistence on the importance of ' pure ' as opposed to ' applied ' science. This does not mean that scientists are against practical application of their findings. What it does mean is that they feel there should always be some disjunction between themselves and the people who apply their discoveries. The reasons for this are basically the same as those which lead the scientist to be on his guard against emotional or aesthetic appeals. For one thing, if a scientist is too closely identified with a given set of practical problems, he may become so committed to solving these as to take up any theory that offers solution without giving it adequate testing. Again, those lines of inquiry most closely related to the practical problems of the day are not necessarily those which lead to the most rapid advances in explanation and prediction. Finally, in so far as practical interests involve inter-business and inter-national competition, over-identification with them can lead to a fundamental denial of the scientific ideal by encouraging the observance of rules of secrecy. Since it is a primary canon of the scientific ideal that every new theory be subjected to the widest possible testing and criticism, free circulation of new findings is basic to the code of the scientific community. (See below.) Hence, in so far as commercial and international competition

[1] See Horton, 1963.

leads to the curtailment of such circulation, it is inimical to science. This is why brilliant and dedicated scientists tend to be among the most double-edged weapons in wars either hot or cold.

The traditional theoretical scheme, as we have noted, brings forth and nourishes a rich encrustation of cultural growths whose underlying motives have little to do with explanation and prediction. Notable among these are elaborate systems of personal relationships with beings beyond the purely human social order, and all manner of artistic embellishments.

As the insistence on segregation of theoretical activity from the influence of all motives but those defined as essential to it gains strength, these various growths are forcibly sloughed off and have to embark on an independent existence. To survive without getting involved in a losing battle with the now-prestigious ' science ', they have to eschew loudly all explanatory pretensions, and devote great energy to defining their ' true ' ends. In doing this, they have often been accused of making a virtue out of sad necessity—of putting a brazen face on what is simply a headlong retreat before science. But their activities in this direction can, I think, also be seen in a more positive way. That is, they too can be seen as a direct outcome of the ' open ' predicament, and thence of the general tendency to reflect on the nature of thought, to define its aims, and to formulate its norms. Now the conclusion such reflective activity arrives at for Theory-Making also holds for Spiritual Communion and for Art: that is, there are several distinct modes of thought; and a particular mode, if it is to fulfil itself completely, must be protected from the influence of all motives except those defined as essential to it. Hence when we hear a Western theologian proclaim loudly the ' modern discovery ' that the essence of religion has nothing to do with explanation and prediction of worldly events, but is simply communion with God for its own sake, we are only partly right when we sneer at him for trying to disguise retreat as advance. For in fact he can claim to be undertaking much the same kind of purifying and refining operation as the scientist. The force of this contention emerges when we come to consider the case of the artist. For when the latter proclaims that his activity is no longer the handmaid of religion, of science, or even of representation, we do in fact grant that this drastic circumscription of aims represents a form of progress akin to that of the scientist purging his subject in the pursuit of objectivity. The rationalist who says that the modern theologian is retreating whilst the modern artist is advancing is thus merely expressing an agnostic prejudice. Both, in fact, are in an important sense caught up in the same currents of thought as those that move the scientist.

It will now be clear that the scientist's quest for ' objectivity ' is, among other things, a purifying movement. As has happened in many such movements, however, the purifying zeal tends to wander beyond its self-appointed bounds, and even to run to excess within these bounds. Such tendencies are well exemplified in the impact of the quest for objectivity on metaphor.

In traditional Africa, speech abounds with metaphor to a degree no longer familiar in the scientifically oriented cultures of the modern West. The function of such metaphor is partly, as anthropologists never tire of saying,[1] to allude obliquely to things which cannot be said directly. Much more importantly, perhaps, its function

[1] See Beattie, 1966.

is to underline, emphasize, and give greater impact to things which *can* be said literally. ' Proverbs are the palm oil with which words are eaten ', say the Ibo.[1] In this capacity, it is clearly a vital adjunct to rational thought. Often, however, metaphor subtly misleads. The analogy between the things which constitute its literal reference and the things which constitute its oblique reference usually involves only limited aspects of both. But there is always a temptation to extend the analogy unduly, and it can then run its users right off the rails. In sociology, for instance, this has happened with the use of organismic metaphors for thinking about societies and social relations. Organisms and societies do perhaps resemble each other in certain limited ways; but sociologists who have become addicted to organismic metaphor often go beyond these limited resemblances and end up by attributing to societies all sorts of properties possessed only by organisms.

These occasional dangers have led the purists to regard metaphor and analogy as one great snare and delusion. No palm-oil with our words, they have decreed with grim satisfaction. The resulting cult of plain, literal speaking, alas, has spread beyond the bounds of strictly scientific activity right through everyday life, taking much of the poetic quality out of ordinary, hum-drum social relations. Not only this. The distrust of metaphor and analogy has in some places gone so far as to threaten intellectual processes which are crucial to the advance of science itself. Thus the positivist philosophers of science have often denigrated the activity of theoretical model-building. At best, some of them have contended, such model-building is a dubious help to serious scientific thought; and at worst, its reliance on the process of analogy may be extremely misleading. According to this purist school, induction and deduction are the only processes of thought permissible to the scientist. His job is not to elaborate models of a supposed reality lying ' behind ' the data of experience. It is simply to observe; to make inductive generalizations summarizing the regularities found in observation; to deduce from these generalizations the probable course of further observation; and finally to test this deduction against experience. A then B, A then B, A then B; hence all A's are followed by B's; hence if there is an A in the future, it will be followed by a B; check. The trouble about this purist paradigm, of course, is that it condemns the scientist to an eternity of triteness and circularity. It can never account for any of the great leaps in explanatory power which we associate with the advance of science. Only in relation to some model of underlying reality, for instance, can we come to see that A and X, B and Y, so different in the eye of the casual observer, are actually outward manifestations of the same kinds of events. Only in relation to such a model are we suddenly moved to look for a conjunction between X and Y which we would never have noticed otherwise. And only thus can we come to see AB, XY as two instances of a single underlying process or regularity. Finally, so it seems, the only way yet discovered in which scientists can turn out the new models of underlying reality necessary to set such explanatory advance in motion is through the drawing of bold analogies.

To sum up on this point: one of the essential features of science is that it is a purifying movement. But like other purifying movements, alas, it provides fertile soil for obsessional personalities. If we can compare the traditional thinker to an easy-going housewife who feels she can get along quite nicely despite a considerable accumula-

[1] Achebe, 1957.

tion of dirt and dust on the furniture, we can compare the positivist who is so often a fellow traveller of science to an obsessional housewife who scrubs off the dirt, the paintwork, and finally the handles that make the furniture of use!

B. Differences Connected with the Presence or Absence of Anxiety about Threats to the Established Body of Theory

5. *Protective versus destructive attitude towards established theory*

Both in traditional Africa and in the science-oriented West, theoretical thought is vitally concerned with the prediction of events. But there are marked differences in reaction to predictive failure.

In the theoretical thought of the traditional cultures, there is a notable reluctance to register repeated failures of prediction and to act by attacking the beliefs involved. Instead, other current beliefs are utilized in such a way as to ' excuse ' each failure as it occurs, and hence to protect the major theoretical assumptions on which prediction is based. This use of *ad hoc* excuses is a phenomenon which social anthropologists have christened ' secondary elaboration '.[1]

The process of secondary elaboration is most readily seen in association with the work of diviners and oracle-operators, who are concerned with discovering the identity of the spiritual forces responsible for particular happenings in the visible, tangible world, and the reasons for their activation. Typically, a sick man goes to a diviner, and is told that a certain spiritual agency is ' worrying ' him. The diviner points to certain of his past actions as having excited the spirit's anger, and indicates certain remedial actions which will appease this anger and restore health. Should the client take the recommended remedial action and yet see no improvement, he will be likely to conclude that the diviner was either fraudulent or just incompetent, and to seek out another expert. The new diviner will generally point to another spiritual agency and another set of arousing circumstances as responsible for the man's condition, and will recommend fresh remedial action. In addition, he will probably provide some explanation of why the previous diviner failed to get at the truth. He may corroborate the client's suspicions of fraud, or he may say that the spirit involved maliciously ' hid itself behind ' another in such a way that only the most skilled of diviners would have been able to detect it. If after this the client should still see no improvement in his condition, he will move on to yet another diviner—and so on, perhaps, until his troubles culminate in death.

What is notable in all this is that the client never takes his repeated failures as evidence against the existence of the various spiritual beings named as responsible for his plight, or as evidence against the possibility of making contact with such beings as diviners claim to do. Nor do members of the wider community in which he lives ever try to keep track of the proportion of successes to failures in the remedial actions based on their beliefs, with the aim of questioning these beliefs. At most, they grumble about the dishonesty and wiles of many diviners, whilst maintaining their faith in the existence of some honest, competent practitioners.

[1] The idea of secondary elaboration as a key feature of prescientific thought-systems was put forward with great brilliance and insight by Evans-Pritchard in his *Witchcraft, Oracles and Magic*. All subsequent discussions, including the present one, are heavily indebted to his lead.

In these traditional cultures, questioning of the beliefs on which divining is based and weighing up of successes against failures are just not among the paths that thought can take. They are blocked paths because the thinkers involved are victims of the closed predicament. For them, established beliefs have an absolute validity, and any threat to such beliefs is a horrific threat of chaos. Who is going to jump from the cosmic palm-tree when there is no hope of another perch to swing to?

Where the scientific outlook has become firmly entrenched, attitudes to established beliefs are very different. Much has been made of the scientist's essential scepticism toward established beliefs; and one must, I think, agree that this above all is what distinguishes him from the traditional thinker. But one must be careful here. The picture of the scientist in continuous readiness to scrap or demote established theory contains a dangerous exaggeration as well as an important truth. As an outstanding modern historian of the sciences has recently observed,[1] the typical scientist spends most of his time optimistically seeing how far he can push a new theory to cover an ever-widening horizon of experience. When he has difficulty in making the theory ' fit ', he is more likely to develop it in the ways described in Part I of this essay than to scrap it out of hand. And if it does palpably fail the occasional test, he may even put the failure down to dirty apparatus or mistaken meter-reading—rather like the oracle operator! And yet, the spirit behind the scientist's actions *is* very different. His pushing of a theory and his reluctance to scrap it are not due to any chilling intuition that if his theory fails him, chaos is at hand. Rather, they are due to the very knowledge that the theory is not something timeless and absolute. Precisely because he knows that the present theory came in at a certain epoch to replace a predecessor, and that its explanatory coverage is far better than that of the predecessor, he is reluctant to throw it away before giving it the benefit of every doubt. But this same knowledge makes for an acceptance of the theory which is far more qualified and far more watchful than that of the traditional thinker. The scientist is, as it were, always keeping account, balancing the successes of a theory against its failures. And when the failures start to come thick and fast, defence of the theory switches inexorably to attack on it.

If the record of a theory that has fallen under a cloud is poor in all circumstances, it is ruthlessly scrapped. The collective memory of the European scientific community is littered with the wreckage of the various unsatisfactory theories discarded over the last 500 years—the earth-centred theory of the universe, the circular theory of planetary motion, the phlogiston theory of chemical combination, the aether theory of wave propagation, and perhaps a hundred others. Often, however, it is found that a theoretical model once assumed to have universal validity in fact has a good predictive performance over a limited range of circumstances, but a poor performance outside this range. In such a case, the beliefs in question are still ruthlessly demoted; but instead of being thrown out altogether they are given a lesser status as limiting cases of more embracing generalities—still useful as lower-level models or as guides to experience within restricted areas. This sort of demotion has been the fate of theoretical schemes like Newton's Laws of Motion (still used as a guide in many mundane affairs, including much of the business of modern rocketry) and the ' Ball-and-Bond ' theory of chemical combination.

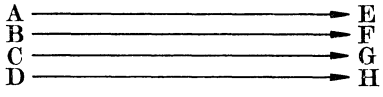
[1] Kuhn, 1962.

This underlying readiness to scrap or demote established theories on the ground of poor predictive performance is perhaps the most important single feature of the scientific attitude. It is, I suggest, a direct outcome of the ' open ' predicament. For only when the thinker is able to see his established idea-system as one among many alternatives can he see his established ideas as things of less than absolute value. And only when he sees them thus can he see the scrapping of them as anything other than a horrific, irretrievable jump into chaos.

6. *Divination versus diagnosis*

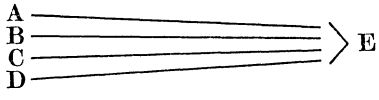
Earlier in this essay I drew certain parallels between the work of the traditional African diviner and the work of the Western diagnostician. In particular, I showed how both of them make much the same use of theoretical ideas: i.e. as means of linking observed effects to causes that lie beyond the powers of common sense to grasp. I now propose to discuss certain crucial differences between these two kinds of agent.

As I noted in the last section, in traditional cultures anxieties about threats to the established theories effectively block many of the paths thought might otherwise take. One path so blocked is the working out of any body of theory which assigns too distinctive an effect to any particular pattern of antecedents. Why this path should be blocked is not hard to see. Suppose that there is a theory X, which makes the following causal connexions:



Now if situation E is disagreeable, and is unambiguously ascribable to cause A, action will be taken to get rid of E by manipulating A. If it fails, then the most obvious verdict is that A → E is invalid. A similar argument applies, of course, to B → F, C → G, D → H.

Suppose, on the other hand, that theory X makes the following connexions:



Now things are very different. If E is ascribed to A, action will still be taken to get rid of E by manipulating A. But if it fails, we are no longer compelled to admit that A → E is invalid. We can now say that perhaps B was present as a complicating factor, and that failure to take account of it was responsible for our disappointment. Or we can say that A was not present at all, but only D. So the theory remains protected.

Coming back to concrete terms, we find that traditional African theories of, say, disease approximate to the second of these patterns rather than to the first, and that this is their ultimate protection. In most traditional cultures, diseases are thought to be caused by the anger of several categories of spirits. Each of these categories is aroused by a different kind of situation. Thus in Kalabari thought heroes, ancestors, water-spirits, and medicine spirits are the main unseen bringers of disease. Heroes

tend to be activated by offences against ' town laws ', ancestors by offences against kinsmen, water-spirits by failure to heed certain tangible signs that they wish to form personal attachments with human partners, medicine-spirits by the machinations of enemies with whom one ' has case '. Hence there is a fairly clear correlation between the kind of activating situation and the kind of spirit brought into play. But although there are the beginnings of a second correlation, between the kind of spirit brought into play and the kind of misfortune inflicted, this has not gone very far. By and large, if a diviner attributes a disease to a certain spirit aroused by certain antecedent circumstances, and if the remedy based on this attribution fails, another diviner can always say that the first attribution was a mistake, and that it was really another spirit, aroused by another set of circumstances, who caused the trouble. Studies like those of Evans-Pritchard on the Zande,[1] Nadel on the Nupe,[2] and Forde on the Yakö[3] suggest that this particular defensive pattern, based on converging causal sequences, is very widespread.

But a theory which postulates converging causal sequences, though self-protective to a high degree, faces serious problems in its application to everyday life. For the man who visits a diviner with misfortune E does not want to be told that it could be due to any one of four different kinds of spirits, activated by circumstances A, B, C, or D. He wants a definite verdict and a definite remedial prescription.

Now given the nature of the theoretical model the diviner operates with, any amount of minute inspection and definition of E will not allow him to give a definite verdict as between A, B, C, or D. Sometimes, he can and does find out from the client whether A, B, C, or D have occurred in his life-history. But the client may well have forgotten the crucial activating circumstance. Indeed, as it is often a guilt-provoking circumstance, he is likely to have forgotten it. Or, the client may remember that happenings answering to both A, B, and C have occurred at various times in his life; and the diviner is still left with the problem of which of these happenings and which category of spirit is actually responsible for the present occurrence of E.

We have, then, an apparently insoluble conflict. For the diviner to give a causal verdict which transcends the limited vision of common sense, he must operate with a theory. But for the theory to survive, it must be of the converging-sequence type which makes the giving of a definite causal verdict very difficult.

As I see it, the essence of divination is that it is a mechanism for resolving this conflict. Faced with a theory postulating several possible causes for a given event, and no means of inferring the actual cause from observable evidence, divination goes, as it were, ' over the head of ' such evidence. It elicits a direct sign from the realm of those unobservable entities that govern the causal linkages it deals with—a sign that enables it to say which of the several sequences indicated by the theory is the one actually involved.

Just how it elicits this sign seems immaterial. Indeed, there is a fantastic variety of divination procedures on the African continent. The diviner may enter into a privileged contact with the realm of unobservable entities postulated by his theory, ' seeing ' and ' hearing ' them in a manner beyond the powers of his client. The diviner may force his client to choose from a collection of twigs, each representing one of the various spirits and causal linkages potentially involved in the situation.

[1] 1936, *passim*. [2] Nadel, 1956, esp. chap. vi. [3] Forde, 1958.

He may set spiders to chew leaves, and give his verdict on the basis of a series of correlations between patterns of chewing and kinds of causal sequence. He may cause a dead body to be carried by several men, suggest to the body the various possible causes of its death, and obtain from its consequent movements a reply as to which is the cause actually involved. He may administer poison to a series of fowls, put one of the several potential sequences as a question to each fowl, and infer from the life or death of the animal whether this particular sequence is the one actually involved. One might cite up to a hundred more ingenious procedures.

All of these divination techniques share two basic features. First, as I have said, they are means of selecting one actual causal sequence from several potential sequences. Secondly, they all carry a subtle aura of fallibility which makes it possible to ' explain everything away ' when remedial prescriptions based on them turn out not to work. Thus many divination procedures require an esoteric knowledge or faculty which the client does not share with the operator. Hence the client has no direct check on the operator; and in retrospect there is always the possibility of the latter's dishonesty or sheer incompetence. Again, nearly all of these procedures are thought to be very delicate and easily thrown out of kilter. Among other things, they may be affected by pollution, or by the machinations of those who have a grudge against the client.

So, whereas the positive features of the divining process make it possible to arrive at a definite causal verdict despite a converging-sequence theory, the aura of fallibility provides for the self-protecting action of such a theory by making it possible, in the event of a failure, to switch from one potential sequence to another in such a way as to leave the theory as a whole unimpugned. In the last section, we noted that the context of divination provided some of the clearest illustrations of the defence-mechanism known as ' secondary elaboration '. Now, I think, we can go further: that is, we can say that divination owes its very existence to the exigencies of this mechanism.

Where the ' open ' predicament prevails, anxieties about threats to the established theories decline, and previously blocked thought-paths become clear. We now witness the development of theories that assign distinctive effects to differing causes; and in the face of this development the type of theory that assumes converging sequences tends to disappear. Nowadays, of course, it is more fashionable to talk of covariation than to talk of cause and effect. But the continuous-covariation formula of the type $ds = f.\ dt$, so prominent in modern scientific theory, is in fact an instance of the tendency I am referring to. For, spelled out, the implication of such a formula is that, to an infinite number of values of a cause-variable, there correspond an infinite number of values of an effect-variable.

Where this type of theory comes into the ascendant, the diviner gives place to the diagnostician. The latter, whether he is concerned with bodily upsets or with aeroplane disasters, goes to work in a way which differs in important respects from that of his traditional counterpart. Dealing as he does with theories that postulate non-converging causal sequences, he has a task altogether more prosaic than that of the diviner. For, given non-convergence, a complete and accurate observation of effect, plus knowledge of the relevant theory, makes it possible for him to give an unambiguous causal verdict. Once these conditions have been fulfilled, there is no need for the additional operations of the diviner. No need for special mechanisms to elicit signs

from the realm of unobservable entities. No need for a way of going ' over the head of ' observable evidence in order to find out which of several potential causes is the actual one.

Modern Western diagnosis, it is true, has not lost all of the aura of fallibility that surrounds traditional divining. Incomplete and inaccurate observation of effect may sometimes provide a plausible defence for failures of diagnosis based on outmoded theory. But such a defence is a poor thing compared with that provided by converging-sequence theory and a divining mechanism characterized as inherently delicate and subject to breakdown. In the modern West, of course, the diagnosticians and remedialists are usually not the same as the people who are actively concerned with the developing and testing of theory. (Hence the division between ' pure ' and ' applied ' scientists.) Nevertheless, it is often through reports of failure from these men that the developers and testers get their stimulus for the replacement of an old theory with a new one. Thus in medicine, reports from general practitioners about widespread breakdown of well-tried diagnostic and healing procedures have often provided the stimulus for medical researchers to make drastic revisions in the theory of disease.

Far from being an integral part of any mechanism for defending theory, then, the diagnostician often contributes his share to the circumstances that lead to the abandonment of old ideas and the adoption of new ones.

7. *Absence versus presence of experimental method*

Anyone who has read Part I of this paper should be in little doubt as to how closely adjusted traditional African theoretical systems often are to the prevailing facts of personality, social organization, and ecology. Indeed, although many of the causal connexions they posit turn out to be red herrings when subjected to scientific scrutiny, others turn out to be very real and vital. Thus an important part of traditional religious theory posits and attempts to explain the connexion between disturbed social relationships and disease—a connexion whose reality and importance Western medical scientists are only just beginning to see. Nevertheless, the adjustments of these systems to changing experience are essentially slow, piecemeal, and reluctant. Nothing must happen to arouse public suspicion that basic theoretical models are being challenged. If changes are to take place, they must take place like movements in the game of Grandmother's Footsteps: i.e. when Grandma is not looking, and in such a way that whenever she turns round, she sees somebody standing stock-still and in a position not too obviously different from the one he was in when last she looked. The consequence of all this, if the reader will excuse me for mixing my metaphors, is that traditional idea-systems are usually catching up on experience from a position of ' one jump behind '.

Scientific thought, by contrast, is characteristically ' one jump ahead ' of experience. It is able to be so because of that distinctive feature of the scientist's calling: the Experimental Method. This method is nothing more nor less than the positive extension of the ' open ' attitude to established beliefs and categories which we referred to in Section 5. For the essence of experiment is that the holder of a pet theory does not just wait for events to come along and show whether or not it has a good predictive

performance. He bombards it with artificially produced events in such a way that its merits or defects will show up as immediately and as clearly as possible.

Often, the artificially produced events involved in an experiment are ones that would take a long time to observe if left to occur of their own accord. Thus a medical research worker who has a theory about the destructive effect of a certain chemical upon pneumonia germs does not wait for the next severe English winter to bring its heavy toll of pneumonia victims. He gets a large batch of monkeys (or, in America sometimes, condemned human volunteers), deliberately infects them with pneumonia, gives some the chemical and others an inert substance, and observes the results. In many cases, the artificially produced events are of a kind which would almost certainly never occur were nature left to take her own course; but the experimentalist sets great store by them because they are expressly designed to provide a more unequivocal test of theory than any naturally occurring conditions. Most laboratory experiments in biology, chemistry, and especially physics are of this kind.

We can say, then, that whereas in traditional thought there is continual if reluctant adjustment of theories to new experience, in science men spend much of their time deliberately creating new experience in order to evaluate their theories. Whilst in traditional thought it is mostly experience that determines theory, in the world of the experimental scientist there is a sense in which theory usually determines experience.

8. *The confession of ignorance*

The European anthropologist working in a traditional African community often has the experience of soliciting people's theories on a number of (to him) interesting topics, and of getting the reply ' we don't know anything about that ' with the implication ' we don't really care '. Thus the anthropologist usually comes to Africa with ideas about the wonderful ' creation myths ' to be found there. Very often, however, he finds that the people he has come to live with are not at all curious about the creation of the world; and apart from acknowledging that it was the work of a supreme being, they are apt to say with a shrug of their shoulders ' the old people did not tell us anything about it '. (Often, of course, an equal lack of curiosity on the anthropologist's part leads him to miss an elaborate body of indigenous explanatory theory covering some area of experience his own lack of interest prevented him from enquiring about.)

What the anthropologist almost never finds is a confession of ignorance about the answer to some question which the people themselves consider important. Scarcely ever, for instance, does he come across a common disease or crop failure whose cause and cure people say they just do not know.

Given the basic predicament of the traditional thinker, such an admission would indeed be intolerable. For where there are no conceivable alternatives to the established theoretical system, any hint that this system is failing to cope must be a hint of irreparable chaos, and so must rouse extreme anxiety.

In the case of the scientist, his readiness to test every theory to destruction makes it inevitable that he will have to confess ignorance whenever a theory crumbles under testing and he has no better one immediately available. Indeed, it is only in a culture where the scientific attitude is firmly institutionalized that one can hope to hear the answer ' we don't know ' given by an expert questioned on the causes of such a

terrible human scourge as cancer. Such willingness to confess ignorance means that the world-view provided by scientists for wider consumption is apt to seem far less comprehensive and embracing than many of the world-views of pre-scientific cultures. In fact, it tends to give the impression of a great expanse of darkness illuminated only at irregular intervals. This impression, of course, is tolerable to scientists precisely because the beliefs they hold at a given time are not things of absolute value to which they can imagine no possible alternatives. If current beliefs let in the dark, this does not rule out the possibility of other beliefs which may eventually shut it out.

9. *Coincidence, chance, probability*

Closely related to the development of a capacity to tolerate ignorance is the development of concepts which formally recognize the existence of various kinds of limitation upon the possible completeness of explanation and prediction. Important among such concepts are those of coincidence, chance, and probability.

Let us start with the idea of coincidence. In the traditional cultures of Africa, such a concept is poorly developed. The tendency is to give any untoward happening a definite cause. When a rotten branch falls off a tree and kills a man walking underneath it, there has to be a definite explanation of the calamity. Perhaps the man quarrelled with a half-brother over some matter of inheritance, and the latter worked the fall of the branch through a sorcerer. Or perhaps he misappropriated lineage property, and the lineage ancestors brought the branch down on his head. The idea that the whole thing could have come about through the accidental convergence of two independent chains of events is inconceivable because it is psychologically intolerable. To entertain it would be to admit that the episode was inexplicable and unpredictable: a glaring confession of ignorance.

It is characteristic of the scientist that he is willing to face up to the inexplicability and unpredictability of this type of situation, and that he does not shrink from diagnosing an accidental convergence of different chains of events. This is a consequence of his ability to tolerate ignorance.

As with the idea of coincidence, so with that of probability. Where traditional thought is apt to demand definite forecasts of whether something will or will not happen, the scientist is often content to know the probability of its happening—that is, the number of times it will happen in a hypothetical series of, say, a hundred trials.

When it was first developed, the probability forecast was seen as a makeshift tool for use in situations where one's knowledge of the factors operating was incomplete, and where it was assumed that possession of all the relevant data would have made a definite forecast possible. This is still an important context of probability forecasting, and will continue to be so. An example of its use is in prediction of incidence of the mental disease schizophrenia. Psychiatrists have now come to believe that heredity plays a large part in causing the disease; and given a knowledge of the distribution of previous cases in a person's family history, they are able to calculate the probability of his contracting it. Their forecasts only run to probabilities, because they are not yet sure that they know all the other factors which reinforce or inhibit the effect of heredity, and also because they are seldom in a position to observe all those factors they do know to be relevant. Nevertheless, the assumption remains that if all the

relevant factors could be known and observed, the probability forecasts could be replaced by unequivocal predictions.

In the twentieth century, a yet more drastic step has been taken in acknowledging the limits of explanation and prediction. For physicists now admit that the entities they postulate as the ultimate constituents of all matter—the so-called Elementary Particles—have properties such that, even given all obtainable data about their condition at any instant, it is still impossible to give more than a probability forecast of their condition at any instant in the future. Here, the probability forecast is no longer a makeshift for an unequivocal prediction: it is ultimate and irreducible.

From one angle, then, the development of the scientific outlook appears more than anything else as a growth of intellectual humility. Where the prescientific thinker is unable to confess ignorance on any question of vital practical import, the good scientist is always ready to do so. Again, where the prescientific thinker is reluctant to acknowledge any limitation on his power to explain and predict, the scientist not only faces such limitations with equanimity, but devotes a good deal of energy to exploring and charting their extent.

This humility, I suggest, is the product of an underlying confidence—the confidence which comes from seeing that one's currently held beliefs are not the be-all and end-all of the human search for order. Once one has seen this, the difficulty of facing up to their limitations largely dissolves.[1]

10. *Protective versus destructive attitude to the category-system*

If someone is asked to list typical features of traditional thinking, he is almost certain to mention the phenomenon known as ' taboo '. ' Taboo ' is the anthropological jargon for a reaction of horror and aversion to certain actions or happenings which are seen as monstrous and polluting. It is characteristic of the taboo reaction that people are unable to justify it in terms of ulterior reasons: tabooed events are simply bad in themselves. People take every possible step to prevent tabooed events from happening, and to isolate or expel them when they do occur.

Taboo has long been a mystery to anthropologists. Of the many explanations proposed, few have fitted more than a small selection of the instances observed. It is only recently that an anthropologist has placed the phenomenon in a more satisfactory perspective by the observation that in nearly every case of taboo reaction, the events and actions involved are ones which seriously defy the established lines of classification in the culture where they occur.[2]

Perhaps the most important occasion of taboo reaction in traditional African cultures is the commission of incest. Incest is one of the most flagrant defiances of the established category-system: for he who commits it treats a mother, daughter, or sister like a wife. Another common occasion for taboo reaction is the birth of twins. Here, the category distinction involved is that of human beings versus animals—multiple births being taken as characteristic of animals as opposed to men. Yet

[1] Some similar comments on the themes of ignorance and uncertainty in relation to the scientific outlook are made by R. G. Armstrong in a brief but trenchant critique of ' The Notion of Magic ' by M. and R. Wax (1963).

[2] This observation may well prove to be a milestone in our understanding of traditional thought. It was first made some years ago by Mary Douglas, who has developed many of its implications in her recent book *Purity and Danger*. Though we clearly disagree on certain wider implications, the present discussion is deeply indebted to her insights.

another very generally tabooed object is the human corpse, which occupies, as it were, a classificatory no-man's land between the living and the inanimate. Equally widely tabooed are such human bodily excreta as faeces and menstrual blood, which occupy the same no-man's-land between the living and the inanimate.

Taboo reactions are often given to occurrences that are radically strange or new; for these too (almost by definition) fail to fit in to the established category system. A good example is furnished by a Kalabari story of the coming of the Europeans. The first white man, it is said, was seen by a fisherman who had gone down to the mouth of the estuary in his canoe. Panic-stricken, he raced home and told his people what he had seen: whereupon he and the rest of the town set out to purify themselves —that is, to rid themselves of the influence of the strange and monstrous thing that had intruded into their world.

A sort of global taboo reaction is often evoked by foreign lands. As the domains of so much that is strange and unassimilable to one's own categories, such lands are the abode *par excellence* of the monstrous and the abominable. The most vivid description we have of this attitude is that given for the Lugbara by John Middleton.[1] For this East African people, the foreigner is the inverted perpetrator of all imaginable abominations from incest downwards. The more alien he is, the more abominable. Though the Lugbara attitude is extreme, many traditional African cultures would seem to echo it in some degree.[2]

Just as the central tenets of the traditional theoretical system are defended against adverse experience by an elaborate array of excuses for predictive failure, so too the main classificatory distinctions of the system are defended by taboo avoidance reactions against any event that defies them. Since every system of belief implies a system of categories, and vice versa, secondary elaboration and taboo reaction are really opposite sides of the same coin.

From all this it follows that, like secondary elaboration, taboo reaction has no place among the reflexes of the scientist. For him, whatever defies or fails to fit in to the established category-system is not something horrifying, to be isolated or expelled. On the contrary, it is an intriguing ' phenomenon '—a starting point and a challenge for the invention of new classifications and new theories. It is something every young research worker would like to have crop up in his field of observation—perhaps the first rung on the ladder of fame. If a biologist ever came across a child born with the head of a goat, he would be hard put to it to make his compassion cover his elation. And as for social anthropologists, one may guess that their secret dreams are of finding a whole community of men who sleep for preference with their mothers!

11. *The passage of time: bad or good?*

In traditional Africa, methods of time-reckoning vary greatly from culture to culture. Within each culture, again, we find a plurality of time-scales used in different contexts. Thus there may be a major scale which locates events either before, during, or after the time of founding of the major institutions of the community: another scale which locates events by correlating them with the life-times of deceased

[1] Middleton, 1960.

[2] This association of foreign lands with chaos and pollution seems to be a universal of prescientific thought-systems. For this, see Eliade, 1961, esp. chap. 1.

ancestors: yet another which locates events by correlating them with the phases of the seasonal cycle: and yet another which uses phases of the daily cycle.

Although these scales are seldom interrelated in any systematic way, they all serve to order events in before-after series. Further, they have the very general characteristic that *vis-à-vis* ' after ', ' before ' is usually valued positively, sometimes neutrally, and never negatively. Whatever the particular scale involved, then, the passage of time is seen as something deleterious or at best neutral.

Perhaps the most widespread, everyday instance of this attitude is the standard justification of so much thought and action: ' That is what the old-time people told us.' (It is usually this standard justification which is in the forefront of the anthropologist's mind when he applies the label ' traditional culture '.)

On the major time-scale of the typical traditional culture, things are thought of as having been better in the golden age of the founding heroes than they are today. On an important minor time-scale, the annual one, the end of the year is a time when everything in the cosmos is run-down and sluggish, overcome by an accumulation of defilement and pollution.

A corollary of this attitude to time is a rich development of activities designed to negate its passage by a ' return to the beginning '. Such activities characteristically depend on the magical premiss that a symbolic statement of some archetypal event can in a sense recreate that event and temporarily obliterate the passage of time which has elapsed since its original occurrence.[1]

These rites of recreation are to be seen at their most luxuriant in the ancient cultures of the Western Sudan—notably in those of the Bambara and Dogon. In such cultures, indeed, a great part of everyday activity is said to have the ulterior significance of recreating archetypal events and acts. Thus the Dogon labouring in the fields recreates in his pattern of cultivation the emergence of the world from the cosmic egg. The builder of a homestead lays it out in a pattern that symbolically recreates the body of the culture-hero Nommo. Even relations between kin symbolize and recreate relations between the primal beings.[2]

One might well describe the Western Sudanic cultures as obsessed with the annulment of time to a degree unparalleled in Africa as a whole. Yet other, less spectacular, manifestations of the attempt to ' get back to the beginning ' are widely distributed over the continent. In the West African forest belt, for instance, the richly developed ritual dramas enacted in honour of departed heroes and ancestors have a strong recreative aspect. For by inducing these beings to possess specially selected media and thus, during festivals, to return temporarily to the company of men, such rituals are restoring things as they were in olden times.[3]

On the minor time-scale provided by the seasonal cycle, we find a similar widespread concern for recreation and renewal. Hence the important rites which mark the end of an old year and the beginning of a new one—rites which attempt to make

[1] In these rites of recreation, traditional African thought shows its striking affinities with prescientific thought in many other parts of the world. The world-wide occurrence and meaning of such rites was first dealt with by Mircea Eliade in his *Myth of the Eternal Return*. A more recent treatment, from which the present analysis has profited greatly, is to be found in the chapter entitled ' Le Temps Retrouvé ' Lévi-Strauss, 1962.

[2] See Griaule and Dieterlen, 1954, and Griaule, 1965.

[3] For some interesting remarks on this aspect of West African ritual dramas, see Tardits, 1962.

the year new by a thoroughgoing process of purification of accumulated pollutions and defilements.

This widespread attempt to annul the passage of time seems closely linked to features of traditional thought which I have already reviewed. As I pointed out earlier, the new and the strange, in so far as they fail to fit into the established system of classification and theory, are intimations of chaos to be avoided as far as possible. Advancing time, with its inevitable element of non-repetitive change, is the vehicle *par excellence* of the new and the strange. Hence its effects must be annulled at all costs. Rites of renewal and recreation, then, have much in common with the processes of secondary elaboration and taboo behaviour. Indeed, their kinship with the latter can be seen in the idea that the passage of the year is essentially an accumulation of pollutions, which it is the function of the renewal rites to remove. In short, these rites are the third great defensive reflex of traditional thought.[1]

When we turn from the traditional thinker to the scientist, we find this whole valuation of temporal process turned upside down. Not for the scientist the idea of a golden age at the beginning of time—an age from which things have been steadily falling away. For him, the past is a bad old past, and the best things lie ahead. The passage of time brings inexorable progress. As C. P. Snow has put it aptly, all scientists have ' the future in their bones '.[2] Where the traditional thinker is busily trying to annul the passage of time, the scientist may almost be said to be trying frantically to hurry time up. For in his impassioned pursuit of the experimental method, he is striving after the creation of new situations which nature, if left to herself, would bring about slowly if ever at all.

Once again, the scientist's attitude can be understood in terms of the ' open ' predicament. For him, currently held ideas on a given subject are one possibility amongst many. Hence occurrences which threaten them are not the total, horrific threat that they would be for the traditional thinker. Hence time's burden of things new and strange does not hold the terrors that it holds for the traditionalist. Furthermore, the scientist's experience of the way in which successive theories, overthrown after exposure to adverse data, are replaced by ideas of ever greater predictive and explanatory power, leads almost inevitably to a very positive evaluation of time. Finally, we must remember that the ' open ' predicament, though it has made people able to tolerate threats to their beliefs, has not been able to supply them with anything comparable to the cosiness of the traditional thinker ensconced amidst his established theories. As an English medical student, newly exposed to the scientific attitude, put it:

> You seem to be as if when learning to skate, trying to find a nice hard piece of ice which you can stand upright on instead of learning how to move on it. You continue trying to find something, some foundation piece which will not move, whereas everything will move and you've got to learn to skate on it.[3]

The person who enjoys the moving world of the sciences, then, enjoys the exhilaration of the skater. But for many, this is a nervous, insecure sensation, which they

[1] Lévi-Strauss, I think, is making much the same point about rites of renewal when he talks of the continuous battle between prescientific classificatory systems and the non-repetitive changes involved in the passage of time. See Lévi-Strauss, 1962.

[2] Snow, 1959, p. 10.

[3] Johnson Abercrombie, 1960; quoted on p. 131.

would fain exchange for the womb-like warmth of the traditional theories and their defences. This lingering sense of insecurity gives a powerful attraction to the idea of progress. For by enabling people to cling to some hoped-for future state of perfect knowledge, it helps them live with a realization of the imperfection and transience of present theories.

Once formed, indeed, the idea of Progress becomes in itself one of the most powerful supports of the scientific attitude generally. For the faith that, come what may, new experience must lead to better theories, and that better theories must eventually give place to still better ones, provides the strongest possible incentive for a constant readiness to expose oneself to the strange and the disturbing, to scrap current frameworks of ideas, and to cast about for replacements.

Like the quest for purity of motive, however, the faith in progress is a double-edged weapon. For the lingering insecurity which is one of the roots of this faith leads all too often to an excessive fixation of hopes and desires on an imagined Utopian future. People cling to such a future in the same way that men in pre-scientific cultures cling to the past. And in doing so, they inevitably lose much of the traditionalist's ability to enjoy and glorify the moment he lives in. Even within the sciences, an excessive faith in progress can be dangerous. In sociology, for instance, it has led to a number of unfruitful theories of social evolution.

At this point, I should like to draw attention to a paradox inherent in the presentation of my subject. As a scientist, it is perhaps inevitable that I should at certain points give the impression that traditional African thought is a poor, shackled thing when compared with the thought of the sciences. Yet as a man, here I am living by choice in a still-heavily-traditional Africa rather than in the scientifically oriented Western subculture I was brought up in. Why? Well, there may be lots of queer, sinister, unacknowledged reasons. But one certain reason is the discovery of things lost at home. An intensely poetic quality in everyday life and thought, and a vivid enjoyment of the passing moment—both driven out of sophisticated Western life by the quest for purity of motive and the faith in progress. How necessary these are for the advance of science; but what a disaster they are when they run wild beyond their appropriate bounds! Though I largely disagree with the way in which the 'Négritude' theorists have characterized the differences between traditional African and modern Western thought, when it gets to this point I see very clearly what they are after.

So much, then, for the salient differences between traditional and scientific thought. There is nothing particularly original about the terms in which I have described the contrast between the two. Indeed, all of my eleven points of difference are to be found mentioned somewhere or other in previous anthropological literature. This literature, however, leaves much to be desired when it comes to interpretation. Thus one author deals with secondary elaboration, another with magic, another with taboo, and so on. A particular explanation covers a particular trait of traditional thought, but seems to have very little relevance to the others. Most social anthropologists would acknowledge that the eleven characteristic traits of traditional thought listed in this essay tend to occur together and vanish together; but so far they have offered no over-all interpretation that does justice to this concomitance.

In so far as my paper makes a fresh contribution, I think this lies precisely in its

provision of just such an over-all interpretation. For the concept of the ' closed ' predicament not only provides a key to the understanding of each one of the eleven salient traits of traditional thought, it also helps us to see why these eleven traits flourish and perish as a set. Where formerly we saw them as an assemblage of miscellaneous exotica, we can now see them as the components of a well-defined and comprehensible syndrome.

So far, however, the interpretation, though it breaks new ground, remains largely intellectualist. At this stage, it does not allow us to relate ideational differences to broader sociocultural differences. It does not as yet allow us to suggest answers to such questions as ' Why did the scientific attitude emerge spontaneously in Europe but not in Africa? ' or, ' Why, in Europe, did it emerge at particular times and places? ' None the less, I think it does give a valuable clue as to the sort of circumstances we should be looking for: i.e. circumstances tending to promote awareness of alternatives to established theoretical models. Three relevant factors of this kind suggest themselves at once:

(i) *Development of written transmission of beliefs*[1]

Earlier on in this essay, I talked of the paradox of idea-systems whose users see them as static, but which are in fact constantly, albeit slowly, changing. This paradox, as I said, seems to imply something like a game of Grandmother's Footsteps, with Grandson moving a little at a time when Grandma's back is turned, but always taking care to be still when Grandma rounds on him.

Now it is, above all, the oral transmission of beliefs which makes this intellectual Grandmother's Footsteps possible. For in each generation, small innovations, together with the processes of selective recall, make for considerable adjustments of belief to current situation. But where they cannot refer back to the ideas of a former generation ' frozen ' in writing, both those responsible for the adjustments and those who accept them remain virtually unaware that innovation has taken place. In a similar manner, a small and seemingly marginal innovation in belief can occur without anyone realizing that it is part of a cumulative trend which, over several generations, will amount to a very striking change.

In these circumstances, everything tends to give the main tenets of theory an absolute and timeless validity. In so doing, it prevents the development of any awareness of alternatives. Oral transmission, then, is clearly one of the basic supports of the ' closed ' predicament.

Where literacy begins to spread widely through a community, the situation changes radically. The beliefs of a particular period become ' frozen ' in writing. Meanwhile, oral transmission of beliefs goes on, and with it the continuous small adjustments to changing circumstances typical of preliterate society. As time passes these adjustments produce an idea-system markedly different from that originally set down in writing. Now in an entirely oral culture, as we have seen, no one has the means of becoming aware of this change. But in a literate culture, the possibility of checking

[1] The discussion that follows leans heavily upon Goody and Watt, 1963. Goody and Watt are, I believe, among the first to have spelled out the probable importance of the transition from oral to written transmission of beliefs for the take-off from tradition into science. I have drawn heavily here upon their characterization of the contrasting predicaments of thinkers in oral and literate cultures; though my argument diverges somewhat from theirs in its later stages.

current beliefs against the ' frozen ' ideas of an earlier era throws the fact of change into sharp relief.

In these circumstances, the main tenets of theory can no longer be seen as having an absolute and timeless validity. In the consciousness that one's own people believed other things at other times, we have the germ of a sense of alternatives. The stage is set for the emergence of the ' open ' predicament.

Not only does attention to the question of literacy help us to understand why the ' open ' predicament developed in Europe but not in Africa. It also helps us to understand why, in Europe, this predicament developed just when and where it did. Thus in their sketch of the history of writing,[1] Goody and Watt point out that pictographic writing developed in the Middle and Far East from the end of the fourth millennium B.C. But the various pictographic systems were so unwieldy and their assimilation so time-consuming that they tended to be the exclusive possessions of specially trained, conservative ruling *élites*. The interests of such *élites* in preserving the *status quo* would naturally counteract the ' opening ' tendencies of written transmission. It was in sixth-century-B.C. Greece that a convenient, easily learnable phonetic alphabet became in some communities a majority possession; and it was in this same sixth-century Greece that the ' open ' predicament made its first notable appearance. The subsequent fortunes of literacy in the Mediterranean world seem to correspond rather well with the subsequent fortunes of the ' open ' predicament. Thus what we term the ' Dark Ages ' was at once a period which saw the restriction of literacy to small, conservative ruling *élites*, and at the same time a period in which the ' closed ' predicament reasserted itself in full force. And in the reawakening of the twelfth–seventeenth centuries, a great expansion and democratization of literacy was the precursor of the final, enduring reappearance of the open predicament and the scientific outlook. Notable during the early part of this period was the rediscovery, via Arab sources, of the ' lost ' writings of the great Greek philosopher-scientists. Since in early Medieval times current theoretical tenets were taught very much in the ' this is what the ancients handed down to us ' spirit of the closed society, the sudden forced confrontation with the very different reality of what these ancestral heroes actually did believe must have had an effect which powerfully supplemented that due to the growth of literacy generally.

(ii) *Development of culturally heterogeneous communities*

There is one obvious, almost platitudinous answer to the question: what gives members of a community an awareness of alternative possibilities of interpreting their world? The answer, of course, is: meeting other people who do in fact interpret the world differently. But there are meetings and meetings; and it is clear that whilst some make very little difference to the outlooks of those involved, others are crucial for the rise of the ' open ' predicament.

Now neither traditional Africa nor early Europe lacked encounters between bearers of radically different cultures. So our aim must be to show why, in Africa, such encounters did little to promote the ' open ' predicament, when in Europe they did so much.

[1] Ibid., pp. 311–19.

My own very tentative answer goes something like this. Traditional African communities were as a rule fairly homogeneous as regards their internal culture, and their relations with culturally alien neighbours tended to be restricted to the context of trade. Now such restricted relations did not make for mutual encounter of a very searching kind. In extreme cases, indeed, they were carried on without actual face-to-face contact: take for instance, the notorious ' silent trade ' between North African merchants and certain peoples of the Western Sudan—an exercise in which the partners neither met nor spoke. Much trade between bearers of radically different cultures was, of course, carried out under conditions far less extreme than these; and it was even common for members of a given community to speak the languages of the culturally alien peoples they traded with. Yet culturally contrasted trading partners remained basically rooted in different communities, from which they set out before trade, and to which they returned after it. Under these limitations, confrontation with alien world-views remained very partial. The trader encountered the thought of his alien partners at the level of common sense but not usually at the level of theory. Since common-sense worlds, in general, differ very little in comparison with theoretical worlds, such encounters did not suffice to stimulate a strong sense of alternatives.[1]

Even where the member of a traditional community did make contact with his alien neighbours at the level of theory, the content of theory was such that it still presented an obstacle to the development of a real sense of alternatives. As I pointed out in Part I of this paper, the bulk of traditional theory was concerned with its users' own particular community. There was an implicit premiss that the world worked one way within one's own community, and another way outside it. Hence if one's neighbours believed some very strange and different things, this was in no way surprising or disturbing in terms of one's own beliefs. In such circumstances, radically contrasting belief-systems could seldom be seen as genuine alternatives.

When we turn from Africa to Europe, it is important to note just when and where the ' open ' predicament came to prevail. Its first home, historians seem to agree, was in certain parts of sixth-century-B.C. Greece. Not in such centrally placed, culturally homogeneous states as Sparta, whose self-contained agricultural society remained rigidly ' closed '; but in the small, cosmopolitan trading communities on the frontiers of the Greek world—old established Ionian cities like Miletus and Ephesus, and more recently established colonies like Abdera and Syracuse.[2]

After declining in this area the fortunes of the ' open ' predicament flourished for several centuries in Alexandria. Later, they waxed briefly in the cities of the Arab

[1] This point, I think, is relevant to an argument advanced against my analysis of magic. (John Beattie, personal communication.) The argument is that once a person learns another language, he becomes aware of alternative possibilities of dividing up the world by words and, on my premisses, must inevitably adopt a non-magical outlook.

In rebuttal, I would say that where a person learns another people's language and thought only at the common-sense level, he is not exposed to a radically different way of dividing up the world by words. Indeed, he is liable to see most of the common-sense words and concepts of the alien language as having equivalents in his own. They are ' the same words ' and ' the same thoughts '. It is only when he learns the alien language and thought at the theoretical level that he becomes aware of a radically different way of dividing the world.

[2] For a brilliant sketch of the beginnings of the ' open ' predicament in the Greek city-states, see Popper, 1945. Although, as I said earlier, Popper's definition of ' closed ' and ' open ' differs somewhat from my own, much of what he says is relevant to my argument and has indeed provided inspiration for it.

world. Thence, in late Medieval times, the current passed to the cities of the Iberian Peninsula and coastal Italy. Finally, it passed to the cities of north-western Europe.

What was it about the communities that lay along this devious path that made them such excellent centres for the development of the ' open ' predicament? First and foremost, perhaps, it was the conditions of contact between the bearers of different cultures. Whereas in Africa intercultural boundaries tended to coincide with inter-community boundaries, in these Mediterranean and European cities they cut right through the middle of the community. In these centres, people of diverse origins and cultures were packed together within single urban communities. And although the ' sons of the soil ' were frequently the only people who had full citizenship rights, most of the inhabitants had feelings of common community membership and common interests *vis-à-vis* such outsiders as territorial rulers, the lords of the local countryside, other cities, and so on.

Under these conditions, relations between bearers of different cultures were much broader in scope than the purely commercial relations which typically linked such people over much of traditional Africa. And a broader context of social relationship made for a deeper and more searching intellectual encounter. Here, the encounter was not merely at the level of common sense where differences were negligible. It was also at the level of basic theory where differences were striking. Much of the ' open ' temper of late and Medieval and Renaissance times, for instance, can probably be traced to the confrontation of the basic tenets of the Christian, Islamic, and Jewish thought-traditions in the twelfth-century cities of Spain and coastal Italy.[1]

Another factor making for more searching encounter was the actual content of the theories involved. The various traditions of thought making up the intellectual inheritance of these Mediterranean and European cities were the products of peoples who had long been living in communities far more integrally linked to the wider world than was usual in traditional Africa. As such, they were more universalistic in their content. So here, when a confrontation took place, it was no longer possible to rest content with saying: ' My theory works for my little world, and his works for his.' My theory and his theory were now patently about the same world, and awareness of them as alternatives became inescapable.

(iii) *Development of the trade-travel-exploration complex*

So much for encounter between bearers of different cultures within a single community. A second important kind of encounter arises from voyages of travel and exploration in which members of one community go to live temporarily amongst members of a culturally alien community, with the express aim of intellectual and emotional contact at all levels from the most superficial to the deepest.

Now although individual members of many traditional African cultures must have made such voyages from time to time, these, so far as we know, have never become a dominant theme of life in any of the traditional cultures. But in sixth–third-century-B.C. Greece, in the medieval Arab world, and finally in fifteenth–seventeenth-century western Europe—all crucial centres for the development of the ' open ' predicament—these voyages were such important features of social life that they coloured everyone's outlook on the world.

[1] For the importance of the confrontation between these three thought-traditions, see Heer, 1962.

The evidence we have from ancient Greece indicates that many of the great independent thinkers such as Thales, Anaximander, Democritus, Herodotus, and Xenophanes probably made extensive exploratory voyages themselves. And in some of their writings, the connexion between first-hand experience of a variety of alien ways of looking at the world and an ' open ' sceptical tenor of thought becomes explicit.[1] Again in fifteenth–eighteenth-century western Europe, exotic world-views personified in figures like the Noble Savage, the Wise Egyptian, and the Chinese Sage haunt the pages of many of the sceptical writings of the times; and here too the link between confrontation with alien world-views and ' open ' thinking is often explicit.[2]

It is, of course, possible to argue that these voyages and these confrontations were a consequence and not a cause of the ' open ' predicament; that ' open-minded ' people embarked on them with the idea of putting parochial views to the deliberate test of wider horizons of experience. This may have been true once the voyages had become a dominant feature of the life of the times. But I believe the beginnings of the eras of exploration can still be best understood in terms of the aims and interests of essentially ' closed-minded ' societies.

One's suspicions on this score are aroused in the first instance by the fact that in both of the great eras of exploration, many of the voyages were encouraged if not directed by the pillars of tradition: in early Greece by the Delphic Oracle, and in western Europe by the Popes.

Again, it is clear that the motive forces behind the voyages included the aim of reducing population pressure by overseas settlement and that of extending commerce to include new items to be found only in faraway lands. The detailed probings of alien world-views can thus be understood as intelligence operations directed toward solving the problems of human coexistence involved in overseas settlement and commerce. There was probably little ' open-mindedness ' in the intentions which originally lay behind them.

Perhaps the most interesting example of the essentially ' closed ' motivations behind activities which were to make a great contribution to the development of the ' open ' predicament is provided by the operations of Christian missionaries in the fifteenth–eighteenth centuries. The fanaticism with which the missionaries worked to convert distant peoples of alien faith can, I think, be understood as a product of the ' closed ' society's determination to protect itself from the possibility of being disturbed by confrontation with alien world-views—a possibility which loomed large in this era of exploration. But the more intelligent missionaries saw that effective evangelization required a prior understanding of the faiths of those to be converted; and they set themselves, however reluctantly, to acquire such an understanding. The result was a body of records of alien world-views that came to colour much of the thought of the times, and that was undoubtedly one of the important contributions to the genesis of the open thinking of the seventeenth century.

[1] Take, for instance, the following passage from Xenophanes, quoted in Toulmin, 1961:

' Mortals consider that the gods are begotten as they are, and have clothes and voices and figures like theirs. The Ethiopians make their gods black and snub-nosed; the Thracians say theirs have blue eyes and red hair. Yes, and if oxen and horses or lions had hands, and could paint with their hands, and produce works of art as men do, horses would paint the gods with shapes like horses, and oxen like oxen, and make their bodies in the image of their several kinds.'

[2] For this see Hazard, 1964. (Especially chap. 4).

The eras of exploration encouraged the growth of the ' open ' predicament in a second way. This was through the rich material fruits of the voyages. In traditional cultures, as we have seen, distant lands tend to epitomize all that is new and strange, all that fails to fit into the established system of categories, all that is tabooed, fearful, and abominable. Hence, whether among the Lugbara of East Africa or among Dark Age Europeans, we find them peopled with abominations and monsters. In the eras of exploration, however, reports came back not of monsters but of delights and riches. Slowly, these pleasant associations of the Great Beyond extended themselves to new and strange experience generally. The quest for such experience came to be seen not as something dangerous and fool-hardy, but as something richly rewarding and pleasantly exciting. This relation between the fruits of exploration and the new attitudes to the strange and category defying is portrayed very clearly in some of the metaphors of these eras. Take, for instance, Joseph Glanvill's notion of 'An America of Secrets and an Unknown Peru of Nature ', waiting to overthrow old scholastic ideas and force men to replace them with something better.[1]

Not only, then, did the events of these eras undermine the feeling that one's established beliefs were the only defence against chaos and the void. They gave a less horrifying, nay benign, face to chaos itself.

In naming these three factors as crucial for the development of the ' open ' predicament, I am not implying that wherever they occur, there is a sort of painless, automatic, and complete transition from ' closed ' to ' open ' thinking. On the contrary, the transition seems inevitably to be painful, violent, and partial.

Even in ancient Greece, the independent thinking of the great pre-socratic philosophers evoked strong and anxious reactions.[2] In late Medieval times, a few decades of confrontation with alien world-views and ' open ' sceptical thinking tended to be succeeded by decades of persecution of those responsible for disturbing established orthodoxy and by a general ' closing-up ' of thought.[3] In present-day Nigeria, we seem to be seeing yet another example of the atrocious birth-pangs of the ' open ' society.

Why should the transition be so painful? Well, a theme of this paper has been the way in which a developing awareness of alternative world-views erodes attitudes which attach an absolute validity to the established outlook. But this is a process that works over time—indeed over generations. Throughout the process there are bound to be many people on whom the confrontation has not yet worked its magic. These people still retain the old sense of the absolute validity of their belief-systems, with all the attendant anxieties about threats to them. For these people, the confrontation is still a threat of chaos of the most horrific kind—a threat which demands the most drastic measures. They respond in one of two ways: either by trying to blot out those responsible for the confrontation, often down to the last unborn child; or by trying to convert them to their own beliefs through fanatical missionary activity.

Again, as I said earlier, the moving, shifting thought-world produced by the

[1] Quoted from *The Vanity of Dogmatizing*, in Willey, 1962, p. 168.

[2] See Popper, 1945, for some of these reactions to pre-socratic ' open ' thinking.

[3] See Heer, 1962, for a vivid picture of the way in which the Medieval world oscillated crazily between ' open ' and ' closed ' attitudes.

' open ' predicament creates its own sense of insecurity. Many people find this shifting world intolerable. Some adjust to their fears by developing an inordinate faith in progress toward a future in which ' the Truth ' will be finally known. But others long nostalgically for the fixed, unquestionable beliefs of the ' closed ' culture. They call for authoritarian establishment and control of dogma, and for persecution of those who have managed to be at ease in a world of ever-shifting ideas. Clearly, the ' open ' predicament is a precarious, fragile thing.

In modern western Europe and America, it is true, the ' open ' predicament seems to have escaped from this precariousness through public acknowledgement of the practical utility of the sciences. It has achieved a secure foothold in the culture because its results maximize values shared by ' closed-' and ' open-' minded alike. Even here, however, the ' open ' predicament has nothing like a universal sway. On the contrary, it is almost a minority phenomenon. Outside the various academic disciplines in which it has been institutionalized, its hold is pitifully less than those who describe Western culture as ' science-oriented ' often like to think.

It is true that in modern Western culture, the theoretical models propounded by the professional scientists do, to some extent, become the intellectual furnishings of a very large sector of the population. The moderately educated layman typically shares with the scientist a general predilection for impersonal ' it-' theory and a proper contempt for ' thou-' theory. Garbled and watered-down though it may be, the atomic theory of matter is one of his standard possessions. But the layman's ground for accepting the models propounded by the scientist is often no different from the young African villager's ground for accepting the models propounded by one of his elders. In both cases the propounders are deferred to as the accredited agents of tradition. As for the rules which guide scientists themselves in the acceptance or rejection of models, these seldom become part of the intellectual equipment of members of the wider population. For all the apparent up-to-dateness of the content of his world-view, the modern Western layman is rarely more ' open ' or scientific in his outlook than is the traditional African villager.

This takes me back to a general point about the layout of this paper. If I spent the whole of Part I labouring the thesis that differences in the content of theories do more to hide continuities than reveal genuine contrasts, this was not, as some readers may have imagined, through a determination to ignore the contrasts. Rather, it was precisely to warn them away from the trap which the Western layman characteristically falls into—the trap which makes him feel he is keeping up with the scientists when in fact he is no nearer to them than the African peasant.

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Résumé

DE LA TRADITION A LA SCIENCE

2e Partie

APRÈS avoir exposé le problème de la continuité dans la 1ère partie de cet article, l'auteur en arrive maintenant à celui qui concerne les différences. En fonction de l'hypothèse d'Evans-Pritchard, il démontre que la différence essentielle entre une culture traditionnelle et une culture qui repose sur la Science se trouve confrontée avec plusieurs possibilités théoriques.

Dans les cultures traditionnelles, les choix sont très limités. Le système de croyances établi est absolu et l'unique choix possible réside entre l'ordre établi et le chaos. Dans une culture qui repose sur la Science, les options sont plus étendues. Le choix ne réside plus entre l'adoption et le chaos. L'auteur, ensuite, énumère sept oppositions importantes de l'ordre établi entre la pensée traditionnelle et la pensée scientifique, et expose comment elles se rattachent toutes à la différence de base mentionnée plus haut.

Enfin, on peut supposer qu'il y ait, en arrière-plan, trois facteurs étroitement associés à l'évolution de la tradition vers la Science. Le premier est la mutation de base qui fait passer la transmission des croyances de la voie orale à la voie de l'écriture. Le second, le développement de l'hétérogénéité culturelle à l'intérieur de la communauté. Le troisième, le développement de ce que l'on pourrait appeler le complexe de la ' découverte par le voyage et le commerce '. L'importance de ces trois facteurs et leur influence va à l'encontre du choix entre les deux alternatives traditionnelles.

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