

Three Worlds

KARL POPPER

THE TANNER LECTURE ON HUMAN VALUES

Delivered at
The University of Michigan

April 7, 1978

KARL RAIMUND POPPER was born in Vienna in 1902. He studied at the University of Vienna, where he received his Ph.D. in 1928. He lectured in Canterbury, New Zealand, from 1937 to 1945 and in the London School of Economics (University of London) from 1946 to 1969. Sir Karl is a Fellow of the Royal Society and of the British Academy and a member of several national and international academies.

I

In this lecture I intend to challenge those who uphold a monist or even a dualist view of the universe; and I will propose, instead, a pluralist view. I will propose a view of the universe that recognizes at least three different but interacting sub-universes.¹

There is, first, the world that consists of physical bodies: of stones and of stars; of plants and of animals; but also of radiation, and of other forms of physical energy. I will call this physical world 'world 1'.

If we so wish, we can subdivide the physical world 1 into the world of non-living physical objects and into the *world of living things*, of *biological* objects; though the distinction is not sharp.

There is, secondly, the mental or psychological world, the world of our feelings of pain and of pleasure, of our thoughts, of our decisions, of our perceptions and our observations; in other words, the world of mental or psychological states or processes, or of subjective experiences. I will call it 'world 2'. World 2 is immensely important, especially from a human point of view or from a moral point of view. Human suffering belongs to world 2; and human suffering, especially avoidable suffering, is the central moral problem for all those who can help.

World 2 could be subdivided in various ways. We can distinguish, if we wish, fully conscious experiences from dreams, or from subconscious experiences. Or we can distinguish human consciousness from animal consciousness.

¹ For a fuller discussion of these ideas, see my *Objective Knowledge* (Oxford: Clarendon Press, 1972, 1979); my Autobiography in P. A. Schilpp, ed., *The Philosophy of Karl Popper* (La Salle, Ill.: Open Court, 1974), also published as *Unended Quest* (London and La Salle, Ill.: Fontana/Collins and Open Court, 1976); and my contributions to K. R. Popper and J. C. Eccles, *The Self and Its Brain* (Berlin, Heidelberg, New York, London: Springer International, 1977).

The reality of the mental world 2 —and with it, the reality of human suffering —has been sometimes denied; more recently by certain monistic materialists or physicalists, or by certain radical behaviourists. On the other hand, the reality of the world 2 of subjective experiences is admitted by common sense. It will be part of my argument to defend the reality of world 2.

My main argument will be devoted to the defence of the reality of what I propose to call ‘world 3’. By world 3 I mean the world of the products of the human mind, such as languages; tales and stories and religious myths; scientific conjectures or theories, and mathematical constructions; songs and symphonies; paintings and sculptures. But also aeroplanes and airports and other feats of engineering.

It would be easy to distinguish a number of different worlds within what I call world 3. We could distinguish the world of science from the world of fiction; and the world of music and the world of art from the world of engineering. For simplicity’s sake I shall speak about *one* world 3; that is, the world of the products of the human mind.

Many of the objects belonging to world 3 belong at the same time also to the physical world 1. Michelangelo’s sculpture *The Dying Slave* is both a block of marble, belonging to the world 1 of physical objects, and a creation of Michelangelo’s mind, and as such belonging to world 3. The same holds of course for paintings.

But the situation can be seen most clearly in the case of books. A book, say volume one of my own set of Shakespeare’s *Works*, is a physical object, and as such it belongs to world 1. All the individual books belonging to the same edition are, as we know, physically very similar. But what we call ‘one and the same book’ — say, the Bible — may have been published in various editions which physically are vastly different. Let us assume that all these editions contain the same text; that is, the same sequence of sentences. In so far as they do, they are all editions, or copies, of

one and the same book, of one and the same world 3 object, however dissimilar they may be from a physical point of view. Obviously, this *one* book in the world 3 sense is not *one* book in the physical sense.

Examples of world 3 objects are: the American Constitution; or Shakespeare's *The Tempest*; or his *Hamlet*; or Beethoven's Fifth Symphony; or Newton's theory of gravitation. All these are objects that belong to world 3, in my terminology; in contradistinction to a particular volume, located at a particular place, which is an object in world 1. This volume can be said to be a world 1 embodiment of a world 3 object.

If we discuss the influence of the American Constitution on the life of the American people or its influence on the history of other peoples, then the object of our discussion is a world 3 object; similarly if we compare the often very different performances of *one* dramatic work, say Shakespeare's *Hamlet*.

Of most though not of all world 3 objects it can be said that they are *embodied*, or *physically realized*, in one, or in many, world 1 physical objects. A great painting may exist only as *one* physical object, although there may be some good copies of it. By contrast, *Hamlet* is embodied in all those physical volumes that contain an edition of *Hamlet*; and in a different way, it is also embodied or physically realized in each performance by a theatrical company. Similarly, a symphony may be embodied or physically realized in many different ways. There is the composer's manuscript; there are the printed scores; there are the actual performances; and there are the recordings of these performances, in the physical shape of discs, or of tapes. But there are also the memory engrams in the brains of some musicians: these too are embodiments, and they are particularly important. One can, if one wishes, say that the world 3 objects themselves are *abstract* objects, and that their physical embodiments or realizations are *concrete* objects.

II

Many of my philosophical friends, especially those who are materialists or physicalists, are strongly opposed to all this. They say that my way of talking is seriously misleading. They assert that there is only one world: the world of physical objects. This is the one and only existing or real world; everything else is fictitious. They say that there exist only concrete objects, such as records or tapes or performances, or memory engrams in our brains. Abstract objects they reject: these do not exist. They say that in speaking of world 3 objects, I am guilty of hypostatization; which means, in English, that I make substances or things out of non-existing ghosts, or out of fictions.

III

I regard it as my main task in this talk to make clear what I mean when I speak of a world 3 object, such as a symphony or a scientific conjecture or theory. I therefore wish to explain to you the strong objections to my views about world 3 objects raised by my philosophical friends, the monists as well as the dualists. Let me first explain what a materialist or physicalist monist would say; a monist who insists that there is only *one* world, the world of physical objects; that is, what I call world 1.

It seems that a materialist or a physicalist would say that what I call a world 3 object can be, and ought to be, analysed and reduced to physical objects in a way like the following. He would say that a symphony — let us say Beethoven's Fifth Symphony — does not exist. What does exist are those physical things which I have called its embodiments or its physical realizations: the many performances and discs and tapes and scores of the Fifth Symphony. But, the physicalist would say, the most important embodiments are the engrams, the memory traces in people's brains; not only in the brain of the original composer of the symphony, or in those of the experts who have memorized the whole work,

but also in those of more ordinary people who would merely recognize the one or the other characteristic passage; of those people whose brains are so conditioned as to make them disposed to utter words like: 'I think I remember this: it is the Fifth Symphony, isn't it?' Those who react in this way have, we may assume, some memory traces written into their brains. These memory traces may make them *speak of* the Fifth Symphony. The memory traces or engrams and the speech acts are physical: they *do* exist. But the Fifth Symphony as such just does not exist; although, admittedly, we often use language in such a way that we *speak of* the Fifth Symphony as if it were one of the existing things.

IV

This, in brief, is the position of the materialist monist or physicalist. A dualist, that is, a man who accepts both world 1 and world 2 as real, would accept almost all that the monist says. But he would add that the monist has omitted the main thing: the great *experience* of listening to Beethoven's Fifth Symphony. This experience, the dualist will concede, depends in some way on the sequence of events in our brains: if these brain events are interfered with by a blow on the head, or by an anaesthetic drug, the experience ceases to be. But what motivates a man to travel for miles to go to a concert and to buy a seat he can perhaps ill afford are not the brain events but mainly conscious experiences; and perhaps also unconscious experiences, such as his perhaps unconscious expectation of hearing something wonderful, and exciting.

Thus the dualist will be willing to accept what the monist says about events in the brain and memory engrams in the brain, but he will point out that the monist is grossly mistaken when he insists that this is all there is. In fact, the dualist will point out that the monist has ignored the most important thing: the world 2 of our conscious experiences, without which the world 1 would be a world of lifeless and senseless waste.

There are of course views of the universe other than the two views here described —materialism or physicalist monism on the one hand, and dualism on the other. (There is, more especially, a Berkeleyan monism of experiences.) However, I shall confine my critical discussion to those two views which I have just briefly sketched: to materialism or physicalism, because it is widely held by contemporary philosophers; and to dualism because it is, I think, the view of common sense. I do not pretend that I can refute these two views; but I can challenge them, by offering and defending a pluralist view.

V

What have I as a pluralist to say to the materialist monist and to the dualist? First of all, I am, like the dualist, prepared to agree with much that the materialist monist says; in fact, with everything except his denial of a world 2 of experiences and of a world 3 of abstract objects such as the Fifth Symphony. And similarly, I agree with all that the dualist says, except with his implicit belief that the Fifth Symphony is to be identified with our experiences of hearing it, or of remembering it.

I may perhaps start from the fact — or what seems to me a fact—that there are better and worse performances of Beethoven's Fifth Symphony: better and worse live performances, better and worse records, better and worse tapes.

If this is a fact, and I think it is a fact, then it creates a real difficulty for the materialist monist. Of course, if a bad performance could be simply identified with one that deviates from Beethoven's original score, and a good performance with one that agrees with the score, then there would be no difficulty. However, it is quite possible that one of the best performances has here or there a minor lapse, and that one of the more clumsy performances agrees with the score in every place. Moreover, we could confine

ourselves to comparing performances and other embodiments that are technically without lapses. But *there will still be better and less good performances.*

I do not see how a materialist or even a dualist could explain that there are, objectively, better and worse performances. I think that a materialist or a dualist could only suggest that we call those performances better to which more people, or perhaps more musicians, react approvingly; either by way of 'verbal behaviour' (as the materialist would say) or by way of real enjoyment (as the dualist would insist). In other words, both the materialist monist and the dualist would have to say something like this: 'The performance was very good *because* many people enjoyed it — or at least said that they enjoyed it.' Neither the monist nor the dualist can say: 'It was a marvellous performance; and *therefore* many people enjoyed it, and were deeply moved by it.' Still less could they say: 'It was a marvellous performance, *but* few people appreciated it.' I suggest, however, that this kind of thing can be said, and that it may well be true. A performance so judged is a world 3 object in my terminology — of course, one that is embodied, or physically realized — and it *can* be judged as a world 3 object.

VI

Our discussion of world 3 objects has carried us to the following problem: Is a critical evaluation of a work of art necessarily subjective in the sense that it simply records the subjective world 2 reaction or the appreciation of the persons that were faced with an embodiment of the work? Or can a work of art be great or marvellous as such? It will be clear that the latter view, the objectivist view, is closely linked to the view that there exists a world 3, and that there are world 3 objects.

It may well be the case that world 3 objects and great works of art exist, and that we have, at the same time, nothing like an objective yardstick of their greatness. The only yardstick at our

disposal may indeed be the subjective reaction of certain people to the work of art. But this could be perfectly compatible with the thesis of the objective greatness of a work of art. The people would be used like iron filings in a magnetic field: their reactions would make visible an objective quality of the work of art. This, I suggest, is the true situation; and the reaction of the public is merely an indicator of the quality of the work of art —and certainly not a very reliable indicator.

I do not wish to say very much more about the problems of aesthetics, but I wish to make this particular point quite clear.

I suggest that there is a world 3 of the products of the human mind, and I am trying to show that the objects of world 3 may be in a very clear sense not fictitious but quite real: they may be real in that they may *have a causal effect* upon us, upon our world 2 experiences, and further upon our world 1 brains, and thus upon material bodies. A symphony or another work of art may be an example of such a world 3 object; and a symphony may be a *great* symphony. And to say this may mean that it is *objectively* great; even though we may have no objective yardstick to go by, but only the subjective reaction of certain human beings. Thus we must not conclude from the lack of an objective yardstick either to the subjective character of the work that is being judged, or to the subjective character of its merits.

By contrast, both the materialist monist and the dualist seem to be bound to say that there is nothing objective about a work of art. If the materialist monist or even the dualist is correct —if the universe consists only of concrete physical world 1 objects, or of world 1 objects *and* concrete world 2 experiences, but not of abstract objects such as great books or great theories or great symphonies —then all talk about such objects must be fictitious. Talk about a great symphony, or about a great performance, would have to be interpreted as metaphorical talk. Thus if we say ‘this is a great symphony’ we would not mean that there is a symphony and that it is great, and that this objective fact may

perhaps be ascertained, if we are lucky, by the subjective reaction of certain people. Rather, our talk would mean no more than that people react, in a certain typical way, to certain physical world 1 objects; for example to a musical performance.

It would be exactly as if the statement ‘Here is a strong magnetic field’ would have to be taken as metaphorical; not as talk about an objective physical entity, a magnetic field, but merely as talk about the behaviour of iron filings, if we scatter them in a certain region.

Now this view has indeed been adopted by some eminent philosophers; not only with regard to magnetic fields, but even with regard to observable physical bodies. Thus a physical body has often been interpreted by philosophers not as an objective physical entity but as ‘a permanent possibility of [causing] sensations’ in people.

This is a perfectly respectable philosophical view. I happen to regard it as mistaken, for various reasons.² That is to say, I am a realist regarding the physical world 1. Similarly, I am a realist regarding world 2, the world of experiences. And I am a realist regarding world 3 — the world 3 that consists of abstract objects, such as languages; scientific conjectures or theories; and works of art.

VII

Before proceeding to explain my arguments in favour of this threefold realism — a realism regarding the worlds 1, 2 and 3 — I want to make a final remark on works of art. After that I will turn to the discussion of other world 3 objects, and especially to scientific conjectures or theories.

This final remark on works of art will be very brief. But I wish to make clear that it is on a big subject, a subject worthy of being discussed for hours.

² See, for a discussion of these issues, chapters 3 and 6 of my *Conjectures and Refutations* (London: Routledge & Kegan Paul, 1963, 1976; New York: Basic Books); also available as a Harper Torchbook (New York: Harper and Row, 1968).

By far the most influential, and the most widely accepted theory of art, of music, and of poetry, is the theory that all art is, essentially, *self-expression* : the expression or the revelation of the personality of the artist, and especially the expression of his emotions. I regard this theory as completely mistaken. It is *trivially true* that we express our inner state in everything we do, including of course in art. But we express our inner state also in the way we walk, cough, or blow our nose. Self-expression cannot, therefore, be used to characterize art.

But I do not merely regard the expressionist theory of art as mistaken. I regard it as having a pernicious and a destructive influence upon art. In great art, the artist considers his *work* as important, rather than himself. This healthy attitude is undermined by the theory that art is self-expression.³

VIII

I now come to the discussion of my central problem. Are world 3 objects, such as Newton's or Einstein's theories of gravitation, *real* objects? Or are they mere fictions, as both the materialist monist and the dualist assert? Are these theories themselves unreal, and only their embodiments real, as the materialist monist would say; including, of course, their embodiments in our brains, and in our verbal behaviour? Or are, as the dualist would say, not only these embodiments real, but also our thought experiences; our thoughts, directed towards these fictitious world 3 objects, but not these world 3 objects themselves?

My answer to this problem—and, indeed, the central thesis of my talk—is that world 3 objects are real; real in a sense very much like the sense in which the physicalist would call physical forces, and fields of forces, real, or really existing. However, this realist answer of mine has to be defended, by rational arguments.

There is perhaps a danger here that my central problem, the

³ For a fuller discussion, see sections 13, 14, and 40 of my *Unended Quest*.

reality or existence of world 3 objects, may degenerate into a verbal issue. After all, we can *call* whatever we like 'real' or 'existent.' I think that we can get rid of this danger, by starting from the most primitive idea of reality, and by adopting the physicalist's own method of generalizing this idea, and, ultimately, of replacing it altogether.⁴

I suggest that all of us are most certain of the existence or reality of physical bodies of medium size: of a size such that we can easily handle them, turn them round, and drop them. Such things are 'real' in the most primitive sense of the word. I conjecture that a baby learns to distinguish such things; and I suppose that those things are most convincingly real to the baby that he or she can handle and drop, and can put into his or her mouth. Resistance to touch also seems to be important; and some degree of temporal persistence.

Starting from a primitive idea of real things like this, the physicalist extends the idea by generalizing it. I suggest that the materialist's or physicalist's idea of real physical existence is obtained by including very big things and very small things, and things that do not persist through any length of time; and also by including whatever can causally act upon things, such as magnetic and electrical attraction and repulsion, and fields of forces; and radiation, for example X-rays, because they can causally act upon bodies, say, upon photographic plates.

We are thus led to the following idea: what is real or what exists is whatever may, directly or indirectly, have a *causal effect* upon physical things, and especially upon those primitive physical things that can be easily handled.

Thus we may replace our central problem of whether abstract world 3 objects such as Newton's or Einstein's theories of gravitation have a real existence, by the following problem: can scientific

⁴ See section 4 of my contribution to *The Self and Its Brain*, and also my *Objective Knowledge*. chapter 2.

conjectures or theories exert, in a direct or indirect way, a causal effect upon the physical things of world 1? My reply to this question will be: yes, they can indeed.

IX

My fundamental argument in support of world 3 realism is very simple. We all know that we live in a physical world 1 which has been greatly changed by making use of science; that is to say, by using world 3 *conjectures or theories* as instruments of change. Therefore, scientific conjectures or theories can exert a causal or an instrumental effect upon physical things; far more so than, say, screwdrivers or scissors.⁵

Although I find this simple argument that scientific conjectures or theories can be used to change world 1 decisive, and convincing, I am well aware of the fact that a materialist monist, or even a dualist, will not be ready to accept it. Each of them has a reply to it.

The dualist will say that it is not the conjecture or theory as such —not Einstein's Special Theory of Relativity as such —that has played the role of an instrument, for example, in the making of the atom bomb, but, rather, certain concrete *thought processes* of certain concrete people, such as Einstein himself, and Paul Langevin. Thus the dualist will say that it was Einstein's *thought* that led him, in 1905, to write a paper ⁶ which gave an outline of his Special Theory of Relativity, and that, after the publication of this paper (but in the same year),⁷ Einstein deduced from the

⁵ The fact that conjectures or theories can be used as instruments should not be interpreted to mean that they are nothing but instruments. See the references given in note 2, above.

⁶ Albert Einstein, 'Zur Elektrodynamik bewegter Körper', *Annalen der Physik* 17 (1905): 891–921.

⁷ Albert Einstein, 'Ist die Trägheit eines Körpers von seinem Energieinhalt abhängig?', *Annalen der Physik* 18 (1905): 639–41. I am grateful to Troels Eggers Hansen for a discussion of some points connected with this paper.

Special Theory of Relativity an important result. This result was first written:

$$M' - M = E/c^2$$

It is now usually expressed by the famous formula

$$E=mc^2$$

Now the dualist will insist that it was the *thought processes* of Einstein, and of other physicists — such as Paul Langevin — which led to this formula. And Langevin seems to have been the first to *think* that this formula might help to explain the tremendous output of energy by the sun; and also, that it predicts that tremendous amounts of energy would be released if we could transform some of the mass of an atomic nucleus into radiation. Thus it is, according to the dualist, the world 2 *experiences, the conscious thought processes*, which have played a causal role in bringing about the construction of the atom bomb, rather than any world 3 objects such as the contents of formulae or theories. Apart from the thought processes, certain physical embodiments such as books, written and printed papers, and written formulae, also play a causal role; and of course, certain brain processes. But, a pure dualist will insist, there is no need to bring in any abstract world 3 object as such.

The argument of the materialist monist will be very similar, except that he will eliminate the conscious thought processes, and replace them by the corresponding world 1 brain processes. He will stress, more than the dualist, the various physical embodiments of the theory; and he will assert that these physical embodiments rather than any abstract entity (such as the theory in itself) are the instruments which are used in changing our physical environment; which are used, for example, in the construction of the atom bomb.

X

In replying to the dualist and to the materialist monist, I am now reaching the very core of my argument for the existence of world 3.

I assert that we can, and that indeed we must, distinguish sharply between *knowledge in the subjective sense and knowledge in the objective sense*.

Knowledge in the subjective sense consists of concrete *mental dispositions* especially of expectations; it consists of concrete world 2 thought processes, with their correlated world 1 brain processes. It may be described as our *subjective world of expectations*.

Knowledge in the objective sense consists *not* of *thought processes* but of *thought contents*. It consists of the content of our linguistically formulated theories; of that content which can be, at least approximately, translated from one language into another. The objective thought content is that which remains invariant in a reasonably good translation. Or more realistically put: the objective thought content is what the translator *tries* to keep invariant, even though he may at times find this task impossibly difficult.

It is the objective thought content of a conjecture or theory on which the scientist's subjective thought processes work. They are at work to improve the objective thought contents by way of criticism. It is true that the scientist has to *grasp subjectively* the implications of the objective theories, before he can apply these theories in order to change our physical environment, which is part of world 1. That is to say, world 2 acts as an intermediary between world 3 and world 1. But it is the grasp of the world 3 object which gives world 2 the power to change world 1.

I will try to explain this most important distinction between a concrete world 2 thought process and an abstract world 3 thought content with the help of examples.⁸

⁸ In my *Objective Knowledge*, chapters 3 and 4, I made some remarks about the history of the distinction between thought in the subjective sense and thought in the

Take, as a first example, the following statement: ‘Leonardo thought that a machine can be built that is able to fly like a bird.’

This statement mentions a person, Leonardo, and it mentions a *thought* of Leonardo’s. However, the thought is here characterized by its *content*. As a matter of fact, we know that this thought content did occur to Leonardo quite frequently. Thus our statement indirectly refers to many of his concrete thought processes, by mentioning their common abstract thought content. There must have been particular occasions when this thought content occurred to Leonardo; for example the first time it occurred to him, and the last time it occurred to him. On these various occasions, he experienced concrete thought processes. These were undoubtedly different processes on every occasion they occurred. What they had in common was, precisely, their *content*.

If we look at this example, it may seem that the thought con-

objective sense. I have since (in section 13 of my contribution to *The Self and Its Brain*) written more about the relation of Plato’s ideas to my theory of world 3, and I would now like to add some historical remarks about the more recent history of these ideas, supplementing what I wrote in *Objective Knowledge*, chapter 4: I am anxious to stress the contribution of Heinrich Gomperz (whose work I have discussed briefly in note 89 to my intellectual autobiography, *Unended Quest*).

Heinrich Gomperz was born in 1873 and was about twenty-five years younger than Frege, who was born in 1848. Gomperz (in his *Weltanschauungslehre*, vol. II/i [Jena and Leipzig: Diederichs, 1908]) distinguished clearly between thought in the objective sense and thought in the subjective sense. Gomperz was influenced in this by Husserl’s *Logische Untersuchungen*, 1900–01; and Husserl, in his turn, had been strongly influenced by Bolzano and Frege (especially by Frege’s review, in 1894, of Husserl’s psychologistic *Philosophie der Arithmetik*, 1891). Thus Heinrich Gomperz’s work of 1908 was, no doubt, indirectly influenced by Frege. But Gomperz did not know this because Husserl did not acknowledge Frege’s influence on himself.

So much I knew when I wrote note 12 on p. 162 of *Objective Knowledge* (where I discussed Husserl). But what I failed to see (though it emerges from the bibliography on pp. 150–152 of *Objective Knowledge*) was that the second volume of Gomperz’s *Weltanschauungslehre* (1908) was published ten years before Frege’s ‘Der Gedanke’ (*Beiträge z. Philosophie d. deutschen Idealismus* 1 [1918]: 58–77). This means that the part played by Heinrich Gomperz in the prehistory of the idea which Frege (in 1918) called ‘*Das dritte Reich*’ and which I now call ‘world 3’ is very much more important than I realized when I published *Objective Knowledge* (despite the fact that Gomperz fell back in the end on a psychologistic theory; see my *Unended Quest*, note 89 and text). The whole history would be worth a careful re-examination — it is not improbable that Frege knew of Gomperz’s book, which was published in Jena, where Frege was working.

tent is merely an abstraction, a mere aspect, of a concrete world 2 thought process; so that the dualist may seem to be right.

Now let us consider the following statement: ‘In 1905 Einstein worked out the Special Theory of Relativity.’

This statement again refers to a person and his world 2 thought processes, and it mentions a particular occasion — the occurrence of those thought *processes* that led for the first time to this particular thought *content*, the Special Theory of Relativity.

But the Special Theory of Relativity is more than a mere aspect of Einstein’s world 2 thought processes, as the following statement shows. ‘There are many important logical consequences of the Special Theory of Relativity which Einstein did not think of in 1905; and there may be important logical consequences of this theory which nobody has thought of so far, and which perhaps nobody will ever think out.’

If you consider this statement then you will see that the theory is not merely an abstraction from a concrete thought process, but an *object* very much like other objects; I suggest, a typical abstract world 3 object. It is a thought content, but neither a thought content of one thought process, nor of several thought processes; but rather something like the thought content of some possible as well as some actual thought processes.

What is most characteristic of this kind of world 3 object is that such objects can stand in *logical relationships* to each other.

Examples of logical relationships are: logical equivalence; deducibility; compatibility; and incompatibility. These logical relationships can hold only between abstract world 3 contents, such as conjectures or theories; they never hold between concrete world 2 thought processes. Even if we speak of *similar* thoughts, we usually have thought contents in mind, and a kind of *logical* similarity.

On the other hand, causal relations such as the influence of one author upon another may be said to hold between thought processes, and not between thought contents.

Thus if we say that James Clerk Maxwell was influenced by Michael Faraday, we speak, first of all, about Maxwell's thought processes, and we suggest that these processes were partly caused by reading Faraday's papers and grasping their thought content. However, we also hint, at the same time, that a logical similarity of the *thought contents* of Faraday's and Maxwell's papers resulted.

By contrast, if we say that there are similarities between the thoughts of the Buddha and of Christ, then we do not speak about thought processes at all, but only about thought contents. The same holds if we say that certain of the thoughts of the Buddha are incompatible with certain of the thoughts of Christ, or that certain thoughts of Einstein's contradict certain thoughts of Newton's. In all these cases, we do not speak about events, about thought processes, but about doctrines, or theories, or thought contents: about things which, in my terminology, belong to world 3.

Thought contents are, we may conjecture, products of human language; and human languages, in their turn, are the most important and basic of world 3 objects. But languages have, of course, also a physical aspect, while the content of what has been thought or said is something abstract. We may say that the content is that which we aim to preserve, and to retain invariant, in a *translation* from one language to another. (If the theory is correct that the dance of the honeybee contains a message that can be translated: 'There is food at such and such a distance and in such and such a direction', then the language of the bee-dance also has a content.)

XI

From the point of view which I am defending here, the transition from a non-linguistic thought to a linguistically formulated thought is of the greatest importance. By formulating a thought in some language, we make it a world 3 object; and thereby we make it a possible object of criticism. As long as the thought is

merely a world 2 process, it is merely a part of ourselves, and it cannot easily become an object of criticism for us. But criticism of world 3 objects is of the greatest importance, both in art and especially in science. Science can be said to be largely the result of criticism —of the critical examination and selection of conjectures, of thought contents. In scientific discussions, what we do is to criticize competing conjectures from the point of view of whether or not they may be *true*.

Not only logical relationships but also the ideas of *truth* and of *fulsity* apply only to thought contents, to world 3 conjectures or theories. Admittedly, we sometimes speak also of true or of false *beliefs*; and a belief is, as a rule, a world 2 object. For example, if we speak of an unshakeable belief or, say, of a shaken belief, we speak indeed, I suggest, not of a world 3 object, but of a world 2 object. But if we speak of a *true* belief or a *false* belief, then we speak not only of a world 2 object, but also of the world 3 thought *content*: the theoretical content connected with this particular belief.

To sum up. I suggest that we must distinguish between world 2 *thought processes* and world 3 *thought contents*. The thought processes are concrete, in the sense that they happen to certain people on certain occasions; at a certain place and at a certain time. Also, we have reason to conjecture that there are brain processes closely connected with these thought processes.

By contrast, there are the thought contents, which are abstract world 3 objects. They can stand in logical relationships. The logical consequences of a theory are especially characteristic of a world 3 thought content. We even may take the abstract thought content of a theory to be the set of its logical consequences.

XII

You may still be inclined to say that only thought processes and the corresponding brain processes exist, and are real, and that

the thought contents are merely abstract aspects of the concrete thought processes. But consider the following example. Children learn to count. This is a skill, a man-made invention. We learn so to count that we can construct to *any* given number its successor number, without end. So we come to understand the infinite sequence of natural numbers. But since it is infinite, there is no physical realization, no embodiment of this sequence. Nevertheless the sequence of natural numbers is a world 3 object about which we can make many discoveries. Thus we discover that all numbers (and 'all numbers' means infinitely many) are either odd or even. And we discover that certain numbers, such as 2, 3, 5, 7, 11, 13, are prime numbers, that is to say, not divisible. (Of course, all numbers are either divisible or prime.) And we even discover Euclid's theorem, according to which, although prime numbers become rarer and rarer when we proceed in the sequence of natural numbers, they never peter out completely: Euclid's theorem says that there are infinitely many prime numbers within the infinite sequence of natural numbers.

It is of course perfectly true that all these discoveries are the *results* or *products* of thought processes: what I call world 3 is, indeed, the world of the products of the human mind; that is, the products of world 2. But the infinite sequence of natural numbers is, clearly, an abstract world 3 object; and it is an object that we can investigate, and about which we can make quite unexpected discoveries. In fact, there are many open problems about this object, problems of number theory which mathematicians have failed to solve so far.

We can compare a world 3 object, such as the infinite sequence of natural numbers, and the problems that arise in connection with it, with a world 1 object, such as, say, DNA, and the problems it presents to the biochemist; or, somewhat more crudely, we can compare it with a high mountain, such as Mount Everest, and the problems it presents to the mountaineer.

In all these three cases we are attracted to the object of our

search by our curiosity, and by the wish to solve some difficult problems. In all these cases we investigate an object of which we have partial knowledge, the knowledge we inherit from earlier investigators. In all these cases we may be surprised by the results of our investigation. In all these cases the results can be inter-subjectively tested, by other investigators.

But the main point is that in all these cases, there is genuine causal interaction between the object of investigation and ourselves. In each case, the object is comparatively passive while we are actively investigating it; just as a man who sits for a portrait is comparatively passive while the painter is active. Yet the man is there, and his presence does exert a causal influence upon the painter.

I have stressed that the sequence of the natural numbers, since it is infinite, cannot be physically realized, or embodied. It is an unembodied, an abstract world 3 object. The same holds for every conjecture or theory, if we identify a conjecture or theory —that is, its logical content —with the system of all the theorems that can be derived in it; that is to say, with the corresponding deductive system. Such a theory, or such a system, is infinite, and may be full of surprises. Thus it must have been a surprise for Einstein when he found, shortly after writing his first paper on Special Relativity, that the now-famous formula $E = mc^2$ could be deduced from it as a theorem.

XIII

World 1 embodiments of world 3 objects, such as handwritten books, or printed books, or articles in journals, are extremely important; but they are important not as world 1 objects but as world 3 objects. Examples of other such world 1 embodiments of world 3 objects are: a geographical map, a plan of a building, or of an engine, or of a motor car, or of an aeroplane. Such maps or plans are based upon theories; they are, precisely like books, embodiments of world 3 objects. Their causal efficacy is very

obvious: such maps and plans, of a new harbour, or a new airport, have indeed been instrumental in changing world 1. But like books, they are valueless for those who cannot read them.

But not only maps and plans are world 3 objects: plans of action are too; and this may include computer programmes.

Of all these world 3 objects it is very characteristic that they can be improved by criticism. And it is very characteristic of them that the criticism may be cooperative: it can come from people who had nothing to do with the original idea. This is another argument for the objectivity of world 3 objects, and for the fact that they may stimulate people to think: but this means, *cause* them to think. Critical cooperation in planning has become fashionable, and it is becoming more so. But it is an old idea. Edmund Burke, the British statesman and political theorist, wrote two hundred years ago, about the critical emendation or mending of political and military plans: 'In my course I have known and . . . cooperated with great men; and I have never yet seen any plan which has not been mended by the observations of those who were much inferior in understanding to the persons who took the lead in the business.'⁹

It is clear that when Burke speaks here of plans, he has world 3 objects in mind, rather than the concrete thought processes of the cooperating people. These concrete thought processes help to *improve* the abstract common plan. They consist of criticisms of the abstract common plan, and therefore must be causally influenced by the abstract plan, and especially by the aims —the not yet existing aims —it sets out to achieve. Critical cooperation on an abstract plan presupposes the objectivity of the plan. Moreover, in saying that a plan can be improved through criticism, Burke points to an aspect of world 3 objects which makes them again similar to world 1 objects: it is possible to work on a world 3

⁹ I have used this passage from Burke as one of the mottoes to the first volume of recent editions of *The Open Society and Its Enemies* (London: Routledge & Kegan Paul, 1963, 1977; Princeton, N. J.: Princeton University Press, 1966).

object, almost as a mechanic works on an engine, and to improve its performance.

XIV

Let me go back to my original central thesis. My thesis was that world 3 objects such as theories play a tremendous role in changing our world 1 environment and that, because of their indirect causal influence upon material world 1 objects, we should regard world 3 objects as real. Nothing depends here on the use of the word 'real': my thesis is that our world 3 theories and our world 3 plans causally influence the physical objects of world 1; that they have a causal action upon world 1.

This influence is to the best of my knowledge always indirect. World 3 theories and world 3 plans and programmes of action must always be *grasped* or *understood* by a *mind* before they lead to human actions, and to changes in our physical environment, such as the building of airports or of aeroplanes. It seems to me that the intervention of the mind, and thus of world 2, is indispensable, and that only the intervention of the mental world 2 allows world 3 objects to exert, indirectly, a causal influence upon the physical world 1. Thus in order that Special Relativity could have its influence upon the construction of the atom bomb, various physicists had to get interested in the theory, work out its consequences, and *grasp* these consequences. Human understanding, and thus the human mind, seems to be quite indispensable.

Some people think that computers can do it too, because computers can work out the logical consequences of a theory. No doubt they can, if we have constructed them and instructed them by way of computer programmes which we have thought out.

Thus I arrive at the view that a mind–body dualism is nearer to the truth than a materialist monism. But dualism is not enough. We have to recognize world 3.

XV

Having mentioned computers I feel that I have to say a word or two about an issue which is much discussed today. Can computers think? I do not hesitate to answer this question with an emphatic 'No'. Will we ever be able to build computer-like machines that can think? Here my answer is a bit more hesitant. After reaching the moon and sending a spaceship or two to Mars, one should not be dogmatic about what can be achieved. However, I do not think that we shall be able to construct conscious beings without first constructing living organisms; and this seems to be difficult enough. Consciousness has a biological function in animals. It does not seem to me at all likely that a machine can be conscious unless it *needs* consciousness. Even we ourselves fall asleep when our consciousness has no function to fulfil.

Thus unless we succeed in creating life artificially, life aiming at long-term survival; and more than that, artificial self-moving animals that require a kind of pilot, I do not think that conscious artificial intelligence will become a reality. In fact, much impressed as I am by the power of computers, I think that too much fuss has been made about them.

XVI

If I am right that the physical world has been changed by the world 3 products *of the human mind*, acting through the intervention *of the human mind* then this means that the worlds 1, 2, and 3, can interact and, therefore, that none of them is causally closed. The thesis that the physical world is not causally closed but that it can be acted upon by world 2 and, through its intervention, by world 3, seems to be particularly hard to swallow for the materialist monist, or the physicalist.

And yet, this openness of the material world 1 to influences from outside is just one of those things which experience shows us constantly. Thus there is no reason to think that human brains

have changed much in the last hundred years; but our material environment has changed beyond recognition both through our planned actions and through the unintended consequences of our planned actions. Of course, the materialist will explain it all in terms of our brain processes; and admittedly, they do play a role in mediating the intervention of effects from world 3 through world 2 to world 1. But where the great change originated is in world 3, in our theories. These have, metaphorically speaking, a kind of life of their own, though they depend heavily on our minds and, very likely, also on our brains.

I think that it means shutting one's eyes to the obvious, and explaining away the obvious, if we deny that world 1 is causally open to world 2, and through it, to world 3.

XVII

Mention should also be made of the close relationship between what I call world 3 and what the anthropologists call 'culture'. The two are very nearly the same. Both can be described as the world of the products of the human mind; and the term 'cultural evolution' covers very much the same as I should call 'world 3 evolution'.

However, the anthropologists are inclined not to distinguish the world 1 embodiments of world 3 objects from the world 3 objects themselves. This leads to a great difference between their outlook and mine, and between our two views of the universe.

XVIII

To sum up, we arrive at the following picture of the universe. There is the physical universe, world 1, with its most important sub-universe, that of the living organisms.

World 2, the world of conscious experience, emerges as an evolutionary product from the world of organisms.

World 3, the world of the products of the human mind, emerges as an evolutionary product from world 2.

In each of these cases, the emerging product has a tremendous feedback effect upon the world from which it emerged. For example, the physico-chemical composition of our atmosphere which contains so much oxygen is a product of life — a feedback effect of the life of plants. And, especially, the emergence of world 3 has a tremendous feedback effect upon world 2 and, through its intervention, upon world 1.

The feedback effect between world 3 and world 2 is of particular importance. Our minds are the creators of world 3; but world 3 in its turn not only informs our minds, but largely creates them. The very idea of a self depends on world 3 theories, especially upon a theory of time which underlies the identity of the self, the self of yesterday, of today, and of tomorrow. The learning of a language, which is a world 3 object, is itself partly a creative act and partly a feedback effect; and the full consciousness of self is anchored in our human language.

Our relationship to our work is a feedback relationship: our work grows through us, and we grow through our work.

This growth, this self-transcendence, has a rational side and a non-rational side. The creation of new ideas, of new theories, is partly non-rational. It is a matter of what is called 'intuition' or 'imagination'. But intuition is fallible, as is everything human. Intuition must be controlled through rational criticism, which is the most important product of human language. This control through criticism is the rational aspect of the growth of knowledge and of our personal growth. It is one of the three most important things that make us human. The other two are compassion, and the consciousness of our fallibility.