

# Science and Religion: Separate Dimensions or Common Ground?

by Michael Polanyi

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THE SUGGESTION I am presenting here responds to one part of Tillich's system of ideas. Tillich has argued that science contradicts religious teachings only as long as religion makes statements about physical events, about biological structures, about psychological phenomena or historical happenings which conflict with the state of affairs established by natural science and historical scholarship. This conflict is avoided, if religion sticks to its proper domain, which is to use symbols for expressing religious faith. Science and religion would speak then in two different dimensions which logically by-pass each other, the dimension of science being that of strictly detached knowledge, while the dimension of religion is one of unconditional commitment.<sup>1</sup>

I recognize the difference between observing a fact and speaking of a symbol and agree that in consequence the meaning of similarly worded statements may lie in dimensions which by-pass each other. But I believe that our knowledge of nature yet has a bearing

on our religious beliefs: that, indeed, some aspects of nature offer us a common ground with religion.

It is true that science professes to be based on detached observation. But actually, no knowledge of the external world can be discovered, or held to be true, in accordance with the ideal of strict detachment. I have proposed, therefore, a new theory of knowledge, which recognizes the participation of the knower as an indispensable coefficient of all knowledge. I shall sketch out here the logical process by which such participation enables us to know the existence of comprehensive entities. From the structure of this knowledge we shall pass on to the structure of the entities of which it speaks, and this will lead on to an evolutionary panorama akin to Christian views of man's position in the universe.

Such is the common ground in which I should seek a reconciliation of science and religion.

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The best point to start from is to realize that *there are things*

*that we know but cannot tell.* We know a person's face, and can recognize him among a thousand, indeed, among a million. Yet we usually cannot tell how we recognize a face we know. So most of this knowledge cannot be put into words. There are many other instances of the recognition of a characteristic physiognomy — some commonplace, others more technical — which have the same structure as the identification of a person. We recognize a person's mood, without being able to tell, except quite vaguely, by what signs we know it. At the universities, great efforts are spent in practical classes to teach students to identify cases of diseases and specimens of rocks, of plants and of animals. All descriptive sciences study physiognomies which cannot be fully described in words and not even by pictures.

Another set of examples, showing that there are things that we know but cannot tell, is found in the exercise of skills. I can say that I know how to ride a bicycle, or how to swim, but this does not mean that I can tell how I manage to keep my balance on a bicycle, or keep afloat when swimming. Yet, it cannot be said either, that I know how to bicycle or to swim and *not* know how to coordinate the complex pattern of muscular acts, by which I do my cycling or swimming. I know this too, but cannot tell it.

There is nothing new in these facts, nor in the way I shall analyse them to start with. Gestalt psychology has taught us that we can know a whole, without being able to specify its parts. This is how we recognize a physiognomy without being able to tell what the signs are by which we recognize it. This is also how we exercise a skill, without being able to identify the elementary muscular acts which we use

for this purpose. Gestalt psychology tells us also that the appearance of a part will be different when seen in isolation than it is when included in a whole.

Gestalt psychologists have observed this predominance of the whole over its parts, both in the case of physiognomies and of the performance of skills. We usually meet with a blend of the two. Medical diagnostics is combined about equally of skillful testing and the skillful noticing of symptoms. Intellectual and practical understanding mutually support each other, and are jointly interpreted by Gestalt psychology in the same way as the recognition of physiognomy and the performance of skills are interpreted in themselves.

What have we to add to these findings of gestalt psychology in order to transform them into a theory of knowledge? I have given a clue to this when I spoke of the way the two kinds of knowing — of things we can tell and of things we cannot tell — are linked to each other. Things that we know and *cannot* tell are parts contributing to a whole, while the whole itself, to which they contribute, is something we know and *can* tell. A tacit awareness of the parts is combined here with an explicit knowledge of the whole. *We are relying on our tacit awareness of the parts for attending to the whole, to which they contribute.* My theory of knowledge recognises that this structure of knowledge is universal.

When we speak of something we know, whether in theory or in practice, we mean something to which we can attend. Such things we can also designate: so we may call them explicitly known things. The new theory of knowledge recognises that our *explicit knowledge of a thing invariably relies on our tacit awareness of some other things.*

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In the examples I have given so far, the things of which we are tacitly aware for the purpose of attending to something else were always the parts of a whole to which we were attending. This way of knowing a comprehensive entity will remain my most important example for this structure of knowledge. But I must give at least one other example, the example of visual perception, if I am to indicate the way the new theory of knowledge fulfills the large claims I have made for it.

I have said that we always rely on our awareness of the parts for attending to the whole which they form. This suggests that an action is involved here on our part: an action, for the sake of which we rely on our awareness of the parts, so that we come to know them more in terms of the entity formed by them than in themselves. When we look at an object, we see it standing against a background, situated at a certain place; being in motion or at rest; having a certain size and color, a certain shape. We see an object in this definite way, owing to the adjustment of our pupils, of the lenses in our eye and of the convergence of our eyes, which jointly fashion the two retinal images on which the perceived picture is based. Perception is determined also by the messages received from the muscles adjusting our eyes and from the internal ear, and also from the muscles and joints by which we keep our body in position. An important contribution is made also by memory traces: we tend to see what we have seen in the past. It is this vast constellation of internal data which determines the way we see an object. We may put this in the terms of our theory of knowledge by saying that we rely on our awareness of all these internal events, to which we are not attending in themselves, for the

purpose of looking at the object in front of us, and that we thus become aware of these internal data in terms of the way we see this object.

It may seem strange to identify the way the internal data of perception determine the external image of the perceived object with the relation between the parts of a whole and the whole which they form. But I am only identifying the *structure* of knowing these two relations. The parts of a whole and the whole they form are of course situated in the same place, while objects seen outside lie far away from the traces they cause inside our body. But we can bridge this difference by continuous stages. The blind man groping his way by means of a stick is aware of its impact on his palm in terms of the way the outer end of the stick hits upon objects outside. When exploring a cavity by means of a probe, the surgeon feels the point at which its tip touches the walls of the cavity. In such cases, the thing to which we are attending is situated at some distance from the things on the awareness of which we rely for attending to it. But we can reduce this distance at will, until we touch the object with our hand. Our faculty of feeling things at a distance by means of a probe, thus bridges the disparity between seeing an object at a distance and comprehending the way it is formed by its parts.

From this rather sketchy introduction to the theory of knowledge, I shall try to derive later the cosmic structure that corresponds to it. But first let me simplify the language of my theory. Instead of saying that we are relying on our awareness of certain things for attending to something else, we shall say that we are attending *from* these things *to* something else. We shall say that we are attending *from* the parts

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to the whole and *from* the internal events of perception to an object outside. This may make clearer what is meant by saying that when we comprehend a coherent entity, its parts play the same kind of role in our achievement of their comprehension as do the internal events of perception in our seeing the perceived object.

There is a striking feature of the world as we see it, to which we must turn next. It lies in the fact that each of us divides the entire universe into two parts, one being our body with which we identify ourselves and the other the totality of all other things which are not our body. The way the two parts are related in our knowledge of the world is illustrated by the process of perception. We make sense of the world by relying on our awareness of the impacts made by the world on our body and of the responses our body makes to these impacts. In other words, we know the world by attending to it from our body: and our body differs from all other objects in the world by being the only collection of things which we know almost exclusively by attending *from* them to other things, rather than by attending *to* them in themselves. This is what is meant by saying that we live in our body. As we live in our body by using it as an instrument for knowing things outside it, our confidence in our knowledge of such things expresses our commitment to life in our body.

This logical relation, that links life in our body to our knowledge of things outside, can be generalized to other instances in which we rely on our awareness of certain things for attending to something else. Thus we recognize that when we attend from a set of particulars to the whole which they form, we establish a logical relation between the

particulars and the whole, similar to that which exists between our body and the things outside it. We acknowledge then that we use parts of a whole for attending to an entity which they form, as if they were our body used for attending from it to objects outside. We may describe this relation by saying that the act of comprehending a whole *is an interiorisation of its parts, which makes us dwell in them* in a way that is logically similar to the way we dwell in our body.

Lest this generalization should appear to be stretching analogies too far, let me reduce the tension by referring once more to the use of probes. We feel the impact that a probe makes on our palm and fingers at its outer end, where it knocks against things outside. We are attending here from the events inside our body to objects perceived outside. And this is achieved by appropriating an external object — i.e. the probe — for the purpose of attending to something on which this object has a bearing, in the same way as the parts of the whole have a bearing on the entity formed by them.

If this argument still appears sketchy, let me remark that I am merely giving here the outline of a theory that has been more fully presented elsewhere. I shall pass on therefore to develop the perspectives opened up by this theory.<sup>2</sup>

We already see the features emerging to which I have referred in my critique of Tillich's image of the scientific method. If the logical structure of all knowledge is such as I have described, then all knowledge is based on the interiorisation of certain elements, for the purpose of attending to something we explicitly know. It is not by attending to the particulars of the whole, but by

dwelling in them that we comprehend their joint meaning.

This use of the term "indwelling" applies here in a logical sense, as affirming that the parts of the external world that we interiorise function in the same way as our body functions when we attend from it to things outside. In this sense we live also in the tools and probes which we use, and likewise in our intellectual tools and probes. To apply a theory for understanding nature is to interiorise it. We attend then *from* the theory to things interpreted in its light. This is why a sound knowledge of a mathematical theory can be acquired only by practising its application. We often find our acceptance of moral teachings described as their interiorisation. This means that we identify ourselves with the teachings in question for judging the actions of men, including our own.

At the turn of the last century, German thinkers postulated that indwelling is the proper means of knowing man and the humanities. Dilthey taught that the mind of a human person can be understood only by reliving its workings; and Lipps represented esthetic appreciations as an entering into a work of art to understand its meaning. Dilthey and Lipps described here a particular kind of indwelling, which they call *Einfühlung*, usually translated as "empathy." Empathy is an indwelling by which we share the emotions felt by a person or expressed by art. This is a special function of indwelling, applying to this case. My conception of indwelling comprises far more than that, as it applies to life in our own body and to the interiorisation of all manner of particulars by which we comprehend the entities to which they contribute.

This idea of indwelling is roughly coextensive with the existentialist con-

ceptions of being in our body and in the world. When I say that we expand our understanding of things outside by interiorising their particulars and attending from these to the entities they form, this corresponds to Sartre's vision of man acquiring existence *en soi* by invading the world with his projects. The opening of this connection should be illuminating to both sides. For my part, I see in it a confirmation of my view that an adequate theory of knowledge must involve a true conception of man and the universe and itself be supported by it. The absurdity of the world view which a false ideal of knowledge has spread in our time may bear this out.

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Biology studies the shapes of living things and the way they grow into these shapes from germ cells; it describes the organs of living things and explains the way they function; it explores the motor and sensory functions of animals and their intelligent performances. All these are comprehensive entities. Morphology, physiology, animal psychology — they all deal with comprehensive entities. None of these entities can be mathematically defined and the only way to know them is to comprehend the coherence of their parts. This is how the existence of animals and plants was recognized long before zoology and botany; how the difference between life and death was recognized before physiology, and the difference between sentience and insentience, between intelligence and mindless stupidity, were known long before these matters were studied by science. What is more, this still is how scientists themselves must recognize these things, before they can undertake their study.

But the false ideal of scientific detachment will not admit that scientists

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recognize living shapes and living functions by indwelling, and cannot recognize them otherwise. Biologists must insist that the only scientific way of representing living beings is in terms of the laws of physics and chemistry which govern their isolated particles.

This program combines a great absurdity with a more subtle error, both of which gain their convincing power by being identified with the triumphs of biology.

Take first the absurdity. It is absurd to claim that the sentience of animals and the experience of consciousness in general can be accounted for by the laws of physics and chemistry. The laws of physics and chemistry do not ascribe consciousness to any process controlled by them; and if material processes could be found which, though controlled by the laws of physics and chemistry, were accompanied by consciousness, new laws would have to be discovered to account for this accompaniment.

Thus the explanation of all living processes by physics and chemistry collapses, unless we deny altogether the existence of consciousness. It would seem impossible that neurologists, let alone psychologists, should deny the existence of consciousness which is a major part of their subject matter. Can one study perception without referring to what people see? Or the localisation of emotional centers in the brain, without referring to what the subjects feel? Yet you find a leading neurologist, like O. Hebb, affirming that the existence of consciousness is merely an inference from facts, not itself a directly observable fact. Hebb urges scientists to assume that consciousness does not exist, even though this hypothesis may eventually prove false. This fits into the picture described by L. S. Kubie on the

same occasion.\* He holds a 'working concept' of consciousness indispensable to psychology, and goes on to say: "Sometimes we are explicit and frank about this. Sometimes we fool ourselves about it. Many workers have attempted to avoid using the word because of its traditional connotations, which have had a somewhat mystical, imponderable, non-scientific, philosophic and/or theological flavour." Writing this in 1953, Kubie added that the reluctance to accept the existence of consciousness was weakening, but today in 1963, I do not think the situation has much changed. The place which neuropsychologists attribute to consciousness remains unclear. We can discover their views only from the way they obtain and formulate their results.

Strict behaviourists avoid referring to the existence of consciousness in their writings; others recognize it as an accompaniment of neurological processes. Neither group acknowledges consciousness as an independent agent exercising power over the nervous system. In effect, both groups work on the assumption that consciousness is an ineffectual accompaniment of neural processes, controlled by the laws of physics and chemistry.

Such a view actually abandons the possibility of explaining all life in terms of physics and chemistry, even though this fact is ignored. It leaves us at the same time with a new set of absurd assumptions. It teaches that certain physical-chemical processes, operating in Shakespeare's brain, gave rise to the thoughts of his sonnets, but that the thoughts of Shakespeare had no effect

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\* I am referring here to the contributions made by O. Hebb and L. S. Kubie to the Symposium on *Brain Mechanism and Consciousness* held in Quebec in August 1953; see report ed. J. F. Delafayne, Blackwells, Oxford, 1954.

on the composition of his sonnets. Physical and chemical processes would account for the enjoyment of the sonnets by their readers, but their pleasure would have no effect on making them read the sonnets.

This is perhaps not logically unthinkable; but it is absurd to suppose that nature should have brought forth mechanisms of sonnet writing and sonnet reading, and endowed them with the illusion of composing and enjoying sonnets.

I shall not discuss this matter further, but go on to point out the second, more subtle, error which I have said to be present in the professed program of biology. This error consists in asserting that biology explains living beings in terms of physics and chemistry, while the purpose that biology actually pursues, and by which it achieves its triumphs, consists in explaining living beings in terms of *a mechanism founded on the laws of physics and chemistry, but not determined by them.*

The distinction is important and fairly simple. The laws of physics and chemistry determine the processes and structures of inanimate nature. We enquire into these processes and structures without asking what they are for, because we assume that they achieve nothing. Thus do we discover the laws of physics and chemistry. Take by contrast the study of physiology. It consists in observing the structures of living beings and the processes occurring in them, with a bearing on the question what these things are for. For the task of physiology is to explain the achievements of living beings. It usually explains them in terms of a mechanism which functions in the way a machine works. Physiological mechanisms are based, like machines, on the laws of physics and chemistry, but they are not

accounted for by these laws. They are determined by rules which, as in machines, may be called 'operational principles'. Operational principles describe the parts composing a mechanism and define the way they function in making the mechanisms work.

You may ask, how it is possible for a mechanism which obeys the laws of physics and chemistry to be determined also by another principle, not accountable by physics and chemistry. The answer is that the physical sciences expressly leave open certain conditions of a system, that are usually described as its boundary conditions, and that the operational principles of a mechanism take effect by controlling these boundary conditions. As a result, physical and chemical laws *are made to serve* the physiological mechanism of living beings.

This structure of a mechanism makes it liable to failure, for the physical process on which it relies will tend to escape its control. Machines can break down, and all life is likewise in jeopardy of disease and death. This distinguishes mechanisms from the processes of inanimate nature, which can never go wrong.

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I shall return to this analysis of mechanisms when I come to speak of the evolutionary origin of man. Let me now turn to the question, whether my rejection of the professed ideals of science implies a rejection of its results. My answer is that the practice of science is usually sound, even when it is conducted in the name of false principles. It is even possible that valuable research *must* be based on absurd assumptions. Consider the recent exploration of various parts of the brain by electrodes of microscopic size, which showed the nervous system operating as a machine. This splendid enquiry would be ham-

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pered by keeping in mind the fact, that the assumption of the whole nervous system operating as a machine is nonsensical. Neurologists are right, therefore, in ignoring the absurdity of the idea underlying their work. This may be true for many parts of science, but certainly not for all. In some fields, as we shall find in the theory of evolution, the ideal of strict detachment falsifies the very conclusions of science. When applied to psychology and to the social sciences, this ideal tends to impoverish enquiry, reducing it often to triviality. Wherever the current scientific outlook bears directly on man and society and affects our world view, it denatures its subject. Only the blessed inconsistency of its expositors prevents them from rendering man, and all the sufferings and works of man, quite meaningless.

But we cannot continue to rely for our view of men and the universe on merciful right-wing deviations from the current scientific outlook. However widely the ideal of strict detachment may help to guide science to ever new discoveries, we must not allow it to deprive our image of man and the universe of any rational foundation. All men, scientists included, must seek and hold on to a reasonable view of the universe and of man's place in it. For acquiring this we must rely on a theory of knowledge which accepts indwelling as the proper way for discovering and possessing the knowledge of comprehensive entities. I believe also that this may open up a cosmic vision which will harmonize with some basic teachings of Christianity.

If this project succeeds, it would achieve a more satisfactory reconciliation of human convictions, than would the acknowledgement of strictly separate dimensions for science and religion. Instead of by-passing each other, the secular view of the universe and its religious interpretation would mutually

reinforce each other. In a way, this enterprise would serve as a counterpart to Tillich's undertaking. He has fought for the purification of faith from religious fundamentalism; I would supplement this by purifying truth from scientific dogmatism.

In our search for a reasonable world view, we should turn in the first place to common sense. I have shown that science itself largely relies for its subject matter on a common knowledge of things. The conceptions of life and death, of plants and animals, of health and sickness, of youth and old age, of mind and body, of machines and technical processes, and of innumerable other equally important things, are commonly known. All these conceptions apply to complex entities, the reality of which is called in question by a theory of knowledge, which claims that the whole universe should ultimately be represented in all its aspects by the physical laws governing the inanimate substrate of nature. The new theory of knowledge rejects this claim and restores our respect for the immense range of common knowledge acquired by indwelling. Starting from here, we shall develop our cosmic perspective from the wider implications of the fact that all knowledge is acquired and possessed by indwelling.

I have spoken of the way we identify a person's physiognomy by relying on our awareness of features which we cannot specify, and I have shown that, in a sense, this amounts to a dwelling in the features of a person for the purpose of comprehending their joint meaning. We can also read in the features and behaviour of a person the presence of moods, the gleam of intelligence and the signs of sanity and human responsibility. At a lower level we comprehend by a similar mechanism the body of a person and understand the functions of his physiological mechanism. We have

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seen that even physical theories comprehend in this way the processes of inanimate nature. Such are the various levels of knowledge acquired and possessed by indwelling.

These levels form a hierarchy of comprehensive entities. Inanimate nature is comprehended by physical laws; the mechanism of physiology is built on these physical laws and enlists them in its service; next, the intelligent behaviour of a person relies on the healthy functions of his body controlled by him; finally, moral responsibility relies on the faculties of intelligence which it directs.

Remember how the operations of machines and of mechanisms in general rely on the laws of physics and chemistry, but cannot be accounted for by these laws. In a hierarchic sequence of comprehensive levels each higher level is related to the levels below it, in the same way as the operations of a machine are related to the particulars obeying the laws of physics. You cannot explain the operations of an upper level in terms of its particulars on which its operations rely. Each higher level of integration represents, in this sense, a higher level of existence, not accountable by the levels below it.

Yet each higher level is known to us by relying on our awareness of the particulars on the level below it. *We know each level by interiorising its particulars and mentally performing the integration which constitutes it.* This is how all knowledge is based on indwelling; and this is how the consecutive stages of indwelling form a continuous transition from the understanding of the inanimate, right up to the understanding of moral responsibility. The sciences of the I-It relations thus pass imperceptibly into the sciences of the I-Thou relations. From the minimum of indwelling that we call an observation

we move without a break to the maximum of indwelling, which is a total commitment.

The cosmic significance of this panorama is revealed, when we look upon it as the stages of an evolution that has achieved the rise of man. It may seem obvious that the succession of changes, sustained over a thousand million years, which have transformed microscopic specks of protoplasm into the human race, has brought forth, in doing so, a higher and altogether novel kind of beings; that this process ranks with the one by which a fertilized human germ develops into a mature infant and the infant grows into an adult: a process that obviously produces a higher form of being.

But scientists must deny this. Their theory of knowledge requires that all stages of life be accountable by the laws governing inanimate nature. Hence they cannot recognize the rise of higher levels of existence, that are inexplicable in terms of the laws governing the lower levels. They must believe, or try to believe, that a germ cell can grow into a man writing sonnets like Shakespeare, without developing any faculty that is not accounted for by the laws of physics and chemistry.

In this light, evolution would represent the production and reproduction of a set of relatively stable atomic configurations. This is also all that a modern theory of evolution *can* account for. Darwinian selectionism has no place for an evolution continuously tending towards higher forms of life.

Writers have protested time and again against this denaturing of evolution. They have insisted on the fact that the central feature and problem of evolution lies in its sustained tendency to produce higher levels of existence. But these writers have always been silenced. Listen to the latest instance of this; how

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one of the most distinguished biologists of our time brushes aside Teilhard de Chardin's plea for the recognition of this central fact of evolution: ". . . the idea that evolution has a main track or privileged axis is unsupported by scientific evidence." (P. B. Medawar in *Mind* LXX [1961], p. 99) Such statements confirm my view that as long as science accepts the false ideal of strict detachment, it cannot but deny reality to the most significant features of the universe. The new theory of knowledge, combined with the logical distinction between levels of existence, should cure us of the blindness, by providing a conceptual framework which recognizes the emergence of ever higher levels of reality by evolution.

In this light, evolution shows man arisen by a creative power inherent in the universe. The immense ancestral travail that has borne man invests him with a cosmic responsibility. Michelangelo's image of Adam created at God's command, becomes a more plausible symbol of man's position in the world than a description of him as a relatively stable collocation of atoms. The ideas of Butler, Lloyd Morgan, Bergson and Whitehead which have pointed towards this conclusion, are developed here on firmer grounds.

I must reject, on the same grounds, the current attempts to assimilate the cultural development of humanity to organic evolution as conceived by modern selectionism. Sir Julian Huxley's advocacy of an evolutionist humanism is foremost in this movement of thought. But listen to Sir Julian Huxley prefacing one of the most authoritative statements of current selectionist theory (Huxley, Hardy and Ford, *Evolution as a Process*): "A single basic mechanism underlies the whole organic evolution — Darwinian selection acting upon the genetic mechanism." He defines

this mechanism: "Mutations . . . are the result of a failure of precision in the basic property of self-copying exhibited by Mendelian genes, which, aggregated in linear order within the chromosomes, constitute the physical side of heredity.<sup>3</sup> Such a mechanism must exclude any evolutionary process that cannot be represented by the physical laws governing inanimate matter. It has no place for directed evolutionary emergence; nor can it account for the rise of consciousness, let alone the progress of human thought. The effects of the imperfect self-copying of genetic material cannot be continuously aligned with the creation of music and science, of poetry and law, of the visual arts and religious faiths. Huxley's evolutionist humanism is not a synthesis but a self-contradictory construction.

Let me continue my own argument. I see further aspects of man's peculiar position reappearing in the story of emergence. Each successive stage of emergence is more comprehensive, more meaningful than the last. Yet a higher faculty must always operate through the levels below it. It must enlist the laws controlling the lower levels in the service of its own higher principles, and the lower level which enables the higher one to operate through it will always limit the scope of these operations and menace them with failure. All our higher endeavours must work through our lower nature and are necessarily exposed thereby to corruption. You may recognize here the cosmic roots of tragedy and of man's fallen condition.

This relation of the higher to the lower applies once more when an upper level endeavours to reach beyond itself. If it be true that no higher level can be accounted for by the operation of a lower level, then no effort of ours can be truly creative in the sense of establishing a higher principle not intrinsic

to our initial condition. Yet this is what all great art, great thought, and great action, must aim at. And this is how these efforts have, in fact, built up the heritage in which our minds grow up and live.

Has man's intelligence broken through the limits of his own powers? Yes and no. Inventive efforts can never fully account for their success; but the story of man's evolution testifies to a creative power that goes beyond that which we can account for in ourselves. This power can make us surpass ourselves. We exercise some of it in the simplest act of acquiring knowledge and holding it to be true. For, in doing so, we strive for intellectual control over things outside, in spite of our manifest incapacity to justify this hope. The greatest efforts of the human mind amount to no more than this on a large scale. All such acts find their paradigmatic expression in the Pauline scheme of redemption which imposes an obligation to strive for the impossible, in the hope of achieving it by divine grace.

Tillich teaches that the irrelevance of Christianity, as represented by fundamentalism, can be overcome only by passing through the darkness of existentialist despair. The irrelevance of the current scientific outlook for the understanding of man and his position in the universe can perhaps also be overcome only by passing through this ordeal.

Existentialism makes us face a situation of absolute self-determination. Mathieu demands this of himself in the *Chemins de la Liberté*: "To be free. To be the cause of oneself. To be able to say: I am because I want to be. To be my own beginning." But he realizes then that values created at his own command can have no claim on him. Nothing is left, but the despair of existentialism.

Admittedly, this despair can be avoided by passing through life as it comes, but no complacency is altogether safe against erosion by modern self-doubt. And those who have passed through such self-doubts and gauged their effects on our times, might perhaps be prepared to brave the warnings of the scientific outlook and accept nature as the cosmic home of man, in which he is both a child of creation and a bearer of prospects beyond his own range of control.

The recognition of our intrinsic limitations by evolution and history would render the very idea of absolute self-determination meaningless. Releasing us from the absurdity of such self-determination, it may make us willing to accept our limited tasks as our calling.

Such is the close neighborhood of science and religion to which a revised theory of knowledge leads us. It is on this common ground, rather than as separate dimensions, that science should be reconciled with religion.

#### REFERENCES

1. Comp. Paul Tillich, *Dynamics of Faith* (1958) e.g., p. 81. The present paper responds to this statement and more directly to recent lectures by Tillich at Berkeley in February 1963. The following formulation that comes nearer my own position (to which my attention has been called) can be found in Tillich's *Systematic Theology* Vol. 1, p. 97: "The element of union and the element of detachment appear in different proportions in the different realms of knowledge. But there is no knowledge without the presence of both elements."
2. See my *Personal Knowledge* (London and Chicago: 1958) and *Study of Man* (London and Chicago: 1959) as well as articles in *Philosophy Today*, Vol. 6, Fall and Winter 1962.
3. Julian Huxley, A. C. Hardy and E. B. Ford *Evolution as a Process* (London: 1954) pp. 2 and 4.

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