

Lecture ThreePERSONAL KNOWLEDGE

1. The construction of a fixed framework, on which we may rely to handle experience for us by virtually automatic operations, seems to be the dominant intellectual craving of man. Yet this craving itself, as the history of science shows, tends to demolish a hitherto accepted framework, or parts of it, in order to establish an even more rigorous and comprehensive framework in its place. This process of refinement and enlargement of objective systems rests, in a twofold sense, on a non-objective ground. Discovery, which leads from one such framework to its successor, bursts the bounds of objectivity in an intense if transient moment of heuristic vision. And the new objectivity, once accepted, still rests implicitly on the personal awareness of rationality from which it sprang: an element of theoretic vision remains, even in the impersonal formulations of accepted systems, to demand our allegiance and compel our assent.

But, going far beyond this, there is the incomparably more complete and sweeping visionary experience which some minds attain sometimes. For we carry in us impulses which are altogether opposed to the constraint imposed by a fixed cognitive framework and occasionally break through it in the endeavour to achieve and hold for ever, in ecstatic vision, an immediate experience of the universe. Here is revealed in its primitive force the contemplative impulse, which in the momentary flashes of scientific discovery and the quiet appreciation of scientific theory, is harnessed to the quest of objectivity. It may be well to pause therefore at this stage, and envisage the contemplative use of the mind in its more direct and complete expressions.

2. The most radical manifestation of the urge to break through all fixed frameworks is the act of mystical contemplation.

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In a sense, of course, this act itself tends to establish a fixed technique for the facilitation of its own practice, but the rules given by mystics as guides to contemplation do not form a conceptual screen separating the self from the world: they teach us rather how to destroy that screen ever again. The state of mind which the mystic is trying to achieve should be akin therefore to that of the baby before he has built up any conceptual framework. With this in view, I shall outline some salient features of this pre-objective condition of the infant mind.

The new born child lacks the integrative control of the sense organs which directs the examination and identification of external objects. His ocular fixation being deficient his eyes stare uncomprehendingly at the things around him. In this way he can see only coloured patches of no definite shape or size, appearing at no particular distance and undergoing perpetual changes of shade and colour. He cannot yet listen to sound or feel the shape, surface or weight of objects. He lives through a crowded sequence of brightnesses and noises, of touches and smells, which reach him without a meaning and leave him without a memory. Even within his own body he cannot localise bodily sensations. A pain in his foot does not immediately draw his attention to his foot. It is rather a wandering pain which (once he has reached the stage of being aware of other persons) he supposes everyone to share. (J. Piaget's The Child's Conception of the World, p. 28).

The child's first coherent experiences consist in the satisfaction of his appetites and his attachment to persons on whom he relies for food and love. Accordingly, he develops his first conceptual framework in terms of desires, emotions and interpersonal exchanges. This is a highly permeable framework which allows the child's own self to mingle freely with the world outside, and particularly with other people. The work of Baldwin and still more that of Pierre Janet has made it clear

that childish imitation is due to a sort of confusion between the self and other persons. For example, the sound a child hears stimulates him to make the necessary motions to continue it, without his seeing any difference between the sound that is reaching him from outside and the sound produced by himself. (Piaget, The Child's Conception of the World, p. 128). When small children talk in the company of other children, it is impossible to say whether they speak to themselves or address the others, for the child does not quite realise what constitutes the act of communication. He always believes himself to be understood and therefore cannot try to make himself understood. Similarly, he always believes that he understands and therefore cannot make an effort to understand. (Comp. J. Piaget, Language and Thought of the Child, p. 99 - 101). Hence the child either appears egocentric, as when it believes that its sensations and thoughts are universally shared, or irrationally responsive to others, when it treats other people's emotional expressions as if they were his own. Bleuler has described this stage of infancy as 'autistic', but it might be called 'self-less', if the word is taken in its strictly literal sense.

The merging of the child's consciousness in the unshaped impressions of its senses, we may call sensory autism, while the merging of itself with others may be called interpersonal autism.

The emotional imagination of the child extensively elaborates its interpersonal autism. At this stage all objects are felt by him to be in personal interaction with his own person. Instead of thinking of the sun as of an object which shines, is hot and is endowed with movement, the child thinks it as an object that knows it shines, that intentionally makes

us warm and that moves according to the needs of its own life.+ Activity is for him necessarily purposive and conscious. A wall cannot be knocked down without feeling it, a stone cannot be broken without knowing it, a boat cannot carry a cargo without effort, etc.++ Thus autism expands into animism, and as a logical extension of animism we find elaborate magical practices common <sup>among</sup> children. For example a child may put on his shoes twice over to prevent his being questioned in class. (Piaget, l.c., p. 160).

The effects of maturation on the various forms of autism which I have just surveyed are different and some of them are greatly affected by the cultural milieu in which the child grows up. The new born babe's sensory autism is overcome by the acquisition of perceptual and muscular control. This process of integration includes at a further stage the objectivisation of geometric relations and the setting up of formalised thinking in general, which I have described earlier as forming a prelude to the progressive depersonalisation of knowledge achieved in physics.

While the child's perceptual and motoric integration is determined preponderantly by its innate faculties, the formalisation of the child's thought, which depends mainly on his learning to speak, will be profoundly affected by the milieu in which he is brought up. If, as it happened in rare cases, the child was brought up among animals, his capacity for formal thought remained altogether stunted, nor could it be developed later when as an adolescent he was restored to human company. And of course even a normal upbringing will

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+ Piaget, The Child's Conception of the World, p. 238.

++ Piaget, l.c. p. 177.

establish a different interpretative framework in the child depending on the idiom which he is taught to use.

The child's failure to distinguish clearly between himself and other persons is but an extravagant use of a faculty which remains indispensable to him throughout his later life. The fellow feeling by which we identify ourselves with others and which underlies all communication with others, entails the same kind of interpersonal autism - if on a reduced scale - which strikes us as so odd when taken to excess in the child. Interpersonal identification is cultivated to unequal degrees in different modern and primitive societies. The diverse codes of morality and law are as many formal systems, by which our native interpersonal propensities are voiced and lastingly set to various characteristic patterns.

This analysis may appear anomalous to those who believe that other persons are at first observed as mere objects to whom we subsequently impute feelings, by noticing the similarity of their outward appearances to our own when we experience the same feelings. But personal impacts between babies and adults take place much before the baby had opportunity to watch his own emotional expressions.+ Coherent interpersonal relations, emerge, in fact, at a pre-objective stage, from which the conception of mere objects is only developed later, by a laborious process of depersonalisation.

The third group of childish autisms, its magical practices and animistic beliefs, manifests the myth-forming activities of its imagination which are largely suppressed by the objective framework of the adult mind but continue to supply

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+ Comp. Katz. Gestaltpsychologie, Basel, (1944) p. 80.

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the resources for the non-objective workings of the adult mind.

3. When we break through the intellectual framework which separates our selves from the objects objectively known by means of this framework, we return to an immediate experience of them, similar to that which we possessed at the stage of infantile autism and release the emotions which engendered the mythological world picture of childhood and of primitive man.

Such contemplative communion with the world is not necessarily religious. Drugs like hashish can generate a similar condition, with outbursts of sweeping elation embroidered by fanciful interpretations of experience. Such conditions are known also as an accompaniment of falling deeply in love; are observed in the course of going to sleep; and form part of the hypomanic state of the insane. They can be evoked by certain people at will, for example by repeating their own name.+

The religious mystic achieves contemplative communion as a result of an elaborate effort of thought supported by ritual. By concentrating on the presence of God who is beyond all physical appearances, the mystic seeks to relax the intellectual control which his powers of perception instinctively exercise over the scene confronting them. His fixed gaze no longer scans each object in its turn and his mind ceases to identify their particulars. The whole framework of intelligent understanding by which he normally appraises his impressions, sinks into abeyance, and uncovers a world experienced uncomprehendingly. The process is known in Christian mysticism as the via negativa and the tradition which prescribes it as the only perfect path to God stems from the Mystic Theology of the Pseudo-Dionysius. It

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+ Leuba, reference to Tennyson.

invites us, through a succession of "detachments", to seek "in absolute ignorance union with Him who is beyond all being and all knowledge."<sup>4</sup> The same technique of negation is used also by the Yoga which applies a similar regime to the mystic's body: the integrative control exercised by normal muscular alertness is counteracted by allowing the limbs to go quite limp or become completely rigid. In this manner the feeling of having a body may be altogether suppressed and the mind set free both from its intellectual and physical selfhood.

The Christian mystic's communion with the world is an act of reconciliation which is part of the technique of redemption. It is man's surrender to the love of God in the hope of gaining his forgiveness and admission to his presence. The radical anti-intellectualism of the *via negativa* is part of the technique of 'becoming like little children' and relying on the 'foolishness of God'. It represents that short-cut to the understanding of Christianity, of which St. Augustine spoke, saying that it was free to the simple minded but impassable to the learned. The Christian faith in everyday action is no more than a sustained search for access to a God who is not of this world, an effort supported by prayer and the observance of ritual, rather than by a knowledge of theology.

Simone Weil has described in Attente de Dieu the effect of a very simple self-imposed rite:

"Last summer, doing Greek with T....., I went through the 'Our Father' word for word in Greek. We promised each other to learn it by heart. I do not think he ever did so, but some weeks later as I was turning over the pages of the Gospel, I said to myself that since I had promised to do this thing and it was good, I ought to do it. I did it. The infinite sweetness of this Greek text so took hold of me that for several days I could not stop

myself from saying it over all the time. A week afterwards I began the vine harvest. I recited the 'Our Father' in Greek every day before work, and I repeated it very often in the vineyard.

Since that time I have made a practice of saying it through once each morning with absolute attention. If during the recitation my attention wanders or goes to sleep, in the minutest degree, I begin again until I have once succeeded in going through it with absolutely pure attention. Sometimes it comes about that I say it again out of sheer pleasure, but I only do it if I really feel the impulse.

The effect of this practice is extraordinary and surprises me every time, for, although I experience it each day, it exceeds my expectation at each repetition.

At times the very first words tear my thoughts from my body and transport it to a place outside space where there is neither perspective nor point of view. The infinity of the ordinary expanses of perception is replaced by an infinity to the second or sometimes the third degree. At the same time, filling every part of this infinity of infinity, there is silence, a silence which is not an absence of sound but which is the object of a positive sensation, more positive than that of sound. Noises, if there are any, only reach me after crossing this silence." (Waiting on God, London, Routledge and Kegan Paul, 1950, p. 23 - 24).

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By persevering in his refusal to exercise intellectual control over the objects of his surroundings, the mystic may arrive at a state of stupor, which seems indeed to be fulfilled in the nirvana to which Hinduism aspires. But Christian mysticism does not aim at the extinction of consciousness. It

only wishes to reduce the barriers between the self and the world so that we may become aware of it in a new manner, not objectively, but as an expression of God. In its systematic and precisely formalised nature the framework of Christian teachings and practices may be compared with that of science. The greatest difference between the application of theoretical physics to the intellectual control of experience on the one hand and a sincere participation in religious services as prescribed for example by the English Prayer Book on the other hand, lies in the width of the channels opened up in either case to our capacity for experience. Theoretical physics refers to measurements which are executed through the narrowest possible contact between a man and an object, while religion impels the believer to surrender himself comprehensively to what lies outside him. The framework of physics brings about a minimum of personal participation of oneself in one's object; that of religious practices induces the largest possible measure of such participation.

Religious practices stand in this respect closer to sensual abandon than to exact observation. Mystics speak of religious ecstasy in erotic terms, describing communion with God or with Christ as the union of bride and bridegroom. In the orgiastic rituals of fertility cults religion and sensual fervour are openly blended.

4. I have mentioned before that in science itself there recurs intermittently partial destructions of the existing screen between self and object. New scientific discoveries originate from new visions which break through the accepted conceptual framework or lend new unexpected significance to existing theories.

During this onward movement towards new questions, scientific thought temporarily recovers its personal quality, in the very quest of further, more rigorously impersonal solutions. Scientists never cease perfecting the rules which guide and constrain the operations of intelligence in science, and each new step towards greater rigor and increased objectivity is carried out by the rebellious upsurge of a new vision. In science these visionary acts are called discovery, for once its task is completed the motion subsides and gives way to the quiet enjoyment of the results henceforth publicly available to all. This stands in contrast to religion. For while in science vision has only a passing function the successful completion of which eliminates vision, religious practices culminate in the achievement of a vision which man seeks to hold forever. A

5. Consider next by further comparison mathematical theories which have no application to experience. I have mentioned instances when parts of mathematics suddenly gained an entirely unexpected significance by being embodied in the framework of a physical theory. Should such a physical theory be disproved by further empirical tests, the mathematics it had employed would once more lose its application to experience and revert to the status of pure mathematics. Besides, we continue to appreciate the significance of pure mathematics even if at some point application can be found to practice. The eminent usefulness of natural numbers for the process of counting does not alter the fact that number theory is for the greater part a subject which is of interest only in itself.

In one characteristic feature pure mathematics is more akin to technology than to science. Whoever thinks first of a zip fastener or a Morse-telegraph invents something new, and the same is true of whoever thinks first of a new mathematical conception. In both cases the process of invention utilises some previous knowledge including possibly some previous

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inventions. In the fourth century B.C. the Greek mathematician X Menaechmus developed from his knowledge of the cone the invention of the conic sections, of which the ellipse, the hyperbola and parabola were quite novel conceptions. In mathematics the purpose of inventions is to set new problems which are difficult to solve and yet can be solved. The fascination exercised on mathematicians by the profundity of new problems and in the ingenuity of their solutions justifies in their view the inventions which make it possible to formulate these problems. These excellencies of a mathematical conception inspire our confidence and compel our allegiance, beyond its hitherto explored implications. The mathematician is prepared to pursue these implications into regions far beyond his present understanding and the respect paid to mathematics is accorded to it as to the holder of its yet unrevealed future inferences. In this respect mathematics is like a person of surpassing ingenuity but strictly reticent disposition, whose inexhaustible gifts can be drawn out only by endless cross-questioning.

6. An operation like that<sup>+</sup> which leads from mathematical physics to pure mathematics, will transform religion into fiction. If there is no God, the Book of Common Prayer <sup>might</sup> ~~will~~ still be read as literature, churches <sup>might</sup> ~~will~~ still be visited by tourists, sacred music performed at concerts and altar pieces exhibited in museums. But these works of art will be classed with others of purely secular intention.

This brings us to works of art. Such works like pure mathematics are artifices of man and by their acceptance we ascribe to them an inherent excellence as we do by accepting a new development in mathematics. But while both are ~~works of the imagination~~, mathematical imagination is conceptual, while artistic imagination is sensuous, and consequently a work of art can affect us far more comprehensively than a mathematical theorem. The artist does not rival the mathematician's rigorous

penetration, but he vastly exceeds him in the richness of his vision; both the creation and the acceptance of a work of art are massive visionary acts, the counterparts of which in pure mathematics, even if equally intense, are altogether devoid of sensuous content. The creation and enjoyment of art entail therefore a contemplative experience which is akin to that of religious mysticism. Art, like mysticism, discards the screen of objectivism and draws on our original capacities for autistic communion.

I have shown how the visionary powers of the scientist which lead him to new discoveries subside, once discovery is achieved, into a peaceful contemplation of the result: while religious practices culminate in the communion which they seek to achieve. The arts are in an intermediate position. As in science, the vision of the originator far exceeds in intensity the vision induced by his finished product in an appreciative public. But the work of art is more akin to an act of religious devotion in remaining, even in its finished form, pre-eminently an instrument of contemplative experience. The artist's effect on others is akin to his own creative experience. Though he cannot transmit to the public the sweep of his imagination nor make them re-live his moments of inspiration, he does teach them to see, hear and appreciate things they had never seen, heard and understood before. At first the public is often at a loss to use the new channels of experience opened up for them by the artist and like those born blind to whom an operation has restored their eyesight, they see only chaos. But protracted confrontation with a new fashioned work of art eventually teaches them to use the new powers which it offers them.

"To achieve this" writes Marcel Proust<sup>1</sup> "the creative

1. Proust, Preface to P. Morand "Tendres Stocks" 1922

painter, the creative writer proceed like the eye specialist. The treatment - with the help of their paintings, their writings - is not always pleasant. When the treatment is concluded they tell us: You can look now. And thus the world which hasn't been created only once, but is re-created every time a new artist emerges, appears to us perfectly comprehensible - so very different from the old. We now adore the women of Renoir and Giraudoux, whereas before the treatment we refused to recognise them as women. And we would love to go for a stroll in those woods which previously seemed to represent anything but woods, for example a tapestry woven of thousands of shades with just the colourings of a forest missing. Such is the passing and new universe created by the artist, which survives only until a new artist arises." But the new visionary faculties offered to their appreciators by new works of art - or by any of the pioneer achievements of mathematics, scientific theory or religious thought - are not assimilated by the public passively, by sheer habit. They can acquire them only by an effort, persevered in often fruitlessly for a long time. This is their own choice, taken at their own risk, and to that extent it is the followers and not the teachers who determine the universe in which successive generations will live.

7. A scientific theory, a religious practice, a branch of mathematics and a work of art are all represented by certain typical objects and sounds and actions, which convey their meaning. We do not merely see or hear these but look at them or listen to them; and when we participate in a dance or a ritual we must go beyond mere imitation of gestures. Symbolic forms are not recognised as such unless they are accepted as something intelligible and only our understanding can accredit them as the true formal systems of science, religion mathematics or art. In this order properly to distinguish the appropriate forms of acceptance

and understanding we have to note the following characteristics of these several systems. The formalism of scientific theory is a screen with narrow slits through which we make only extremely unsensuous contacts with the outside world. By contrast religious observances promote a comprehensive reunion with the universe and its creator. The formalisms of pure mathematics and of works of art are screens without holes. They can find confirmation neither in the observation of facts nor in the contemplation of God. Such knowledge as they convey to us satisfies us entirely in the light of our own standards, without correspondence to anything outside themselves. These standards of appreciation cannot be specified as a demand for coherence. We do not know (and shall never know) whether arithmetic is strictly coherent, and the harmony of a work of art would be deadening if its coherence could be demonstrable. Both in mathematics and art 'coherence' is therefore merely an expression of confidence and appreciation. Yet mathematics is accepted as rigorous, while there is an inclination to class works of art with dreams and fantasies. This tendency, though mistaken, is not altogether groundless, since owing to its sensuous character artistic imagination is more akin to the subjective life of desire, emotion and fantasy, than the conceptual poetry of mathematics. I have mentioned before a somewhat similar contrast between scientific observation and religious mysticism, pointing out that religious ecstasy had an affinity to sensual abandon, which is altogether lacking in observational acts, owing to the extreme thinness of the external contacts formed by science. We may now try to set us a framework within which we can separate the various forms of acceptances by which we accredit science, mathematics, religion and art, and assign to each of these systems their sensory, emotional and imaginative content.

8. I shall distinguish for this purpose three ways of

accrediting which I shall call verification, validation and authentication. These terms will be defined by examples of the use to which I wish to put them.

9. I shall say that the pain which a patient actually feels is authentic, while the pain which a malingerer pretends to feel is not authentic. The various means by which I believe that I can distinguish between the two constitutes a process of authentication. Similarly, there may be ways of authenticating the hallucinations, optical illusions, cravings and passions of other people, but none of these will be said to be valid. The authenticity of my own hallucinations is guaranteed by their very occurrence and even if I realise at the same time that they are not valid perceptions, though I may be misled in this respect. The realm of the authentic is the subjective, which either commits us to nothing or commits us to something known to be erroneous.

10. Works of art and new branches of pure mathematics are accepted by validation without verification. Gauss had conceived the idea of non-Euclidean geometry before Lobatschewskj, but kept it quiet for fear that it might be rejected as fantastic. The long struggle through which non-Euclidean geometry was eventually accepted, was fought precisely over this question; namely, whether Lobatschewskj's conceptions deserved serious cultivation. Eventually, the pleasure it gave to its students and the admiration it aroused in them, established an ever wider respect for non-Euclidean geometry. It was the conviction that it offered scope for fascinating problems of an unlimited range that finally established the new theory.

A conviction of this kind recognises a branch of mathematics as deserving universal respect. This implies a twofold commitment, first to the pursuit of the peculiar delight

of thinking in terms of the new formalism, and second, to the prediction that it will continue to procure yet undiscovered delights of the same kind, indefinitely.

11. The validation of works of art proceeds on similar lines. My previous quotation from Proust describes how a work of art gradually develops in those who tend to appreciate the faculties required for its enjoyment. As it becomes part of me I dwell in a universe experienced through it.

The validation of a work of art is once more a personal commitment of a twofold nature. By assenting to it I give my preference to the kind of experience which the work of art opens up to me, that is, I commit myself to a matter of taste. But my commitment also endorses the work of art as the source of this experience and thereby as a thing excellent in itself. Only by paying respect to it in itself can I express my belief in its inherent, lasting universal and inexhaustible power.

no-one, not even its creator, can ever be conscious of the full import of a work of art. "In all poetry there should be more than the author himself is aware of," and "In really creative writing the author is making something which he does not understand himself." says T. S. Eliot (Time and Tide, June 17 1950, p. 600). It is the test of a 'round character' in a novel - says E. M. Forster - that it can surprise in a convincing way, and we expect the same of every great work of art. Therein lies its profundity. To attribute profundity to a work of art is a matter of judgment rather than of taste.

The personal hazard incurred in the acceptance of a work of art, which characterises the act as a responsible commitment, is made obvious by the fact that it may prove mistaken. The sights and sounds hailed today as artistic treasures may come to be regarded by me as tawdry or even meaningless tinsel tomorrow. I would then regard my past appreciation of them as an aberration

of taste or as proving that my judgment had been misled by superficial qualities. That would be deeply mortifying, for when I am made to despise what I respected, I am ashamed for having respected it.

This accounts for the violence of clashes between persons holding contrary opinions on the merits of works of art. There were scenes of violence around the exhibitions of the early Impressionists in Paris. There was fighting in the Parisian audiences of Stravinski 40 years ago and similar disturbances occurred in various countries at the first performances of some of Wagner's operas.

In such conflicts the two sides are actually fighting for their lives, or at least part of their lives. For in the universe of each, there is an area which can be kept in being only by denying reality to an area in the universe of the other. In protection of his own life insofar as it is guided by art, each side must claim universality for a standard of perfection the affirmation of which is an outrage to the rival standards upheld by the other side.

The Soviet Government has given indirect recognition to the act of personal responsibility involved in the enjoyment of art by insisting on the suppression of any such personal acts. Its exercise of detailed control over the appreciation of painting, music, poetry and fiction may appear as a piece of gratuitous officialdom unless it is realised that anyone who abandons himself to the admiration of a work of art, does in fact pledge his allegiance to something beyond the control of any government, and that a strictly totalitarian regime must regard this as an intolerable act of disloyalty.

Pure mathematics and works of art cannot be verified by experience. When you understand a symphony, a painting or a poem you have gained a new knowledge. But it is the knowledge of an experience and of the work of art from which that experience is derived, and not knowledge of things to which the work of art

refers in the way a map refers to a country or a theory to a set of possible observations. My quotation from Proust illustrates what such knowledge consists in. It may admittedly enlarge our whole outlook and make us see and feel differently on a thousand subsequent occasions. But this merely extends the scope of living by a work of art beyond its actual enjoyment to the experiencing of the world by its guidance; our acceptance of works of art remains comprised by our <sup>dwellling</sup> living in them and respecting them.

Routine acts of validation follow the precedent of previous acceptances and this relation constitutes a rule of appreciation. These rules are indispensable in guiding our discrimination of art, but they must necessarily obstruct the acceptance of new works differing profoundly from any that were accepted before. Proust in the passage which I quoted, compares the acceptance of essential novelty in art to the way a person born blind acquires vision after an ocular operation. The analogy is penetrating, for the newly seeing person has to learn the use of his new faculty by sustained close attention to the shapes and colours of things and may be irritated and repelled by the apparent pointlessness of such efforts. At first his new sights are but confusing admixtures to his established universe of touches, sound and motoric experiences. Only after he has built up a coherent visual world is he able to rely on his eyesight and enjoy what he sees. While conversely, each step in visual understanding depends on his anticipatory willingness increasingly to rely on eyesight and to contemplate shapes, colours, shades, contrasts, as yet beyond the range of his understanding. This is exactly how the validation of a strangely novel piece of music, painting or poetry is achieved. We must contemplate at first uncomprehendingly and superficially its sounds, sights or words in the hope of discovering their pattern which alone can evoke their full impact on our senses.

Appreciation of a novel content and sensibility for its elements must be achieved jointly by alternate anticipatory advances in either respect.

Such a validation is not an application but a modification of existing standards, and to its extent the decision to commit ourselves to a novel work of art is entirely our own personal act, unguided by any previously accepted rule.

We undertake responsibility for this acceptance of new standards in the belief of their universality and we may expect some confirmation of this in the judgment of posterity, but otherwise it can have no external verification. It is typically an existential choice which can be justified only from the point of view of the new existence chosen by it. That is true of course also of religious conversion and even of such great changes in scientific beliefs as occurred from Kepler to Newton, and again from mechanistic physics to quantummechanics. But the purely internal reference of art makes the act of artistic conversion more comprehensively personal. It cannot hope to be relieved from any part of its responsibility either by God or the facts of nature.

12. Turning now to science the verification of a scientific theory includes in general a process which is similar to the validation of a branch of mathematics or of a work of art. Few observational facts are referred to in a textbook of relativity; perhaps fewer than in a course of musical composition. We may accept a physical theory largely, and even entirely, on account of our recognition of its beauty and power. The heliocentric theory had no other advantage than this over the geocentric theory when Copernicus adopted it. But the validation of a theory in empirical science, namely the appreciation of its beauty and power does not as a rule definitely secure its acceptances; the validation of a theory usually looks forward to future

verifications of the theory and it cannot outlive its refutation by experience. Only to the extent to which it is not falsifiable by experience can a physical theory be said to be validatable.

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It is not possible to separate the process of experimental verification from the validation of a theory on grounds of its rationality. For we do not accredit observations irrespective of their bearing on a theory so far accepted as rational.

Verification is never free from such considerations; ~~yet they~~<sup>it</sup> contains an important element which is not determined by such considerations. ~~assess these separately, before drawing a final conclusion in respect to both by a joint assessment of the two.~~

13. In religion such a separation seems impossible. Religious practices constitute a formalism which is transparent to the believer and makes him experience not itself, as would a work of art, but God to whose presence it ushers him.

An experience of God is not an observation for it overwhelms and pervades the experiencing person; and unless a person remains substantially unchanged during his experience, that experience cannot be regarded as his observation, but should be described as an event in which he has become involved.

A response to a prayer is such an event, and its relation to the prayer may be regarded as similar to the relation in which a recovery from a disease stands to the medical treatment which preceded it. It tends to confirm its efficacy as well as the assumption underlying it. That is, in the case of the prayer, the believer's faith in God. This might be classed as a verification. On the other hand, the relation may be compared to that of a state of happiness resulting from the performance of a passionate dance. It would then merely validate prayer as a religious act without accepting any implication that this confirms the existence of God. This would be the position of an apophatic theology which denies that anything can be properly

said about God, while teaching that God may be addressed and loved. I myself feel inclined to the latter persuasion.

In the next lecture I shall return to a consideration of the exact sciences in the light of what I have said about validation and verification. We shall find that processes of validation enter into science itself in ways which were not apparent from the single example of classical mechanics.