

LECTURE 2.

WORKS OF ART*

I have shown that an explicit account of a Shakespearean metaphor turned it into grandiloquent nonsense and similarly the prose rendering of a great sonnet reduced its content to a piece of callous self-adulation.

Further back, we have seen that the new theory of meaning presents us with the basic mechanism of the way explicitation brings about such destruction. The mechanism for destroying the meaning of a word consists in shifting our focal attention from the meaning of the word to the word as a bodily object. The meaning of a metaphor is destroyed likewise by shifting our attention from its meaning to the constituent parts of the metaphor, and the meaning of a poem is destroyed by turning our focal attention from the poem's meaning to the narrative content, which is one of the subsidiaries of the poem.

But the damage done by a specification of metaphors and poems has certain aspects the analogues of which are hardly noticeable when breaking off the bearing of a word in its object. The subsidiaries composing metaphors and poems are joined together by an imaginative performance far richer than any imaginative action linking a word to its meaning. To reduce a metaphor or a poem to its disconnected subsidiaries, is to break the vision which linked them to their own particular ideas. What is left is but a caricature of their true meaning.

But to see the structure of poetry we must distinguish it from the metaphor. To integrate two disparate matters does not amount to a work of art. Maybe the twentieth century will reject the very idea of works of art, but a rejection of art would only add precision to the old conception of art. My enquiry into the loss of meaning in our time must define the meaning of the art before I can speak of its loss, or possible loss.

I have moved from talking about poetry to works of art in general and this extension was deliberate; but my study of works of art will include only painting,

* Polanyi gave this lecture on 21 May 1969 at the University of Chicago. Three variants of the text can be found in the collections of the University of Chicago Library; two in Box 39, Folder 7 and one in Box 40, Folder 9. From the texts that Box 39, Folder 7 contains, we chose to publish the variant which includes corrections in handwriting. In English it appeared only in parts in the fifth and sixth chapter of Michael Polanyi and Harry Prosch, *Meaning* (Chicago: University of Chicago Press, 1975), compiled with the text of Polanyi's lecture given in May 1970 also in Chacago, with the title *Meaning*.

sculpture and stagecraft as an addition to poetry. We have then before us all the arts that clearly represent something, and I shall limit myself here to these arts.

I shall start from the old question how works of art can go on telling stories that are not true. I. A. Richards gives a good example of this paradox. He says that the theatrical presentation of a murder „has a different effect upon us from that which would be produced by ... actual murders ... before us.” (Richards 1924, 110) The question is how this is done. I reply to this by recalling the paradox of the metaphor, the fact that in a metaphor we say one thing and think of other things. We have a similar case in the theatre. In witnessing a murder on the stage we are aware of the setting and the antecedents of the stage murder, which are incompatible with the murder to be genuine and – just as in the case of the metaphor – we do not reject these contradictory affirmations, which would make the stage murder a nonsensical deception, but we call up our power to integrate incompatible matters into a joint meaning. This joint meaning has here the peculiar quality of a dramatic event visible only to the imagination: just as the meaning of a metaphor, produced by integration of its two incompatible elements, is known to us only by our imagination of it.

A dramatic event is a work of art and the structure of dramatic events is typical of all works of art. Stage plays have an exceptional range of subsidiaries. The playwright, the director, the actors, the designers, the whole theatre and the mechanism of stage properties, are all involved in a dramatic performance. We shall see, that poetry and painting are also cases for studying these structures of art.

By analogy to the murder in the theatre, to which we do not respond as if it were real, we could say that the effect of Shakespeare’s 18th sonnet differs altogether from that of its content as stated in prose, because the meaning of the sonnet is rooted in a host of poetic subsidiaries which are disregarded in any prose account of the sonnet’s content. But there is more to this. The sonnet as a work of art is not merely enriched and altogether recast by its poetic subsidiaries, but these subsidiaries also serve to cut the sonnet off from the person of the poet and sanction its fused body.

In order to see this better we have to go back on a great over-simplification that I committed until now in my account of integration until now. I have talked about the integration of retinal snapshots to a perception; of a set of movements to a skill; and went on to describe the integration of disparate objects to the formation of a comprehensive class that covers them, and then I dealt with the integration of widely different ideas to a metaphor, which is linked to poetic integration. I have given weight to the fact, that as we ascend from physiologically performed integrations to the formation of concepts, of metaphors, and, finally, of works of art, integration requires an increasing measure of imaginative effort. Since men notoriously differ in their imaginative faculties, it was implied that many would be unable to perform an integration, which others, more gifted for this task, may achieve. We may now add to this the obvious fact, that the very possibility of a highly imaginative integration will remain undiscovered, until it is actually carried out by a mind of exceptional powers and equipment.

All this was clear enough from my account of a whole range of integrations, but it did not make clear that there are objective limits to the possibility of integrating things. Such facts are actually obvious. In nature untouched by man, all things may be said to hang together to some extent, but we commonly recognise distinct objects, which cohere far more firmly by themselves than they are linked to other likewise coherent objects. Besides, modern science has discovered a vast network of coherences, unknown through the ages, and has dissolved as illusory many seeming coherences accepted as genuine before. Modern engineering has invented innumerable contrivances. Poetry, painting and drama have populated our imagination with works coherent in a number of various ways. Works of science, of engineering and the arts, are all achieved by the imagination, but once a scientist has made a discovery or an engineer has produced a new mechanism, their possession needs little imagination, while this is still needed in the arts. Though the creator's imaginative vision surpasses by far the vision he imparts to his public, all arts live in the imagination of its public.

At the risk of labouring the obvious, let me make quite sure I can rely on these facts for the theory of art. Let it be understood that every time our powers of integration produce a coherence, they do so by cutting off the subsidiaries of this integrated body from its connection with other experiences. This is the principle which makes a discovery, an invention or a work of art into a body of living thought severed from the personality of its maker and the response of its audience.

I. A. Richards writes:

“Through its very appearance of artificiality metre produces in the highest degree the ‘frame’ effect, isolating the poetic experience from the accidents and irrelevancies of everyday experience.” (Richards 1924, 145)

Motor and rhythm are but one integrated artificiality of a poem among many others. Rhymes, expressive sounds and peculiar grammatical constructions, strange connotations of words, and above all metaphors, are other poetic voices. They all function as subsidiaries which, combined with the prosaic of the poem, do form the meaning of the poem.

Normally people talk in prose and this is true also for the usual conversation of poets. Anyone addressing us in rhymed and metrical speech would be taken to do this as a joke, unless we suspected a pathological obsession, similar to that of obsessive punning. Hence a poem can form no part of a poet's usual personality. The formal structure of a poem, which has so much of the poem's meaning in making it, forms a blockage insulating the poem from the poet as a person. If, entranced by a poem, we repeat its words during our lifetime: it is the poem that speaks to us, not the poet.

The same holds of course for the theatre. The persons of Hamlet, Othello and Shylock are known as their great selves and not as parts of Shakespeare's dimly known person. A painting by Cézanne will be instantly recognised by many people who know next to nothing of the painter. These facts are so obvious that one hesitates

to tell them in such detail: but their significance is not being fully recognised. So let me tell about them in a few more lines here.

I have compared Shakespeare's 18th sonnet with the poet's telling to his mistress: „You are beautiful, but you will fade and die, except for being recalled by my own immortal verses.” We can see now that the poem does not speak as the poet's voice, and it tells not what it would say in prose. For its meaning is formed by the integration of such things as could be told in prose. It is the integration of a prose content with an artificial pattern that produces a joint effect of the poem. In this meaning we are subsidiarily aware of its components which, when viewed focally, are incompatible, but which speak in one voice in the subsidiaries of the poem. This is how the grotesque content of its prosaic version is dissolved in the lines of Shakespeare: and this fact is but an instance of the rule – exemplified in many different ways in my first lecture – that the integration of subsidiaries produces a perception that differs both in appearance and content from its constituents.

A *radical novelty* is produced here by the poetic imagination and its reader absorbs this novelty by the powers of his own imagination. Thus we, the readers, come to share in our enjoyment of a poem the detached position the poet has in his relation to his poem. We enjoy it *in itself* and not as we enjoy the satisfaction of any personal matter of our own.

This is also how we can watch a murder in a play in integrated conjunction with its theatrical subsidiaries, without either jumping up to rescue the victim of a stage murder or feeling that this pretending of a murder is nonsensical. We accept the clues which the play offers to our imagination for sharing its meaning.

This is what Kant meant by defining the aesthetic appreciation of art as a disinterested pleasure. And it accords with the claim made for painting by Konrad Fiedler that art is „a production of reality.” But these terms are worn out and must be re-sharpened by our structural analysis of art.

Looking again at poems and also at paintings, as well as at the sculptures or plays, we see them now as so many fixed packages of clues, portable and lasting. Their durability is vastly superior to that of our personal experiences for the coherence of their parts is so much firmer and more effectively organised. I. A. Richards has described, by contrast, the looseness of our personal experiences. (Richards 1924, 237)

In ordinary life a thousand considerations prohibit for most of us any complete working out of our response; the range and complexity of the impulse-systems involved is less; the need for action, the comparative uncertainty and vagueness of the situation, the intrusion of accidental irrelevancies, inconvenient temporal spacing – the action being too slow or too fast – all these obscure the issue and prevent the full development of the experience. We have to jump to some rough and ready solution.

All that poetry tells us it owes to its artificiality; it is their artifice that makes poets to be Shelley's „unacknowledged legislators of the world.” But I must set aside for the moment these powers so as first to include other cases of art, especially painting.

Let us think of painting as it was done in Europe since the Periclean times of Greece for about a thousand years until the Byzantine period, and then again since Giotto and Duccio up to the end of the last century. This kind of painting aimed at making a likeness of things perceived or imagined. Giotto was hailed for making painting lifelike. A century later the imitation of depth by central perspective was developed to the general applause of the Italian public. The last major innovation that promised closer simulation of nature, was that of French Impressionism. And then came a change: the Twentieth Century challenged the ideal of simulation; by new forms of art and other structure.

The strange thing is that all through these times, works of painting and sculpture were poured out by artists to the general acclaim of their public without a feeling of disappointment at the fact that these works never produced the illusion a simulation must be deemed to aim at, namely that it be mistaken for the things which it represents. This was hardly ever achieved and when it occasionally did occur, it was not hailed as the final triumph of visual art.

In a chapter on „Ambiguities of the Third Dimension” of his *Art and Illusion* (1960), E. H. Gombrich surveys past observations on the manifest contradiction between paintings simulating a depth and the actual flatness of the canvas. He quotes the French neo-classical critic Quatremere de Quincy dated 1823:

„When the painter packs a vast expanse into a narrow space, when he leads me across the depths of the infinite on a flat surface, and makes the air circulate ... I love to abandon myself to his illusions, but I want the frame to be there, I want to know that what I see is actually nothing but a canvas or a simple plane.” (Gombrich 1962, 236)

But Gombrich points out that illusions studied by psychologists are destroyed by shifting our attention to an alternative view which contradicts the illusion. „Is it possible (he asks) to ‘see’ both the plane surface and the battle horse at the same time?” and he replies that this is impossible: „To understand the battle horse is for a moment to disregard the plane surface. We cannot have it both ways.”

It is true of course that alternative views representing alternative integrations of the same scene may totally exclude each other. But we have seen ample evidence also of facts which, seen focally, contradict each other and are yet integrated as subsidiaries to a joint meaning of them. So I take this to be so here. The conflict between the perspectivic illusion of the painting and the flatness of its ground is resolved by the same mechanism which fuses the contradictory parts of a metaphor and fuses likewise the formal pattern of a poem with its content as given in prose. Thus the painting as a work of art is unified in terms of visual qualities that do not exist in its separate parts.

Let me add here some experimental work by psychologists that shows how sensory contradictions are resolved in terms of a combined sensory innovation. In an article on Vision and Touch Irving Rock and Charles S. Harris demonstrated this fact as follows (Rock and Harris 1967). A subject, made to practice doodling while

wearing a right-left inverting prism, soon feels his hand to be at the place where his eyes wrongly show it to be: asked to write down some letters and figures with eyes closed he writes them right left instead of left right. A more far reaching integration of conflicting clues in the terms of sensory innovations has been found to underlie the way one finds one's way wearing inverting spectacles. The work of Kottenhoff (1956) has shown that the visual image remains inverted and the subject learns to find his way by reintegrating the inverted image to all his proprioceptive, auditory and gravitational clues. (See references in the annexe.) Sensory innovations of this kind amalgamate conflicting clues and this is the way the viewing of a painting unites the conflicting clues of depth and flatness into the distinctive pictorial quality of the painting.

The theory that our subsidiary awareness of the canvas affects the way we see a picture was first put forward by M. H. Pirenne (Pirenne 1963). He pondered the strange behaviour of the picture covering the ceiling of the Church of St. Ignatius in Rome, done by the Jesuit Andrea Pozzo about the end of the 17th Century. This painting shows, among other figures, a set of columns which appear to continue the pilasters supporting the ceiling. But it can be seen thus only from the middle of the aisle; from other parts of the floor the columns appear curved and lying back at angles to the supporting structure of the church. Dr. Pirenne explained these facts by suggesting that the viewing of an ordinary painting from the side produces a distortion of appearance only when the perspectivic illusion of the painting is so perfect that it makes the painting appear three-dimensional, and that other paintings are insensitive to the angle of viewing, because their perspectivic design is not fully convincing, because the viewer remains aware of facing the flat canvas of the painting. Dr. Pirenne believes that this kind of awareness reduces the illusionary powers of the perspective and enables us thereby to retain at skew angles of viewing an undistorted appearance of the painting, the particular appearance we chose being the one we see from the correct center of perspective. Our eyes seem to select this appearance for all positions of viewing, because it resembles the way the painted object is seen in nature.

When describing the way that in looking at a painting we are aware of its flat canvas, Dr. Pirenne called this a „subsidiary awareness” of the canvas in the sense of my theory of semantic integration. I recognise fully that it was Dr. Pirenne's work that initiated my treatment of the way we view a painting. But I could not include his further argument in my text, for I would prefer not to rely altogether on the particular evidence he uses.

We can distinguish thus sharply between three conditions of brush strokes and canvas. 1) *Trompe l'oeil*: the brush strokes are integrated to a joint meaning which is identical with that of the external object represented; 2) *Work of art*: the brush strokes integrated to a joint meaning with background elements like the canvas of which we are unaware in forming a *trompe l'oeil* and which are indeed focally incompatible with the external object represented by the painting; 3) *Focal view of the*

brush strokes and the canvas which destroys their semantic integration and reduces the painting to a meaningless aggregate of paint-blobs covering a flat surface.

But I have yet to explain why an illusory likeness of its object has not been acclaimed as the perfect achievement of simulation, during the long period which strove by all manner of ways to perfective simulation. The answer may be found in the words of I. A. Richards on the superiority of poetic expression over the effect of our personal experiences. When we see the external objects represented in a painting as facing us as their usual selves, their significance is reduced to that of being some objects among innumerable others, which usually means them to be viewed from a trivial point of view. We realise instantly to what abysmal triviality a still-life by Cézanne would be reduced, were it made to convey the illusion of real fruits and vegetables offered for sale in a recess of an exhibition's wall. We can appreciate then the fact that the joint integration of brush strokes and canvas lends all paintings a distinctive artificial quality which distinguishes them from all natural sights. It secures the *artistic reality* of a picture which guards its distinctive powers from dissolving in the surroundings of *factual reality*.

Sculptures are usually secure against being taken for the subject they represent. But suppose that, as victims of Madame Tussaud's skill, we addressed a girl at her cloak counter and found her to be made of plaster, we would not hail this product of plastic simulation as a work surpassing Michelangelo's Moses, so easily recognised as a mere statue. And the same applies to the stage. An actor playing Hamlet, who would create the illusion that he was actually dying from the poisoned rapier of Laertes, would produce a disgusting disturbance. His aim must be to produce the play in which Hamlet is killed by Laertes.

Hence Coleridge's view that art requires a „willing suspension of unbelief“ is doubly misleading. We do not appreciate a work of art, whether it be poetry, painting, sculpture or drama, by suspending our disbelief in their prose content. A work of art represents *facts of the imagination*, it does not affirm any *facts of experience*. And if we took a work of art for a prose fact, we would reduce it to a worthless illusion. To appreciate a work of art requires belief in that which it means, not disbelief in something that it does not and must not assert.

We recognise the meaning of a work of art without effort if the style of the work is familiar to us. Styles have changed continuously since the Periclean age of Greece, but the changes were slow enough to be understood and welcomed by later times. However, the last hundred years have brought innovations in all forms of art so radical and frequent that they continuously challenged hitherto accepted styles and standards. Some of these innovations were violently opposed for some time, but gained recognition soon after, which eventually resulted in complete transformations of arts, including in particular poetry, painting, sculpture and drama, the arts which I have dealt with here.

These changes brought out a number of facts about art. Opposition against innovations denied to the artists the support they needed for their living. But

they accepted the sacrifice and, renouncing the comforts of bourgeois society, they founded a community accepting neediness, within a permissive, subversive bohemianism. The profound dedication of the innovators was matched by the opposition against them. Upholders of the academic tradition were not satisfied with ignoring the works of art which they did not appreciate, and menacing thereby the livelihood of the innovators, but went on to denounce them as frauds and sometimes violently interrupted the performance of modern plays and operas. They showed as vital an attachment to the existing forms of art, as the innovators had shown at first to their new ideas.

The situation gave rise to a group of critics who recognised the prospects of the modernists, and supported them by explaining their principles. And this evoked in turn a larger number of disciples who became convinced that the new forms of art held a meaning which was worth the effort of penetrating to it. It became part of a modern education to explore by the exercise of the imagination the meaning of the new, puzzling works of art.

These conflicts lasted from about mid-nineteenth century to the thirties of this century. We had two opposing camps, bourgeois academics and the bohemian moderns, the moderns supported by avant-garde critics and a section of the public striving to keep up with progress. I shall deal in a later chapter with the changes in artistic content during the whole period, for the moment I am concerned mainly with a strange transformation of the relation between the artist and his public. Trained during years of battle for new forms of art, modernist critics and their followers developed an unprecedented facility for interpreting unusual art forms, and this facility spread widely among the public. This reduced resistance against artistic innovations to the point that innovators could henceforth count on speedy recognition. The battle between bourgeoisie and bohemians was ended. And these events changed the relation between artists and their public. Poets, painters, sculptors, playwrights and also novelists and film producers, could count on the capacity and willingness of the public to develop scanty, complex clues in the light of their own imagination.

The life of art in society is the work of the artist's imagination as renewed by the imagination of those who receive it. We have seen this imagination rooted in the act of perception and in every deliberate motion of our limbs. Perception of things hitherto unknown might be taken to include scientific discovery. The technical structure of a bird's flight or of man's upright walk presents, when analysed, an ingenious combination of bodily parts functioning together like the parts of a machine. They are the primordial groundwork for the invention of skills, of the use of tools and the feats of engineering. To arrive at the structure of art we have moved from the physiological achievements of meaning to the structure of language, of conceptual terms, of symbols and metaphors, and we have met along this way increasingly accentuated workings of the imagination. I have avoided until now the question, on what grounds we may justify the making of poems or paintings

or plays. To get at this question, which was the centre of all past aesthetics, I shall follow up the parallel line leading from perception and voluntary motoric actions to science and technology, and then compare their content with that of works of art. The ideas of science and technical invention can be understood when they are starting an enquiry and are guiding its pursuit. I shall speak of science first and then generalise to technical invention and art.

Scientific enquiry consists of three parts: first the finding of a problem, then an enquiry into the problem and finally, if the search was successful, the solving of the problem. In recognising a good problem and deciding to pursue it, the scientist must show an exceptional sensitivity to promising clues. He must be able to guess with a high degree of probability that there is something important lying hidden in a particular direction, and he must be able to assess that this hidden thing is accessible and that it will yield results worth the effort and expense of the enquiry. In a modest way, all of us commonly exercise such faculties, but the scientist must have exceptional powers of such anticipations in his subject if his enquiry be not inevitably doomed before it ever started.

All three sections of a scientific enquiry are set in motion by two mental powers. They receive their guidance from *integrative powers*, while they are propelled and supplied with suitable material by *thrusts of the imagination*. The integrative powers are largely spontaneous and to mark this, we may give them the name of 'intuition.' All the labour and anguish of the creative effort goes into the thrusts of the imagination; intuition is effortless. At the inception of an enquiry intuition predominates. Imagination enters at this stage only by keeping intuition alert to sensing a problem. We may describe these anticipatory judgments that guide the sighting of a problem and the decision to enquire into it, the work of a *strategic intuition*.

The enquiry opens by a thrust of the imagination in the general direction suggested by the problem. The thrust, if successful, will reduce the vagueness of the problem, and offer a firmer guidance for the next push towards a possible solution. The whole course of the quest is filled by laborious efforts of the imagination, broadly guided by a *questing intuition*, which also continues to select from the fragments mobilised by the imagination those which promise to become part of the solution.

Poincaré who has described this process, has told how the quest is often brought to a close after a quiet interval, while the efforts of the imagination are at rest, by a sudden illumination which offers a solution for the problem. Such an event is purely spontaneous and so may be called the work of a *concluding intuition*. The result may yet turn out to be false and to send us back to resume our quest and perhaps to fail in the end. But we have always the same story. An idea appears, given by intuition to be pondered by the imagination. Second, the imagination is let loose to hammer out a path of possible clues, guided by intuitive feelings. And thirdly, an idea offers itself intuitively as a proposed conclusion to be pondered in its turn in the light of the imagination

Technical inventions are made through the same three stages. One sees a

problem, anticipates its feasibility and worthwhileness, thrusts one's imagination in a direction that promises success, and finally sights a solution that appears satisfactory. However, the content differs from that of science. The aim of a scientific enquiry is indeterminate, and much as the pursuit of what we dimly anticipate is indeterminate too; while the problem of an inventor is always fixed, much as the aim of a deliberate movement, or the effort of acquiring a skill. And, of course, in technology the test of an apparent solution is more practical than it is for scientific discoveries.

I have claimed that my theory of meaning differs from gestalt psychology by including the effort of achieving a solid real coherence and also the risk of going astray in our judgment of coherence. It was clear from the start that the effort to recognise coherence or to contrive it must lie in the force of the imagination. We can see now that this force is always combined with spontaneous integrations, that can be called intuitions. So the original conception of gestalt appears now to cover only the case when integration occurs without any marked effort of the imagination. Though even so, intuitive integration would in general differ from a classical gestalt formation by claiming to be meaningful and true.

But the most intense interaction of imagination and intuition is at work in the relentless chase from problem to discovery – the chase from a view to a death. Throughout the middle section of the enquiry the imagination is heavily engaged in its quest of the missing solution. In this it must be guided by powers of anticipation, since otherwise its chances of hitting on an appropriate hypothesis would be one in a million. This point is fundamental. The imagination does not work like a computer surveying millions of useless alternatives, but by producing ideas guided by a fine sense of their plausibility, which contain aspects of the solution from the start. I stand by what I wrote about this a quarter of a century ago: „A potential discovery may be thought to attract the mind which will reveal it – inflaming the scientist with creative desire and imparting to him intimations that guide him from clue to clue and from surmise to surmise. The testing hand, the straining eye, the ransacked brain, may all be thought to be labouring under the common spell of a potential discovery striving to emerge into actuality.”

The scientist's anticipatory powers are clearly manifested in the very existence of good problems. A good problem is invaluable, for it offers a pointer to important facts which can as yet be but dimly surmised, and it anticipates also the accessibility of these unknown facts and the worthwhileness of searching for them. The problem lives in the imagination and this is the point from which the imagination starts thrusting towards a solution of the problem.

The imagination is still at work at the other end, when a solution has been found. The thrusts of the imagination have subsided, but a belief that we have found a solution to our problem is fraught with anticipations, which we can entertain only in the imagination. A new theory that claims to be real, anticipates by this claim an indefinite range of future, yet unknown, manifestations. The solution of a technical

problem has perhaps less widely indeterminate implications, but they are wide enough to engage the imagination substantially by entertaining them.

This completes our preparation for comparing works of art with discoveries and inventions. Remember the from-to structure of meaning. The subsidiaries bear on the focal; they mean something to which we attend from them. We have seen how such a semantic relation can be established by integrating subsidiaries to a focus. This led us to the integration of artificial patterns to matters that can be stated in prose, which results in a work of art. We saw how the imagination at work here produced an object of the imagination.

The quest for scientific discovery integrates fragmentary clues to an unknown coherent meaning, while technical invention starts on the contrary by setting itself a definite aim and seeks then the means for contriving it. To produce a work of art is to make something never seen before, and in this essential feature the artist's quest is nearer to that of the scientist, than to that of the inventor. This may seem strange, for the artist does not find things hidden in nature as the scientist does, but contrives his product as inventors do, in fact some arts, like painting, are mere variants of a handicraft. Yet H. W. Janson is right in saying that:

„the making of a work of art has little in common with what we ordinarily mean by 'making'. It is a strange and risky business in which the maker never quite knows what he is making until he has actually made it, or to put it another way, it is a game of find-and-see in which the seeker is not sure what he is looking for, until he has found it.” (Janson 1962, 11)

But the kinship of art to technology is important too. This comes out better if we put these comparisons in terms of from-to integration. A scientific problem consists of subsidiaries anticipating an unknown focus. A technical problem consists of a desirable focus anticipating subsidiaries that will implement it. The scientist's quest has the structure of asking „What do these words mean?”, while the engineer's quest has the structure of asking „What words will express my meaning?”

To search for words to express one's meaning may seem to be exactly what a poet does and is hence perhaps central to all art. But remember that the meaning of a poem comes into existence only with its words. He starts with a problem that is largely indeterminate at both ends: it is open in its aim as much as in the means for achieving it. One can watch this best in a painter's progress. H. W. Janson, l.c. describes it:

„The creative process consists of a long series of leaps of the imagination and the artist's attempts to give them form by shaping the material accordingly. The hand tries to carry out the commands of the imagination and hopefully puts down a brush stroke, but the result may not be quite what had been expected, partly because all matter resists the human will, partly because the image in the artist's mind is constantly shifting and changing, so that the commands of the imagination cannot be very precise. ... In this way, by a constant flow of impulses back and forth between

his mind and the partly shaped material before him, he gradually defines more and more of the image, until at last all of it has been given visible form.” (Janson 1962)

In the twentieth century we have seen a progress in physics which changed the very terms in which we understand nature, and the inventions of modern technology have frequently included the invention of the needs which they satisfied. Science and technology have, to this extent, brought changes in the very substance of intellectual and material existence of man. But all arts work like that. They search for means for solving a problem conceived for this very purpose, and pursue this quest while continuing to shape this problem to fit the means for solving it. A creative work involving jointly both means and ends we have in the way the child grows to a higher level of maturity. Art is a deliberate growth of man’s existence.

Both the inception of a scientific enquiry and the undertaking of a technical problem are based on imaginative anticipations of unknown facts; to start on a work of art is to anticipate a result which will exist first in the imagination of the artist, and then in that of his public. An artistic problem is the imaginative anticipation of a fact of the imagination.

I have said that the artist’s work is a constant invention of means to express his aims, coupled with the re-adjustment of his aims in the light of his means. This manner of deliberate growth resembles scientific or technical enquiry in offering sometimes opportunities for sudden inspiration and demanding on other occasions the taking of infinite pains; for there are examples for both ways in every art.

The greatest difference between the arts on the one hand and both science and technology on the other, is found at the end of their pursuit in the way the two are tested. Technical inventions and scientific discoveries are subjected to much more impersonal tests than are works of art. But however important be this difference, it is not absolute and the nature of artistic validity will be understood better by showing the way personal criteria apply even to essentially impersonal works of the mind.

I shall outline the situation for science. It is generally agreed today that we have no strict proof of any parts of science. This fact is set aside by saying that the statements of science are only probable and merely tentative, but this is an exaggeration and anyway irrelevant. The fact is that we accept and vitally rely on scientific observations and that we do this on the ground of non-strict criteria. Our reliance on the validity of a scientific conclusion depends ultimately on a judgment of coherence, and there can exist no strict criterion for coherence, our judgment of it must always remain qualitative, personal.

Moreover, the recognition of a proposed contribution to science is controlled by a system of subtle values which are decisive in shaping the very conception of science. There are three main scientific values. Other matters being equal, a contribution to science is the more precious, the more clearly and impersonally we can establish the variable on which it relies; and again other things being equal, the deeper and wider the systematic aspects of the contribution the more valuable it is; and thirdly,

both these values are transcended by a pre-scientific value, that is by the ordinary interests of the subject matter. The proportion in which these three values are found in different sciences varies greatly, yet these varying combinations must be assessed jointly as one total value, for this is essential for the rational conduct of science.

But who is to decide the assessment of values? How are the values to be cultivated, while fostering originality which may demand a renewal of values? Consider the fact that no single scientist can judge by his own critical understanding any scientific work lying at some distance of his own field, let alone at such distances as we have, say, between mathematics and medicine. How can any valid consensus of valuations between thousands of scientists spread over the planet be hoped for, or even known to exist had it been somehow established?

I have tried to answer these questions elsewhere. Here I want to show only that the pursuit of science is fraught with value judgments and is perplexed by doubts how to exercise such value judgments much as the arts are.

The scientist applying non-strict criteria to the valuation of scientific merit does so in the conviction that these criteria are universally valid, and scientific opinion endorses this claim. It requires such value judgments to be objective and relies on them to be so. Their validity is attested accordingly by the authority of scientists as a body.

The success of science in universally imposing such self-set standards of value, lends support to a similar practice in the life of the arts. But to see this kinship in its full depth we must first have before us those features of the arts in which their force is manifest.

The arts are works of the imagination, and so are the sciences. But all our hopes and fears, all our memories and our very feeling of ourselves, our suppressed desires and hidden remorse, all that we see in sleep, and indeed in daytime perceptions and deliberate bodily motions, all these are works of the imagination. What then makes the mention of the imagination instantly evoke the works of art? What comes to mind instantly is that the arts alone aim at transmitting their imagination to a public, to successive generations of publics, and depend on the imaginative powers of these people for gaining their foothold. But we can say also what it is that qualifies the arts and the arts alone for this enterprise. Our lives are formless, submerged in a hundred cross currents. The arts are imaginative representations cut into artificial patterns and these patterns, which when jointly integrated with an important content, produce a meaning of emotional quality. It is this wholly otherness of art that isolates it from the shapeless flow of our personal existence, and of society and public life. It makes works of art detached, in many cases portable and reproducible, potentially deathless.

In poetry, the intensity of artistic imagination is fed by inventing far spanned metaphors. The pursuit of science may invoke powers of the imagination for integrating widely scattered pieces of evidence to form a new discovery; but the fusion of these previously unconnected clues will be quietly accepted as a fact. Not

so the fusion of disparate subjects to a metaphor. It will continue to sustain much of the imaginative fire that had served to create it, and those who respond to the metaphor will be moved to answering visions and feelings.

When the artificial frame of a work of art, including its prose content, establishes the detached position of the art, it also claims that its value is universally valid. This is the point which I anticipated when passing from science to the arts. The artist may rightly argue that when he claims universal validity for his self-set standards of value, he is but acting as scientists do when claiming objective validity for their own self-set standards of scientific value. But the maker of a work of art does claim more. A work of art bears the mark of its creator. Name a major painter or sculptor, poet or playwright of past centuries and his manner will readily come to the mind of many a knower of art. A scientist will have his own style in setting up problems and pursuing them; and he may bring about some changes in the standards of scientific interest and even of validity, but once accepted, these modified standards will be applied in their own enquiries by all scientists. Only a forger will try to paint new Renoirs or Cézannes, or to write new Shakespeare sonnets or Ibsen plays. By framing his work, the artist detaches his product from his personal life, but by this very act he includes his own unique artistic problem and its solution by him in the frame that demarcates the property he offers to the public. The artist detaches himself as an artist from himself as a private individual and embodies his artistic person in his work. Hence all art is as intensely personal as it is strictly detached, and must claim universal validity for the personal self-set standards which it obeys.

This clearly goes beyond the appraisals which scientists accept as objectively established. But it does not exceed substantially the claims accorded to self-set standards by which the pursuit of science is guided. Mature scientists are trusted to use considerable sums of money – and the time of their assistants – to explore problems which they personally deem to be more promising than other possible lines of enquiry, and they are trusted still further in pursuing their own hunches. Their imaginative anticipations of feasibility and worthwhileness are accepted, and these assessments have proved right sufficiently often to justify this policy; the more so, since there is no alternative available to this policy.

One could think that, on somewhat similar lines, one could shift the final responsibility for artistic innovations to their acceptance by the public. But this would merely extend the range of relevant self-set standards to include those of non-artists. The inclination of twentieth century audiences to appreciate almost any innovations, might well make us hesitate to rely on their critical judgment. One should rather prefer to rely on those who must labour and suffer to satisfy their self-set standards by their own work. Their perseverance in spite of being rejected by the public, may often be a better test of self-set standards than the ready acceptance of them. This was certainly so in the period from about 1870 to 1930.

Art has no tests external to art. Its making and acceptance must be ultimately grounded on the decision of its maker interacting both with tradition and the public's

present inclinations. The fact that the artist labours to meet his self-set standards is warrant that he submits to these standards as being not of his own making. He may be the first ever to recognise them, but he yet feels bound to them. For to him his innovation of standards appears to be a discovery, just as the acceptance of a statistical understanding of nature was a discovery in modern physics.

That these grounds of artistic creation are ultimate, does not mean that they are infallible. They may be contested, just as the statistical explanation of quantum theory was contested, and they may be eventually abandoned. But this will be a change to other self-set standards, the adoption of which will then be the ultimate justification for the work done under their guidance, and while these standards themselves will be established by this work done under their control. Such is the structure of a responsible commitment, as distinct from a purely subjective, arbitrary, fanciful choice.

This applies equally to the arts and sciences and likewise to the public, whether approving or rejecting works of art. Wherever we are faced with the necessity of deciding on a judgment, we cannot avoid relying on ultimate criteria. For even our failing to judge would demand that we rely on some ultimate criteria for our refusal to judge.

But there still remains a difference between the ultimate criteria of arts and the sciences. The merits of a statistical formulation of quantum theory for which we accepted this version of the theory, were speculative, while when an art is renewed, for example, when painting was revived by impressionism, the attraction lay in the imaginative powers of the new vision. However, this difference vanishes at last when we move on to the effects of science on our world view.

The main influence of science on modern man has not been through the advancement of technology, but through the effect of science on our world view. The industrial revolution came about without substantial aid of the scientific discoveries made up to that time, when the effects of the Copernican Revolution were already widespread. The visible universe had been immensely expanded, the earth thrown out of its centre, and the ultimate grounds of man's existence were reduced to the mechanics of matter in motion. During the last eighty years or so the progress of science has become a mainspring of technical progress, and this has changed many of our habits and improved our material welfare. But though Darwinism, which spread at that time, caused no technical progress, it profoundly affected our conception of ourselves as human beings. It was not technology that produced the ideologies which brought the disasters of the Twentieth Century, nor the feeling of absurdity and contempt for human society that is current today. We have here the scientific image of the world, as reflected in the modern mind.

Such images cannot be tested by experience in the way the actual contents of science can be. They are works of the imagination which take parts of science as their subject. Like all works of fiction, they must treat their topic in a well informed, plausible manner. Remember the famous statement by Laplace, that an intelligence

which knew at one moment of time „all the forces by which nature is animated and the respective positions of the entities which compose it, ... would embrace in the same formula the movements of the largest bodies in the universe and those of the lightest atom: nothing would be uncertain for it, and the future, like the past, would be present to its eyes.” This statement has the plausibility of a good passage of science fiction. I have repeatedly shown that it is absurd, but this makes no impression on scientists who love its magnificent flourish exalting a brilliant aspect of science.

This is not to decry works of the imagination presenting a world view based fundamentally on science; far from it: these very pages are seeking the outline of such a world view. But at this point I am concerned mainly with showing the place where the scientific imagination becomes based on the same principles that underlie the arts. Thus, when Laplace writes „... the future like the past, would be present to its eyes,” we should read this as we read Shakespeare’s line „But thy external summer shall not fade”; and we should note that Laplace, and all those who draw images of the world inspired by science, enter that area of freedom and power, which is that of poetry or painting, of plays or any other of the arts.

I have delayed coming to this point to which works on aesthetics direct their attention from the start. Following I. A. Richards, I developed his theory that the arts can move us by their communication more deeply than real events can do, because they associate their thematic content with artificial features. I went on to say that this is an integration that produces its own incomparable, purely imaginative experience, and I would make this the cornerstone of aesthetic theory. To move man is to move his imagination. It would seem that even acute pain is ineffectual, unless it can make our thoughts respond to it by suffering. Pain can be neutralised by lobotomy, which renders pain carefree. Deprived of its outlets towards the unstable scattered interests of our lives, the matter represented by art fills our imagination to the level of a paroxysm.

Aesthetics have spoken through the ages of harmony and beauty that please us in the arts. But other beauty can please us. The intellectual beauty of a scientific theory is pleasing and so is the beauty of a sunset or a woman, and the word „beauty” is actually used today most freely to praise an ingenious invention, an elegant combination in chess, or a supreme feat of athletics. But these beauties hardly fill our imagination, except with interests of a personal or professional kind. Beauty of this kind is too harmonious for art, which depends for its self-assertion on bridging incompatible elements by the powers of its imaginative integration. Modern poetry, modern painting, modern plays and stagecraft have proved this clearly.

But we have seen other floods of the imagination in the world view of science and I mentioned modern ideologies, shaped by the scientific world view. Ethics and religion too are expressions of the imagination. Works of art are interwoven with morality and religious beliefs, but the only powers of the imagination that can rival that of modern art, is the power of totalitarian ideologies.

The Soviet government decreed that dialectical materialism be the world view of

science. This imposition has been effective in some important branches of biological research and has collided also briefly with the modern principles of physics and physical chemistry. But, taken over the first fifty years of its rule, the official philosophy has not much retarded the progress of science in the U.S.S.R. Its achievements do not appear to have been less distinguished during this period than they were in the previous half century, when compared with other European nations.

By contrast, the effect of the Soviet ideology on the arts was devastating. In painting where Russia's contribution was least distinguished before 1917, submission to the doctrine of Socialist Realism produced a style on a level of empty philistinism, which had no place at all in Europe. In the other arts, where the position of Russia had been among the first in Europe, the Russian contribution fell back to near insignificance.

The Marxist-Leninist ideology gave guidance to cultural life in all its branches. Its vision filled the imagination of its followers completely and suppressed the pursuit of other ideas. It appears that this did not materially affect the pursuit of science, while it ruined the cultivation of the arts. Scientists went on living in peace, while those who tried to develop their imagination in the arts were recognised to be a menace to the state and were treated as such.

This shows what power lies in the artistic imagination, and how vital, how pervasive are the subjects the representation of which is their task. The pursuit of science offers much less scope for the freedom of the mind. Its bearing on man's thought, feeling and purpose is important only as it develops a scientific world view, which is where it ceases to be scientific and pursues instead its own kind of imagination.