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**ABSTRACT**

This paper makes six assertions concerning the artist as experimenter and the means by which artists progress from experiment to experiment. (1) The family resemblances typically cited between the arts and the sciences are trivial, tend to be wish-fulfilling analyses of the common logic of art and science, and promise more than they can deliver. (2) The common denominator that does link art and science is the fact that successive works of the artist are products of experimentation that, as with the scientist's experimental testing of specific hypotheses, represent the undertaking of acts of inquiry. (3) Artistic conceptions, as with scientific hypotheses, are drawn deductively from formal or informal theory. (4) The results of the artist's experimentation reflect in kind upon the artist's theory as does the scientist's confirmation or disconfirmation of hypotheses. (5) The primary focus of evaluation of the artist's work is upon the experimental product itself, the artifact, with limited concern for its theoretic implications. (6) The nature of "progress" in art differs from the nature of "progress" in sciences as a function of the differential focus of critical evaluation: in art the focus is upon the artifact as a unit of achievement, while in science the focus is on the solution of a problem and clarification of theory as the unit of achievement.

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**THE ARTISTIC EXPERIMENT:**

**How and Why Do Artists Do It?**

**American Theatre Association Convention  
August 1981  
Dallas, Texas**

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THE ARTISTIC EXPERIMENT:  
HOW AND WHY DOES THE ARTIST DO IT?

To people who think seriously--or merely think they think seriously--about art, the suggestion of a "science" of artistic inquiry is bound to imply a woefully distorting angle from which to view the work of the artist. It may tempt to a blinding rage the working artist for whom creation is a hard-won way of life, an infinitely less tangible struggle than the accessibly and excessively popularized notion of "scientific method," and far more a matter of deeply personal intuition and private exploration than of formal inquiry. I must admit that my own reaction to such a phrase as "the science of artistic inquiry" is a slight paralysis. However, given the argument which I wish to present in the next few minutes, I have no choice but to hang it upon some such hook; and, alas, I am persuaded of the appropriateness of the argument.

I do not intend to up the ante offered by the series of well-articulated art:science/science:art analogies written during the past 30 years. The prompting questions here are not "Where is the common ground of art and science?" or "What are the creative and aesthetic implications of science?" or "Where is the science of art?" My intention is not yet again to integrate forcibly C. P. Snow's "Two Cultures," or to rethink Martin Johnson's "Art and Scientific Thought."

Rather, the prompting questions here are much more simple and, I would argue, fundamental: By what means does the working artist progress from work to work? From experiment to experiment? Is the movement systemic as most have come to assume--rightly or wrongly--is the routine of the scientist? Or, is it systemless and arbitrary? What are the objectives of an artist's experimentation? What are the functions of aesthetic theory in the artist's conception and execution of works of art? What are the implications of a single experiment for an artist's successive works? What are the functions of criticism in an artist's continuing

experimentation? Why does the progress of art seem unaccountable, relative to the progress of science?

The biases of the argument which follows begin to become evident, of course, in the language of these questions themselves. (1) The defining assumption about art of critical importance here is this: that art is, by its very nature, experimental. About artists: that they, by their very nature, experiment. The work of the artist is not the work of replication but of creation. (2) What can be said in this paper of creative experimentation in theatre will be said also of creative experimentation in music, writing, and the two-dimensional and plastic arts. (3) Most importantly, preoccupation with magic and the inexplicability of creative genius may soothe the nerves of art's mass consumers, may even serve the ends of artists' auto-hagiographies; but it sheds no more light on the nature of artistic creation than does a knowledge of alchemy on protein synthesis. (4) Inquiry is an eminently human inclination, prerequisite to creativity in any temporal enterprise. Even the "scientific method" of inquiry remains no more than helpful methodological formulation, not the supplant of an obtuse path to knowledge. (5) As with the history of science, no theory of art history is complete without an explanation of artistic experimentation. I will not attempt a theory of art history on any scale, though I will argue the implications of artistic inquiry for the evolution of art.

Through the remainder of the paper I am going to propose six assertions in answer to the question: by what means does an artist progress from experiment to experiment?

The first is a negative assertion: the family resemblances typically cited between the arts and the sciences are trivial if present at all; most often the product of wish-fulfilling analyses of the logic of art and science, and consequently promise more than they can deliver.

The questions are often asked: Why not "aesthetics in science"; why not a "science of art"? To the likes of social theorist Sir Geoffrey Vickers for whom such possibilities are so self-evident as to be intellectual dogma, the answers lie "... in the sad history of Western culture, which, over the last two centuries, has narrowed the concepts of both Science and Art as to leave them diminished and incommensurable rivals--the one an island in the sea of knowledge not certified as science; the other an island in the sea of skill not certified as Art."<sup>1</sup> In his article "Rationality and Intuition," Vickers explains this "debasement," to use his term, as a relatively new one, declaring himself with the many other epistemologists who date the lost communion between Arts and Sciences from the mid-nineteenth century departmentalization of university structures. In the good old days of the medieval universities, did not "Ars" and "Scientiae" encompass all knowledge; indeed even overlap territories without upsetting curriculum committees, faculty senates, deans, and chairpeople? Were not astronomy and rhetoric equally science? Were not perspective and painting equally art? Was not Cellini equally builder and architect? Was not DaVinci equally artist and engineer?

The implications of the art/science schism were underscored with a vengeance, of course, by the "two culture" cock-fight initiated by C. P. Snow and joined with such zest by F. R. Leavis and a host of other academic roost-rulers in whose Cambridge High Table pecking order I cannot pretend to belong. In prose labeled by Frank Leavis as "panoptic pseudo-cogencies,"<sup>2</sup> though regarded more sympathetically among the far greater mass of guardians of higher education, Charles Snow saw "literary intellectuals at one pole--at the other scientists . . . Between the two a gulf of mutual incomprehension--sometimes . . . hostility and dislike, but most of all a lack of understanding. "They have," he continued, "a curious distorted image of each other. Their attitudes are so different that, even on the level of emotion, they can't find much common ground."<sup>3</sup> Putting in

his working hours with fellow scientists, as he reports, and going off evenings with literary colleagues. Snow christened these disparate friends representatives of "two cultures." "For constantly," he says, "I felt I was moving among two groups--comparable in intelligence, identical in race, not grossly different in social origin, earning about the same incomes, who had almost ceased to communicate at all, who in intellectual, moral and psychological climate had so little in common that instead of going from Burlington House or South Kensington to Chelsea, one might have crossed an ocean."<sup>4</sup>

Since Snow's famous Rede Lecture at Cambridge in 1959, the "two culture" debate, joined by many, has enlisted energetic, though curiously enough, mostly unilateral support: the issue drawing the most heavy fire from those who regret the schism rather than those who, one must assume in spite or because of the schism, are flourishing as scientists or artists in their largely exclusive communities. In fact, it is somewhat unsettling to confront the icy indifference of producing scientists and artists in the face of a matter of such moment to the epistemologist. Why is the working scientist content to leave alone, if not, in fact, to ridicule as irrelevant the rapidly evolving body of thought in philosophy of science--let alone the emotion-charged cries for a linkage between C. P. Snow's two cultures? One is tempted to respond that work in the scientific laboratory does not allow the time for that kind of reflection. Having yielded to that temptation, there awaits this more bedeviling conclusion: if there is not the time, there must not be the need. Science, after all, continues to get done, regardless of the philosophers' anguish. On the surface, this conclusion is not without warrant. It is patently obvious following a quick review of reflective autobiographical criticism in both domains that, whether or not a debilitating schism exists between artist and scientist, it does exist between the philosophers of art and science and the artists and scientists themselves. With the exception of a scattered few autobiographies of scientists, little

attention is paid by the working scientist to the philosophy of science, let alone to the relation between art and science. True, post hoc reflections by working artists are a dime a dozen, but they rarely confirm one another, and even less often do they confirm the speculations of philosophers of art; and, with the exceptions of those artists who by virtue of a questionable scientism of form or content, rarely hold any candle for illumination of the connecting routes between art and science. Yet arguments continue for the connectedness of these domains of endeavor, from philosophers of science convinced of the "artistic" or "creative" dimensions of the work of science, philosophers of art equally committed to a kind of "scientism" in art, and a strain of social theorists arguing for a "species-specific" kinship linking the enterprise, particularly of the scientist with that of the artist. All three efforts are noble and, in their struggle to ground each domain solidly in the other, strike occasional worthwhile sparks across the void. The inherent dangers of such efforts, however, often result more in static than in useful current.

For example, it is characteristic of the champions for the "aesthetics of science" that they paint their detractors in the old-fashioned corner of objective positivism: a view of scientific discovery as tantamount to the discovery of absolute truth. Hence, they impute the assumption that aesthetic dimensions of scientific inquiry quite naturally are ignored by the scientist who, after all, views the work of science as having a correspondent relation to reality. And, quite logically, to the poor dissenting scientist, presumably holding such a naive conception, aesthetic sensibility would seem at best a speculative indulgence, at worst a capricious biasing of scientific objectivity. Handy for the champions of the "aesthetics of science," many of whom harbor the fond hope of freeing the debilitating empirical constription of their scientist colleagues. In fact, however, few scientists retain such a positivist conception of their work. At its positivist extreme, modern philosophy of science argues

for no more than Karl Popper's --a truth-seeming correspondence between scientific discovery and objective truth.<sup>5</sup> In point of fact, the most recent and currently popular writing in philosophy of science tends to yield to the extreme relativism of the Paul Feyerabend<sup>6</sup> and Thomas Kuhn<sup>7</sup> varieties, arguing for a far more arbitrary rationale for scientific theory change than increased correspondence to absolute truth. Indeed, the language of aesthetics appears far less frequently in the newer relativism than the older positivism. The corner into which the art of science polemicists paint their detractors is more imagined than real.

I seem to contradict an assumption which I really wish to entertain--that there is something fundamentally similar about the artistic and the scientific enterprises. However, the consequences of many attempts to connect the two, I have been contending, result in the trivialization or over-simplification of art or science or both. The most unfortunate result of such attempts, of course, is the alienation of the practicing artist and scientist from consideration of any linkage with one another as having more than the most tertiary and insignificant of implications. Small wonder the practitioners seem boorishly non-plussed at suggestions of such a linkage, if not outright hostile.

I believe there is a linkage, however, of basic, fundamental importance. Obvious, but most often overlooked. Allow me to begin to argue what I think that linkage is by moving through one final illustration of what I think it is not.

By any measure both of critical acclaim and antagonism in the up and coming philosophy of science discipline, Sir Karl Popper ranks among its most noted apostles. In his major work, The Logic of Scientific Discovery, Popper neatly classifies the labor of the scientist as a two-stage process: first, the putting forward of a theory, and second, the testing of that theory. The "putting forward," the conception or invention of theory, he suggests, is neither the



subject of nor susceptible to logical analysis. "The question of how theory conception occurs . . . whether it is a musical theme, a dramatic conflict, or a scientific theory--may be of great interest to empirical psychology; but it is irrelevant to the logical analysis of scientific knowledge." The "logic" with which Popper's book The Logic of Scientific Discovery is concerned, then, is the formal process by which the usefulness of a theory can be systematically examined as an explainer and predictor of phenomena.

Though it will be of no great comfort to Sir Karl, I can agree that the means by which theory is put forward is arguably irrelevant to the logic of scientific discovery, whereby the "discovery" part of his title implies the extension of the usefulness of theory by experimental confirmation or disconfirmation of theory-implied hypotheses. However, leaving, as Popper recommends, the elucidation of theory building to the empirical psychologists, I reject his analogy linking scientific theorizing with artistic creation--whether of a "musical theme, dramatic conflict," poetic or painterly image. I do not agree that the act of writing a play is conceptually akin to the development of a scientific theory. Such a notion of theory among philosophers of science, of course, is of common currency. It is as well a common conception among philosophers of art, rooted in the appealingly seductive and surprisingly long-lasting Platonic tradition of inspiration: the endearing belief that the source of artistic imagination is beyond rational examination, purely intuitive at its least mysterious, and a product of a beatific vision at its most. It is a conception shrouded in the notion of the magic of art versus the rationality of science. It is a conception which springs from a failure to recognize that the artist, by virtue of a mortality every bit as limiting as the scientist's; has access to no more raw sensory data than does any other member of the human species. It is a resistance to the eminently human conclusion that, just as the problems of the scientist are, as Popper says, ". . . enlargements of the problems of common-sense knowledge,"

so too are the problems of the artist.

Now, to the second assertion of this paper: There is a fundamental linkage between art and science, and that is this: successive works of the artist are products of experimentation; hence, as with the scientist's experimental testing of specific hypotheses, the artist's creation of artifacts--works of art--represents the undertaking of acts of inquiry. In its simplest form, this sentence is nothing more than a restatement of the first bias I mentioned a while ago: that art is, by its very nature, experimental; and that artists, by their nature, experiment. Certainly no less can be said in defining the nature of science and the scientist. To give this second assertion some substance, I must hurry on to the third and the bit more troublesome assertion: most often, artistic conceptions (the subjects of artists' experimentation), as with hypotheses (the subjects of scientists' experimentation), are drawn deductively from theory, formal or informal.

An artist's concept--that image or idea which guides the execution of a given work of art--is as often attributable to theory or to a theory-like framework as is a scientist's hypothesis. "Artistic concept" on the one hand and "scientific hypothesis" on the other are products of the same processes of deduction from a larger framework. An artist's concept is no less human and no more mysterious--no less a product of cognition than "the common-sense knowledge writ large" by which Popper characterizes the logic of scientific discovery.

With Popper, I agree that the putting forth of a scientific theory is at best difficult to subject to logical analysis if not irrelevant to the purpose of understanding the logic of scientific experimentation. However, I contend that such is no less the case with the frameworks in which an artist experiments.

The problem of Popper's analogy of scientific theory conception with the creation of a work of art is forgiveable, lying as it does outside his domain of interest. That philosophers of art should succumb to the same temptation--that is, for them to claim that the sources of artistic conception are unknowable--



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is less easy to forgive. Such an incarnation of the work of an artist, taking away their frameworks of formal or informal theory as sources for artistic experimentation, leaves the artist to conceptualize, to experiment, in a vacuum; and leaves the rest of us to assume that, indeed, artistic conception comes from nowhere, at least not from theory, certainly not in a form resembling an hypothesis, and for heaven's sake not via any logical process of deduction!

Yet--and this I regard as significant--I know of few artists whose work arranged chronologically does not directly suggest another logic. Some examples. Why, in E. C. Lathen's famous anthology of Robert Frost's poems arranged chronologically as Frost wrote them, can Lathen see form and content patterns in Frost's early work distinct enough from the remaining work to label that group of poems "A Boy's Will"; and in his next phase of work see form and content patterns evolving in a new direction with sufficient uniqueness to label it "North of Boston"; to label the third cluster "Mountain Interval"; and the fourth, "New Hampshire"; and so on? Why do Picasso's Early Paris Period, his Blue Period, his Rose Period, his Negro Period, his Analytical Cubism, his Pasted Paper, etc., reflect not only the chronology of his life's work but also the major evolving forms and contents of that work? Why do nearly all commentators on Beethoven's symphonies recognize a kind of evolutionary inevitability about them suggesting the tantalizing probability that each successive work in the chronology of First through Ninth seems a conscious effort to extend the limits of the symphonic form already challenged by the one before . . . or, in composer Hector Berlioz' question about Beethoven's Ninth Symphony: "What means were available to Beethoven, in the event of his proposing to go beyond the point where he had already arrived by the unaided resources of instrumentation?" Answer: "The coupling of vocal and instrumental forces . . . , hence, the great choral Ninth Symphony breaking all the bounds of traditional symphonic form, but not without the precedent set by the successively

and consciously experimental extensions demonstrated--to the distaste of most of his musical contemporaries--by each of its eight predecessors.

In each of these and a host of other examples which time does not allow me to explore, there is a curious and intriguing inevitability in the progression of artifacts of the serious and producing artist when arranged chronologically, strongly suggesting another logic--the logic of inquiry, the logic of discovery, so well known to the scientist.

Without question, most artists would protest perceptions of such a logic as an imposition on an essentially intuitive enterprise. And, easily seduced by the mystery of art and the deification of the artist, art consumers are comfortable most often to accept the artists' own metaphysical and sometimes self-serving explanations of the creative act. We are amused but strangely persuaded when painter Paul Klee explains, "From the root the sap flows to the artist; flows through him, flows to his eye . . . . Battered and stirred by the strength of the flow, he molds his vision into his work."<sup>10</sup> After attempting to explain his painting in a 1938 lecture presented at the New Burlington Galleries in London, Max Beckman poured his real feelings into his summary remark: "These, however, are all theories, and words are too insignificant to define the problems of art. My first unformed impression, and what I would like to achieve, I can perhaps only realize when I am impelled as in a vision."<sup>11</sup> Sculptor Henry Moore nails to the wall speculation about the nature of artistic inquiry with this paragraph: "It is a mistake for a sculptor or a painter to speak or write very often about his job. It releases tension needed for his work. By trying to express his aims with rounded-off logical exactness, he can easily become a theorist whose actual work is only a caged-in exposition of conceptions evolved in terms of logic and words."<sup>12</sup>

Curiously enough, the practicing scientists' self-disclosures of their own work are only a little more trustworthy. Warned Albert Einstein; "If you want

to find out anything from the theoretical physicists about the methods they use, I advise you to stick to one principle: don't listen to their words; fix your attention on their deeds."<sup>13</sup> In an autobiographical sketch, Darwin characterized himself as working "...on true Baconian principles, and without any theory collected facts on a wholesale scale";<sup>14</sup> though later in the same work admitting he could not resist forming a hypothesis on every subject--thus giving away the true manner of his work, as opposed to the manner which he felt became him. In discussing these two examples, British biologist and philosopher of science Peter Brian Medawar suggests that such self-deception is common practice to nearly all scientists, "for they are not in the habit of thinking about matters of methodological policy." What Medawar continues to say about scientists can be said with equal force about artists. "You must admit that this adds up to an extraordinary state of affairs. Science, broadly considered, is incomparably the most successful enterprise human beings have ever engaged upon; yet the methodology that has presumably made it so, when propounded by learned laymen, is not attended to by scientists, and when propounded by scientists is a misrepresentation of what they do. Only a minority of scientists have received instruction in scientific methodology, and those that have done so seem no better off."<sup>15</sup>

Why then should we not heed the protests of the artists--and the scientists--and lay off questions about the logic of their inquiry? Medawar, again, provides the answer for the sciences, and I will take the liberty of extending it to the arts. "One way out of this dilemma is to agree that scientific methodology is understood intuitively by scientists and artists and needs to be propounded only for the benefit of other people . . . . Perhaps we should no longer think of scientific or artistic methodology as a discipline of which the chief purpose is to teach scientists or artists how to conduct their business, but rather as an attempt to get non-scientists and non-artists to pull themselves together and smarten up and generally speaking be much more scientific or artistic than

they are."<sup>16</sup> Such is the posture I wish to take in explaining my second and third assertions.

Again, number two--there is a fundamental linkage between art and science, and that is this: successive works of the artist are products of experimentation; hence, as with the scientist's experimental testing of hypotheses, the artist's creation of artifacts represent the undertaking of acts of inquiry. Number three--most often, artistic conceptions (the subjects of artists' experimentation), as with hypotheses (the subjects of scientists' experimentation), are drawn deductively from theory.

We are all nominally acquainted with the scientific method, the logical process of hypothetico-deductive inquiry. I have drawn in Figure 1 a sketchy model of this commonly understood scheme of scientific discovery. Most often the beginning point is a theoretic framework or frameworks of some sort from which a theory-implied deduction is drawn in an effort to propose a testable answer to a particular question--a testable theory-implied guess in the form of an hypothesis. To test the efficiency of this predicted answer to the question at hand, its terms must be defined--conceptually and operationally--with sufficient clarity and specificity to allow for experimental testing. Observation of the progress and conclusions of the experiment lead to specific results in the form of the confirmation or disconfirmation of the theory-implied hypothesis. The focus of criticism and evaluation is upon the implications of those results for the explanatory and predictive power of the theoretical framework from which the hypothetical answer to the question was drawn. Thus, the cycle of inquiry is complete. It is this continuing attempt to extend the usefulness of a theory as a possible answer to another and yet another set of questions that gives the work of the scientist or community of scientists its sequential and evolutionary character.

In Figure 2 I am proposing a similar model in explanation of artistic inquiry.

Figure 1

INQUIRY IN SCIENCE

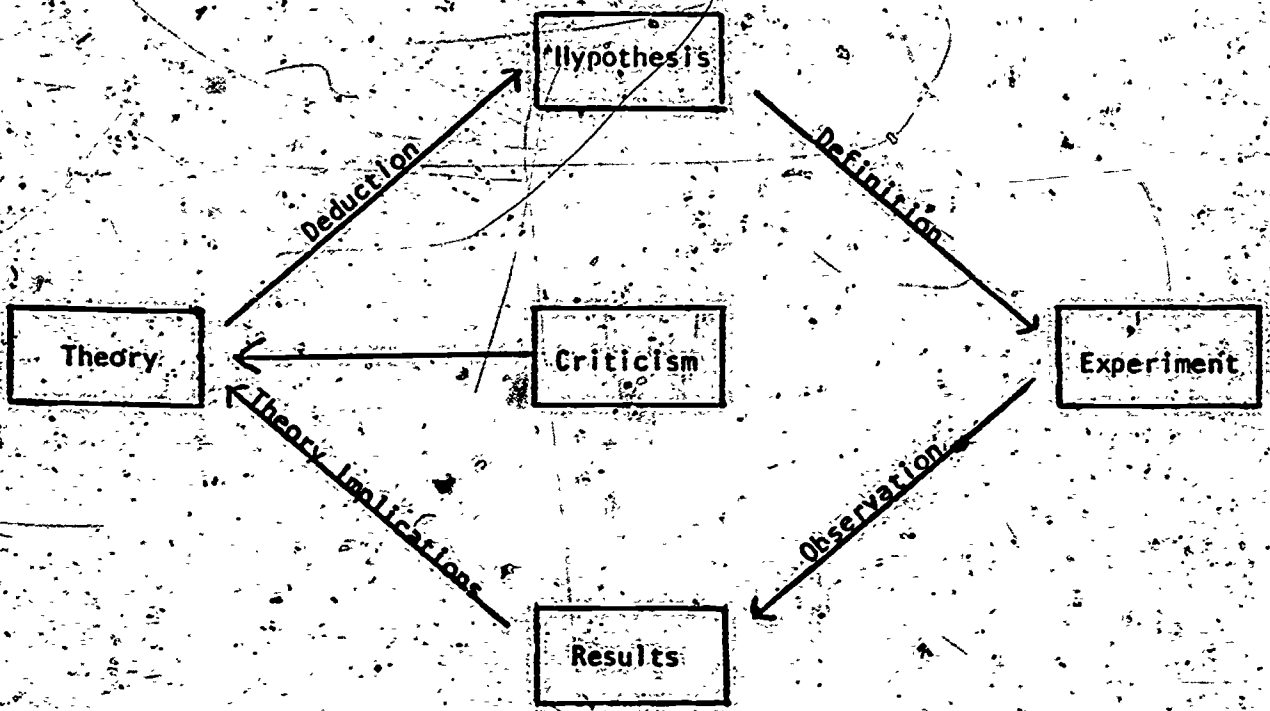
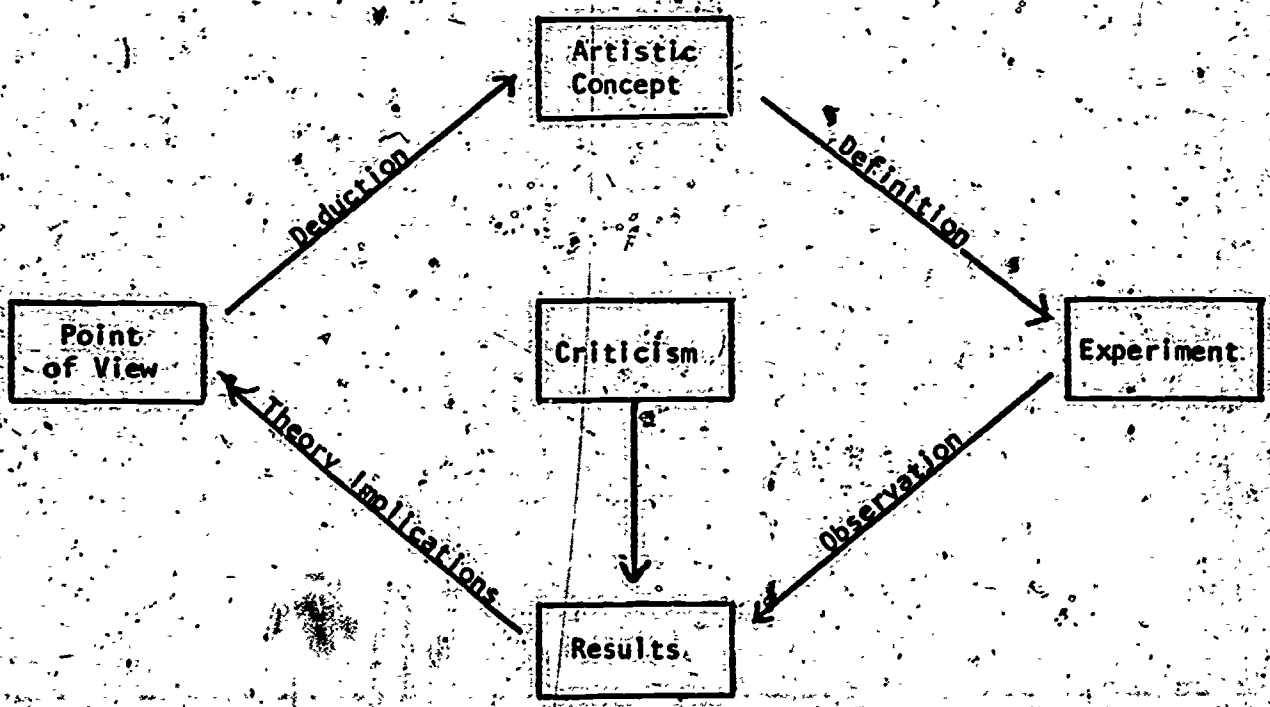


Figure 2

INQUIRY IN ART



Without question, there are some important differences between the two processes which, I believe, characterize the essential differences between the products of art and science. Most obvious are "theory" vs. "point of view," and "hypothesis" vs. "artistic concept." "Theory" and "theory building" in the sciences carries with it some highly specific conventional baggage. For example: the notions which constitute and limit a theory are carefully defined as "concepts." It is imperative that the component concepts of a theory be inclusively articulated as logically related propositions describing the operation of the theory. Popper insists, and most other philosophers of science concur, that an essential characteristic of a good scientific theory is its "falsifiability" rather than its demonstrable truthfulness--thus requiring that the logical form of a theory be left open to refutation by further experience, rather than closed and suggesting absolute truth. A final and tangential characteristic of scientific theory, though there are others, is that it be the property of the community of scientists. The power of a scientific theory is measured by the depth of field it affords as a potential explainer of a wide range of questions, and its usefulness to a disparate group of inquirers.

In the artist's model of inquiry, I have changed the label from "theory" to "point of view"; for although its function is the same, its conventional character is substantially different. For example: whereas occasional scientists are responsible for major scientific revolutions by ignoring commonly accepted theoretical frameworks and drawing their hypotheses from exclusive or unconditional theories, it is the norm for artists to experiment in the context of highly individualistic notions of what art ought to be. An artist is rarely rewarded in a critical, evaluational sense for conducting experiments in the context of commonly held visions of art. Uniqueness, privacy, and iconoclasm of an artist's point of view--assuming technical facility--are the conventional virtues of artistic "theory." Replication is a perfectly valid and indispensable



function of scientific inquiry. The same in art is forgery at worst, merchandising at best.

There is no disciplined concern for the constitutive and limiting nature of the component concepts of an artist's theory, largely because there is no accompanying necessity for the falsifiability criterion of artistic theory. After all, the artist relies on theory or "point of view" to answer questions of value, not questions of fact; and although the artist or the consumer of art may tire of a particular answer (a particular artifact) or regard it as inappropriate, there is no justification for regarding it as "right" or "wrong." Says Picasso, "If there were only one truth, you couldn't paint a hundred canvasses on the same theme."<sup>17</sup>

I have asserted that "artistic conceptions," as with "hypotheses," are drawn deductively from theory. Again, I've used different labels to avoid the implication that artistic conceptualization is as rule-governed an activity as is hypothesizing. It is not. The artist knows no such formal strictures as those, for example, which inform the scientist's decision to use a null versus a directional hypothesis; nor any such discipline as that which enforces the scientist's precision in operational definition of hypothetical terms for purposes of the experiment. The principle, nevertheless, of the artist's extension of a personal point of view of what art ought to be to yet another and another subject is identical to the scientist's extension of theory to hypothesis.

Let me begin an illustration. In a 1958 issue of the American Spectator, Eugene O'Neill posed for himself this problem: "...how--with the greatest possible clarity and economy of means--can [the modern dramatist] express those profound hidden conflicts of the mind which the probings of psychology continue to disclose to us?"<sup>18</sup> His personal point of view as a playwright, his "theory" if you will, from which he approached this and other problems in a unique evolving way through a major portion of his playwrighting life had rough-hewn

concepts of psychology and keenly personal concepts of theatricality. First, the psychological component of his point of view. O'Neill writes, "For what, at bottom, is the new psychological insight into human cause and effect but a study in masks, an exercise in unmasking?" "...One's outer life passes in a solitude haunted by the masks of others; one's inner life passes in a solitude haunted by the masks of oneself."<sup>19</sup> The theatrical component of his point of view: "Looked at from even the most practical standpoint of the practicing playwright, the mask is dramatic in itself, has always been dramatic in itself, is a proven weapon of attack. At its best, it is more subtly, imaginatively, suggestively dramatic than any actor's face can ever be." He continues: "I claim... that masks would give the actors the opportunity for a totally new kind of acting, that they would learn many undeveloped possibilities of their art if they appeared even if only for a season or two, in masked roles. After all, masks did not extinguish the Greek actor, nor have they kept the acting of the East from being an art."<sup>20</sup> Further support for his "theory," his point of view: "With masked mob a new type of play may be written, in which the mob as King, Hero, Villian, or Fool will be the main character -- The Great Democratic Play!"<sup>21</sup>

What deductions did he draw from this framework of "theory," from this point of view? What artistic concepts, what "hypotheses," did he begin to articulate; and in answer to what questions? Here are some examples. How to dramatically stress the element of the fantastic, to intensify the operation of the supernatural? The use of masks in an experiment to be defined as The Emperor Jones. How to emphasize the theme of human role-playing in social situations? The use of masks in an experiment to be defined as The Hairy Ape. How to demonstrate the adventure of the free will in the face of the governing fates? The use of masks in an experiment to be defined as All God's Chillun Got Wings. How to dramatically express the confrontation of the West by the East? The use of masks--

the only way for Western actors to convey the Eastern character convincingly, explains O'Neill--in an experiment to be defined as Marco Millions. And so on, and so on. Through a major part of his career the "mask" framework governed both the questions O'Neill asked and the artistic concepts, the "hypotheses" he proposed in response.

Now to the fourth assertion: the results of the artist's experimentation reflect in kind upon the artist's theory as does the scientist's confirmation or disconfirmation of hypotheses; though the primary product of scientific experimentation is the implication of hypothesis testing for the explanatory power of theory, while the primary product of artistic experimentation remains the artifact.

The general direction in the evolution of science is from theories of a modest level of universality explaining or predicting the operation of very small events to theories of more substantial universality explaining the interactions of many events. The character of the movement in this general direction may be described as follows: theories of a modest level of universality are proposed, then deductively tested by the experimental examination of hypotheses the theories imply. Confirmation or disconfirmation of these hypotheses add to or detract from the explanatory power of the theory source, allowing for the proposal of theories having higher levels of universality, and so on. The methods of scientific investigation, in Popper's words, "...Are invariably based on deductive inferences from higher to the lower level [from theory to hypothesis]; on the other hand, the levels of universality are reached, in the order of time, by proceeding from lower to higher levels [from theories of lesser universality to theories of greater universality]."22

Consequently, the immediate rationale for hypothesis testing is the further elucidation of the theory from which the hypothesis was drawn; and its ultimate rationale is the debunking of that theory in favor of a more powerful, more

universal one.

In the same manner, I suggest, the experimentation of the artist reflects upon the point of view, the "theory," the vision of reality, that the artist holds; with the ultimate goal of repeated experimentation being the expansion of that vision of reality to a more comprehensive, more universal one. Return to Eugene O'Neill. The long middle period of his playwrighting career characterized by his "masking" theory of human behavior was preceded by a group of plays in the American naturalistic tradition: a theory of human behavior governed by individual heroic struggle against the sea-like surging of fate--his "sea" plays ("The Moon of the Caribbees," "In the Zone," "Bound East for Cardiff," "The Long Voyage Home," and "Anna Christie"). Each successive experiment in that early series of plays attempt the increasingly difficult task of incorporating into the naturalism form a sense of the miraculous, the fateful--attempting as critic Ernest Griffin says, "...to parallel the natural logic with a transcendent supernatural logic."<sup>23</sup> For O'Neill, the experimental attempts to explain human behavior by the interplay of these two forces of choice and testing began to give way near the middle of his career to more universal explanations of human behavior and a period of experimentation in support of a different vision of reality, influenced by German expression and springing from the same psychological roots as the European plays of Wedekind and Strindberg... the "mask" period. Without question, O'Neill's shift from a naturalist/fatalist theory of human behavior to a social/psychological one was conscious, one made with the artist's sense that he had played out the implications of his earlier naturalist/fatalist framework in the series of experiments represented by his early plays; and needed to move to a framework offering a more sophisticated level of universality. In launching the series of "mask" play experiments, he used the term "expressionistic" in reference to his new framework with a sense of assurance about what he wanted. In the stage directions at the beginning of

"The Hairy Ape," he noted that treatment of the scenes of the play "should by no means be naturalistic,"<sup>24</sup> referring to his abandoned framework; and in a letter to George Jean Nathan he wrote that the sets "must be in the Expressionistic method."<sup>25</sup>

This was not the last of O'Neill's shifts in point of view, or "theoretic framework." For similar reasons of exhausted experimental implications, he moved later in his career to a vision of human behavior predominantly Freudian, with such experiments as "Strange Interlude"; then, to a psychology of Puritanism, with such experiments as "Desire Under the Elms" and "Morning Becomes Electric"; to the much more probingly personal psychology of "A Touch of the Poet," "More Stately Mansions," and "Long Days Journey into Night."

Let me restate the first phrase of my fourth assertion: the results of the artist's experimentation reflect in kind upon the artist's theory as does the scientist's confirmation or disconfirmation of hypotheses . . . . I have suggested that such was the case with Eugene O'Neill.

The second phrase of that fourth assertion, however, underlines an essential difference between the processes of artistic and scientific inquiry: . . . the primary product of scientific experimentation is the implication of hypothesis testing for the explanatory power of theory while the primary product of artistic experimentation remains the artifact. Richard Purtil, in his article "The Purpose of Science," makes this statement: "Very many scientist's aim at explanation and prediction in their own work; very many of those who do not, see their work as contributing to eventual explanation and prediction, and there is a very close correlation between acceptance of a discipline as a science and acceptance of explanation and prediction as its aims."<sup>26</sup> Herein lay one of the fundamental differences between artistic inquiry and scientific inquiry. Except, perhaps, in the artist's own mind, the primary value of an artistic experiment--a play, a poem, a painting, a musical composition, a

sculpture--is intrinsic; its value lay within itself, first and foremost, and only then in its contribution to the explanatory and predictive power of an artist's point of view or "theoretic framework."

My fifth assertion is largely self-explanatory and is a corollary of the fourth: the primary focus of evaluation of the artist's work is upon the experimental product itself with limited concern for its theoretic implications; while the focus of evaluation of the scientist's work is upon the process of experimentation with substantial concern for its theoretic implications. Now, without question there are implications for evaluative criticism of works of art for artistic theory; and, conversely, for the evaluative criticism of science for the procedures of the experiment, the accuracy of conceptual and operational definition, and the appropriateness of deductions of hypotheses from theory. I am talking here, however, about the primary focus of criticism: in art, a response to the critical values of the experimental product itself; in science, a response to the contribution of the experiment to theory.

The final assertion: The nature of "progress" in art differs from the nature of "progress" in science as a function of the differential focus of critical evaluation: in art, upon the artifact as a unit of achievement; in science, upon the solution of a problem and clarification of theory as the unit of achievement.

The hottest item of debate in both the philosophy of science and the philosophy of art is the nature of scientific and artistic progress. And it is a debate I do not intend to enter in this paper. It is enough to point out that for 20 years, since the publication of Thomas Kuhn's The Structure of Scientific Revolutions, opinions of how the theoretic frameworks--or "paradigms" as Kuhn calls them--are rejected in favor of new frameworks have ranged from extremely positivist accounts to extremely relativist accounts; the former characterized by Popper's taxonomy of the orderly shift to theories of higher

and higher levels of universality, governed by the results of hypothesis testing; the latter, Feyerabend's characterization of theory shifts as dependent upon the reasonableness of alternative theories as measured by such relative factors as acceptance by the community of scientists. Philosophers of art have their parallel debates as to the nature of artistic progress, though their arguments are not as formalized nor their adherents as ardent as in the sciences.

The point I wish to make is valid, I believe, regardless of the paths by which epistemologists explain the progress of art or science. Positivist vs. relativist accounts aside, the progress of art over the centuries, or within the context of a given time and society, is overwhelmingly diffuse when compared to the progress of science. Whether the character of progress in science is cumulative as Popper argues, or paradigmatic, as Kuhn and Feyerabend argue, the causality of its progress from theory to theory is explicable, is rational, may be accounted for. This, as a result of the focus of criticism upon the implication of hypothesis testing for theory frameworks--theory frameworks shared by necessity by a community of scientists. In opposition, the character of progress in art is non-cumulative; its evolution is not so clearly causal. Except within the mind and work of a single artist, perhaps, or a small group of artists, there is no inevitability about "theory A" having lead to "theory B," "theory B" to "C," and so on. Why? The primary focus of public criticism is not upon the implication of the products of experimentation for the theory, but upon the experimental product itself . . . as it should be. The unit of achievement receiving critical attention in science is the enhancement of theory. The unit of achievement in art is the experimental product...the work of art.

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