Art: A Constituent in Orders of Science

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Abstract

Since the last century, there has been at virtually all levels of formal learning an increasingly imbalanced funding of art and science fields of study in the United States. From the look of things, science has been misappropriated to the extent that its ascendancy has eclipsed art. Art has been named science and the effects of this misnomer are far-reaching, yet concerned alike-minded scholars of the present century have not relented in their commitment to confront this problem and propose the balance of policy with reason.

This article reexamines the relationship between art and science by engaging in a philosophical autopsy of specific traditionally designated "scientific productions" to rectify issues in cultural interpretation and judgment. It unquestions the question of purity of science as an unpoliticized academic discipline, and the preferential funding of education in science-related fields of study; i.e., the merits of popular close-ended declaration of what is and what is not science, while unanswering such answers as art being an adjunct-field-of-study to science and the general dismissal of the non-science. Through a series of analyses of selected productions, argument will be marshaled to demonstrate underlying artistic components in the productions against the prevailing dogma that art and science cultures are incoherent, opposing and dissimilar entities.

Introduction

Since the last century, two cultural systems, art[1] and science,[2] have been competing in the United States for peoples' recognition. While these systems continue to crave recognition for their pragmatic and ideological contributions to contemporary economic and political formations in the country, the active mechanism of their structure and nurture has polarized rather than united them. From the look of things, science has been misappropriated to the extent that its ascendancy has eclipsed art. If we are to accept the polarity of these systems in its most radical manifestations, we need to specify in more detail what science is, in pari passu with art. We need to know what it constitutes; how "different" it is from art, to warrant the singular morphology it pretends. Such knowledge is essential to the academic mind, both as a means of pedagogical realignment[3] and for institutional policy reassessment—thus, a historical resource transmissible to posterity.

[1] Art, in this count, includes fields of study that are traditionally designated arts and humanities.
[2] This generally refers to science and technology with emphasis on mathematics and physics.
[3] Failure to find out the truth about these systems presents philosophical problems of legitimizing our claim of the sensory knowledge that Beardsley describes as an illusory perception.

To put these systems in context, I shall refer to them individually or collectively as culture(s). This means that the phrase culture shall denote institutional culture and must be understood as representing either the science or the art culture. If and when I shall talk on record about an art production, analytically or superficially, solely or comparatively, I will mean a visual art production (including industrial design). I want to clarify that this is not a war against science, but an intellectual dialogical inquiry. As an associate member of the science family by virtue of my industrial design background affinity to science, I will not be bashing science, as doing so is tantamount to fighting against oneself. Rather, I shall claim that induced ascendancy of science is an expression of policy makers' irrational way of doing things, or, more accurately, an indication of a good sense of judgment they seem to have.

Four problems arise in investigating cultural status quo from a limited cultural perspective. The first problem is a selective sensitivity syndrome—peoples' tendency to be sensitive to the familiar culture and at the same time passive to the unfamiliar other. The second is the question of the scope of judgment of science and involves determining which cultural models are representatives within the heterogeneous whole model for assessment or, for that matter, whether the typification of science by externalization of art on the assumption of lacking relations, or, on the basis of "the degree of measurable or observable difference"[4] is, in itself, the premise on which science may be understood as a non-absolutely pure culture. The third and most serious problem involves economics and politics. The default notion that our economic and political might is essentially science-reliant, thus justifies ipsilateral funding of studies in science-related fields. The fourth problem is a philosophical question that unquestions the question of what is and what is not science. It unquestions: what ought to be science? In other word, is not art also an aspect of science?

[4] See Howard Becker, Tricks of the Trade, (Chicago: The University of Chicago Press, 1998).

In this article, I intend to do no more than reexamine the relationship between art and science by engaging in a philosophical autopsy of specific productions to rectify issues in cultural interpretation and judgment. I will eschew literary work, since literature, being an art form as we have been told, is language (which must be understood and construed, thus posing problems of interpretation and author's intention), unlike a visual work of art such as a painting (that has colors, imagery, etc.) or a sculpture (that is created with physical matter like stone, steel, bronze, or glass fiber) which occupies space and is directly accessible to perception. I aim to find out why exclusive credit is given to science for joint accomplishments by art and science. There are two basic ways of doing this. An artistic or a scientific production may be individuated by properties intrinsic to it or by its formal structures.

I shall take the "effectiveness" of the current criterion of assessing cultures in the United States for granted, and rely rather on the works of sociologists Everett C. Hughes and Howard Becker, and of feminist Trinh T. Minh-ha and multicultural aesthetician Stephen David Ross, as resources for rethinking the notions of cultural "difference" and "homogeneity." I propose to construe these cultures in my analysis solely in terms of their microcosms and probable relations. I will question the prevailing dogma that science is constitutive of itself.

If we look at cultural relations in the way I shall suggest, it will explain many solutions to the problems surrounding the concept of pure science, such as why art can be a physical component of science and science a chemical/mechanical concomitant of art. This argument will do justice to my thesis toward resolution of the seemingly close-ended interpretation of science.

When Everett Hughes adumbrated his theory of culture relations—"it takes more than one ethnic group to make ethnic relations"[5]—he was referring to culture in the collective.

[5] Everett Hughes, The Sociological Eye (New Brunswick, N.J.: Transaction Books, 1971; 1984), 2. Cultural relations have scholarly been adumbrated by Everett Hughes, propounded by Howard Becker,

Hughes understood cultural dimensions as similar to the flight of a bird. This is impossible with one wing but must be done with two wings—for a bird with one wing cannot fly effectively and safely. His bi-lateral theory of culture is akin to Minh-ha's which reinforces culture as a relational progression, "there is a third world in every first world," and is corroborated by Stephen Ross who questions certain rational standards that "pass themselves off as universal from within a very limited cultural perspective."[6] While these institutional powers might resist the designation "cultural liberalists," Hughes, Minh-ha and Ross have contributed scholarly to cultural concerns in ways that set them apart from some of their intellectual contemporaries posing the possibility that our understanding of culture is predominantly one-sided.[7] The status quo has given rise to counterpropositions to the notion of homogeneity of science.

Judging from his Bi-lateral Theory of Culture Authentication[8] (my designation), Hughes does not embrace the notion of homogeneity of culture because it contradicts his idea that a cultural group is one only if the people inside and outside of it know it is one.[9] And there is ample evidence to support his claim. After all, representatives of art and science agree that the two cultures are cohesive.

Tayo Adenaike, the contemporary Nigerian painter, stated that a past art movement was once a present and a future style,[10] which implies, in my interpretation, that relationships exist between art and science. For Adenaike's philosophical statement to be accepted as truly

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and reinforced by Ali Mazrui as worth considering in the redefinition of culture, if any precision of definition is desirable.

[6] See Stephen David Ross, Art and its Significance (New York: State University of New York, 1994), 599.

[7] Many of these scholars question the model for the classification of cultures. See, for instance: V. Y. Mudimbe, the Invention of Africa; Gnosis, Philosophy, and the Order of Knowledge, (Bloomington: Indiana University Press, 1989); Trinh T. Minh-ha, Woman, Native, Other, (Bloomington: Indiana University Press, 1989), 5-3, 9, and 28.

[8] A Personally designated phrase coined for want of an appropriate title.

[9] See Hughes (1971), 2.

[10] Adenaike stated this on the leaflet of his 2003 Talking with the Past exhibition in Washington, D.C.

illustrative of claimed relations, it has to bi-laterally agree with another outside of it (e.g., a science theory) confirming the relations.

Leonardo Pisano, the Italian mathematician who theorized the Fibonacci Numbers,[11] corroborates Adeniaike's position and illustrates the relations equally well. He identifies the number 2 as the guiding formula for determining evolution by sequencing:

$$1 + 1 = 2,\ 1 + 2 = 3,\ 2 + 3 = 5,\ \wedge\ 3 + 5 = 8$$

$$\Leftrightarrow \pm \text{art} = 1 \wedge \pm \text{science} = 1$$

$$\therefore\ 1 + 1 = 2 \equiv \cup \text{art} \wedge \text{science}$$

This being so, since a cultural group is one because the people inside and outside of it know it is one, and both Adenaike (representing the art culture) and Pisano (representing the science culture) agree that a matter could be integral to another in an order of relations, it should follow that art is an initiate in the union of science and is identified in a measurable degree in such a union, and vice versa. There is art in nearly every, and all, conceivable or perceptible matter, including science. Take a moment to look at everything around us and discover a variety of artistic productions surrounding us.

Does it not stand to reason that some of the so-called scientific productions are either half full of art or half empty of science?[12]

American inventors like Harrison Dyer, Joseph Dixon, Rufus Porter, and William T. James, who built steam coaches from 1860 to 1880, are rarely mentioned today for their artistic pedigree. They are remembered as scientists who set the pace for the development and

[11] In the Fibonacci Theory, the sum of the last two numbers equals the next number in the series.

[12] For a similar logical statement, see Christopher Phillips, Socrates Café: A Fresh Taste of Philosophy (New York: W. W. Norton & Co., Inc., 2001)

manufacture of modern automobile design. Neither Leonardo da Vinci's (1452 – 1519) insatiable and intuitive sense of the laws of nature, which led to his first real studies of flight in the 1480s, nor his awe-inspiring working drawings (made jointly with Isaac Newton [1643 - 1727], the English mathematician), have been fully acknowledged to be scientific contributions to his credit. And yet, of these two great men, da Vinci probably made as much contributions to science as Isaac Newton himself, whose law of gravitational force, though patterned after Galileo's, was founded more on philosophy of art than on mathematical construct.[13]

Da Vinci's drawings of the Ornithopter flying machine are the model for our modern day helicopter. Through the over 100 drawings that illustrated his theories on flight, he visualized solutions to aero-mechanical problems, and thus qualifies as the scientist he was. The first object of a scientist is to visualize the scientific idea. The first object of a painter, in da Vinci's call, is to "make a flat plane appear as a body in relief

and projecting from that plane."[14] He did this beyond the archetype of a Florentine painter to become a major inventor in aeronautic science.

I argue that the invention of the helicopter and the automobile begins and ends with the artistic; it begins with meaningful thinking (philosophy) of what is to be invented, through a series of concepts (delineation of the idea in mental dossier), to preliminary drawings of the various parts (visualization and color roughs of the parts), and to finished/working drawings and prototypes (the plan and its three-dimensional representation, the form), to the mechanics, physics and the chemistry, and finally to the visual communication aspect (the graphics). These

[13] Newton's law is artistic because he used the bicycle instrument to simplify his illustration of the workings of the earth. The result is perceptible and therefore artistic.
[14] See Nicolas Pioch, "Leonardo da Vinci" (Paris: WebMuseum 2005) [database online]; available from database: http://www.ibilio.org/wm/paint/auth/vinci/

allow the constituent orders within the invented to operate simultaneously and be perceived as a whole.

Another way of illustrating polarity of the synthesized is proving that certain idiosyncratic properties of art which are integral to science have been relegated to the background. To the proponents of science purity, the liquid content and bottle, say of Coca-cola, may be considered a scientific production on the basis of the chemistry of the content, but would we say that the form of the bottle and the graphics superimposed thereon are scientific properties? Otherwise, how then might the production be purely scientific?

What is Science?

Science as we know it is not a sine qua non. The same argument holds for art. Both art and science intertwine as constituents in an order, and are constituents of such multiple orders instrumental to nation building. Like Ross's Theory of Art, Trinh Minh-ha's pro-relational theory on gender explains this amalgam quite scholarly. It explains, by implication, how art makes a commute to science in a cohesive evolutionary process. Minh-ha argues that raising the question of cultural identity is to "reopen again the discussion of the self/other relationship in its enactment of power relations."[15] If we were to base the reality of science status quo solely on poignant mathematical construct, we will continue to polarize the synthesized sustainable factors of our civilization, but if we base it rationally on pragmatism we will realize there is hardly a matter of science without a constituent matter of art, however scientific science pretends.

When we talk of the rudiments of American civilization we are partly referring to availability of amenities such as electricity (art and science), roads and bridges (art and civil engineering), pipe-borne water (scientifically treated matter channeled through artistically

[15] Minh-ha maintains that the problem of cultural identity is in the objective, which rests on the fact that "heart X must be X, and Y must be Y, and X cannot be Y."

extruded matter), but also state-of-the-arts infrastructure, such as building (the art of architecture) and environmental ornaments (sculpture and mural that enrich our surroundings). The question of the role art plays, in this respect, may be answered using Stephen Ross's Theory of Art: A work of art to be one "is to be an order of constituents and to be located as a constituent of many orders."[16]

Ross's theory illustrates ways in which a scientific production may be transcendental from within its constituent to orders of an artistic production, and vice versa. Here is how. The artistic in a working drawing for actualization, of say electric generation, is a constituent located in the orders of the electric-generating dam or plant, by the very working-drawing point of departure to construction of hydroelectric powered dams, and to manufacture of accessories and parts of electrical installations. After all, drawings are an artistic constituent located in orders of the mechanics of the electric-generating plant; or, do these dams and installations not have scientific orders in which drawing is located as a constituent?

Similarly, the artistic is located as a constituent in the orders of the Brooklyn and Manhattan Bridges from the point of view of the structures' formal design constituents, e.g., their perfect symmetry. No less have acquired classical ideals from ancient Greece located as a constituent of representational orders of our surroundings and histories been a constituent in orders of the "scientific," e.g., in orders of architectures of the White House and the U.S. Supreme Court, as evidenced in the attending formal and ornamental characteristics of Doric, Ionic, and Corinthian Orders, arches and vaults.

The poet, Shelley, wrote: we are all Greeks—our art, literature, architecture and law have their root in Greece. This means that human civilization is art engrained, since much of the

[16] See Ross, S. Art and its Significance. Albany: State University of New York Press, 1994.

classical ideals marking our civilization derive from Greece. Architecture, painting, sculpture and landscape create a vision of a perfect American civilization.[17]

More than 200 years ago when the founding fathers of the United States were building their new capital in Washington D.C., they "craved a visual style that was to embody their democratic ideals,"[18] and found it nowhere else but in Greece and Rome—a style that embodies harmony, order, and freedom. By the eighteenth and nineteenth centuries, Greece had started to export its classical ideals to the rest of the world—to the Americas, the former Soviet Union, the Indies and beyond. We see these not only in the orders of architecture of the White House, but also in the political emblems on U.S. coins and dollar bills, and in the classical Statue of Liberty. As Michael Wood has pointed out, today we are so engrained in our way of seeing things that we sometimes do not remember these artistic virtues when using them. If all of the virtues are not hybrid benchmarks of civilization, what then should we call them?

Let us examine the reason why Hughes disassociates himself from Abstract Theory, to understand his proposition that an ethnic group cannot be studied all by itself, but partly by tracing "ethnicity" to a network of relations with other groups from which it may have originated.

To put Hughes's theory, corroborated by Ross's, in the context of my subject, I underscore the position that an "ethnic" group of art may be located as a constituent in the orders of an "ethnic" group of science. The foregoing is consistent with Ali Mazrui's which proposes selective sensitivity as a major problem impeding our sense of culture judgment. Mazrui points out that certain values and concerns "may sensitize a person to some problems at the same time

[17] Michael Wood: Art of the Ancient World, prod., and dir., Perry Miller Adato, 114 min., Kultur, 1989. Videocassette.
[18] Ibid.

they cause the individual to neglect a number of different problems that other people in other places deem important."[19]

Mazrui is right. Let's see how right. Suppose a person says chemistry is better than industrial design, and another says industrial design is better than chemistry, would any of these proponents of cultural fundamentalism be right? How right would they be to have based their position on personal sensitivity to a matter of interest by substitution? Are there any universally accepted standards or methods we might employ that would enable us determine which of the advocates is right and which is wrong? What do I mean by this?

Some early promulgators of cultural theories have not sufficiently touched upon this part of the puzzle. But Morris Weitz, one of the key figures to reckon with in Western aesthetics, has mapped out a plan with which we might address the issue, implying that art can be any and everything perceptible. It could also be a philosophical matter by virtue of the intellect that goes into visualization of the artistic. In these respects, we might redefine the artistic to be the synthesized physical/ideological matter in the orders of many scientific productions.

Of course, a proponent of pure science who may claim that art is external to science might stick to it in the face of opposition, maintaining the contention can withstand all alleged counter positions. But the defense set forth, in this respect, is a conscious effort to conceal the likely falsity of the claim only at the cost of rendering it baseless. Without hinting of a possibility of proof and committing to what that proof is, such a claim cannot be substantiated. If the claim that art and science have no chemistry is not false, what then should be the true definition of science? Isn't Minh-ha right to argue in her Woman, Native, Other that there is a third world in every first world? Or doesn't the externalization of art from science raise the question of homogeneity of science and render it vacuous?

[19] Ali Mazrui, a World Federation of Cultures: An African Perspective (New York: The Free Press, 1976), 8.

I have shown how baseless a claim it would be if one should say that a Coca-cola production is absolutely scientific. How such a claim would reflect very little, if any, of the claimant's sensitivity to the heterogeneity of the production. Whatever the criterion for formulation of the current education-funding policy on art and science is in the United States, whatever is the decisive factor of measuring success of our schools, it seems to fail in this respect. It fails in the formulators' lacking knowledge of the representative constituents of a whole culture, because key idiosyncratic properties of art such as color, form and graphics are excluded from the constituents of scientific productions in oblivion of art/science relations.

Here are more questions that might settle the issue. Would we say that the mercury in an instrument as scientific as a thermometer qualifies it as purely scientific, or, nullifies the color, form and graphics within as artistic properties of the apparatus? Are not the color, form and graphics indisputably artistic? If so; why, then, should the ascendancy of science eclipse art? I contend that the proliferation of science and technology should not negate art.

The Question of Science Homogenization

Homogenization is the greatest danger in cultural assessment. A person's sensitivity to a culture of interest externalizes the person's knowledge of another that is relative to the culture of interest. Our degree of concern about, say, chemistry versus industrial design is a matter of subjective sensitivity to the familiar—the cognate. There are those whose sensitivity to chemistry or a chemical production causes them to judge it to be of ultimate importance to either the discharge of their duty, their existence, or their wellness. To them, such a production is what matters and nothing else but it—and there is nothing totally wrong about that. There are also those who are sensitive to, say, industrial design, and foreclose on the importance of a chemical production—and there is nothing entirely wrong about their choice either.

But there is certainly something wrong when a person's sensitivity to a matter of sense, say personal sense of hearing, causes the person to neglect another type of matter of sensual necessity, say the sense of seeing. Is there any reason why loss of the sense of hearing should be more or less important than loss of the sense of seeing? Isn't the loss of either of these senses a physiological anomaly that, if restored, is essential to wellness?

Yet, the prevailing educational policy on art and science seldom reflects this art/science importance with equal emphasis—whereas, it should. Would we say that the Greeks who exported their ancient classical ideals to the Americas and the Indies are not like us on the basis of the prevailing dogma in emergence of classical scholars of the last century, even though our art, literature, architecture, and law have their root in Greece? Monroe Beardsley puts this point across in the clearest perspective, some of the names we give color and shape are borrowed from empirical knowledge of natural and man-made things, e.g. "sky blue," "cherry red," "doughnut-shaped," and "tree-shaped." This designation of one thing from the experience of another explains Ali Mazrui's assertion that peoples' sensitivity to concerns by exclusive reception of the known against the unknown is wrong, and I concur. Now, a review of man's biased sensitivity to the scientific over the artistic and related contradictions.

Cohesiveness of Science: the Historical Perspective

The significance of art and science is full of ironies. We are reminded on the one hand that visual art was man's first educator, but this fact is countered on the other hand by the disappearing attention some policy makers pay to funding education in art-related fields of study. Yet, from day to day we witness the overwhelming impact of the visual arts on pedagogy and the importance of related productions in the consumer industry.

At the pre-school kindergarten level of education, the first stages of learning are those in which the child is able to identify colors and letters. This is the beginning of the development of science and of scientific ideas. Cognition of color and differentiation of hues and values prepare the child to confront greater challenges in the trajectory of learning.

The next stage in early learning is the pupil's ability to translate concepts into drawings, imagery, allegories, and to construct forms of playhouse, ornament, and paper-made airplane and auto-mimicking installation—an activity Beardsley calls a visual design. A visual design may be a scientific activity if executed in plan as to satisfying two-dimensional artistic intention of creating form that would ultimately exist in space. It may also be executed in three-dimensional representation of a "scientific" idea in space. In the creative process (the course of invention), a pupil having artistic pedigree explores the unknown in such ways often leading to the development of an idea into the artistic—as they say, the "scientific." Given the foregoing, isn't a playhouse constructed by a pupil in the pupil's formative years the beginning of architectural design? Have we not seen pupils' miniature-playhouse designs develop into real houses?

Would we say that infantile artistic impression of an airplane is not an early visualization of a pragmatic airplane to come—the so-called "production of aeronautic science"? Doesn't a paper face cap a child designs and colors signify early fashion design development of a production many of us use, including the scientist? Who says that childish construction of a toy automobile isn't preparatory to future invention and proliferation of automobile design technology?

Rather than increase encouragement of artistic activities in post-kindergarten schools, these have gradually been marginalized and are disappearing from the secondary school

curriculum through the university level, where art and design are classified as specialized fields of study.

At the post primary-school level, color is instrumental to the identification of physical and chemical matters of science, and in delineating spatial autonomy of planes of three dimensional pro-scientific modules. More importantly, color makes for the differentiation of chemical substances in a laboratory experiment; without it, the experiment, however scientific, would be difficult or even impossible to conduct. Graphic forms such as graphs, tables, and illustrations are a necessary condition of comprehending literary materials in scientific research and of documenting the findings.

By the time the child is in the eleventh grade, he or she would have developed critical thinking skills not just for constructing more complex two-and three-dimensional shapes, but is also able to apply acquired elemental knowledge of color to confront "scientific" puzzles and experiments, including titration. Despite this apparent cohesiveness of art and science, the latter is not considered a hybrid culture. Would we say that the art of thinking through a plan, of visualization/cognition of color and form, or of executing allegorical painting is science? Given our empirical knowledge of artforms (line, color, and shape) as factors essential to pedagogy, should we allow policy and its default notion of exactitude of science to foreclose on the very artistic that underlies the scientific? Could observational and cognitive processes of determining the concentration of a substance and chemical reactions in a laboratory be an entirely scientific activity?

When we say that a chemistry or physics textbook is written well, is it possible that we could also mean it is drawn well, since the diagrams and illustrations within the book illuminate the text and enhance our understanding of it? Typography, as an artform, is a crucial benchmark

of contemporary scholarship—in the sense hieroglyphics is known as the artform signifier of human "civilization." A good layout of text in a book enhances reading and comprehension. It allows for easy eyeflow in and through the book pages and thus to rapidity of comprehension. So do diagrams and illustrations. How wrong would it be to say that the caption and color of a textbook's cover (identification marks), type layout of the pages (enhancer of legibility and eyeflow), the supporting diagrams and illustrations (additional cognitive matters) are an artistic constituent in the orders of the book? Are these not necessary matters of importance to pedagogy? Since when did freehand and computer generated illustrations cease to be constituents in the orders of mathematics, physics and chemistry textbooks?

I argue that typographic design of a mathematics, chemistry or physics textbook is art. The imprints, the size and color of the book's caption in contrast with the background against which we perceive them, learn us to an empirical knowledge of the book contents—and therefore are of pedagogical importance. Can we imagine how difficult it would be to comprehend materials in, say, a medical pathology textbook without the supporting diagrams and illustrations? This explains why when a book does not have diagrams and illustrations we judge its substance as undesirably narrow. I now look at another example of bias against art beyond pedagogical boundaries to the political.

The Politics of Art Marginalization

The political ramification should be mentioned. Political situations affect visual art production beyond the artist's control.[20] An example was the "closure" of the Brooklyn Museum of Art in 1999 by Rudolph Giuliani, the former New York City Mayor. The reasons given for the closure were as follow: 1) the Mayor believed it was anti-Catholic for a naturalized British artist,

[20] See, for example, Ben Enwonwu, "Problems of the African Artist Today" in Presence Africaine (1956): 8-10.

whose painting was displayed at the Museum, to have painted the Virgin Mary as a Madonna of African descent, and 2) that depicting the Madonna surrounded by "elephant dung" was degrading. Clearly, Giuliani's reaction was a selective sensitivity to cultural concern by elimination of other concerns. Should we not accept the defense set forth by the artist that his use of elephant dung in the controversial painting was representative of "fertility" in Nigerian iconography? Elephant dung is used in parts of Nigeria and Africa as fertilizer to nourish the soil that grows the crops, thus is essential to the good health and growth of the peoples. Evidently, the artist's vocabulary was taken out of context by the Mayor in a seemingly orchestrated action aimed at ensuring his political self-aggrandizement.

If the closure of the particular Museum was not a political move to stifle the artist's creativity and the vocabulary of the visual art, what message did the artist convey in his work that has not already been documented in the Holy Bible, making it so anti-Catholic to have warranted the closure? Come to think of it, is it not written in the gospel according to St. Luke that the shepherds "found Mary and Joseph, and the babe" (Jesus) "lying in a manger"?[21] Can we think of any manger (then and now) that would not be surrounded by dung (elephant's, cow's or sheep's)?[22] Such a closure defunctionalized the Museum against the description of it by John Tagg, the renowned art history professor, as a monumental explanatory machine. It assaulted the controversial painting in its capacity as an educational resource and the museum as center for such and similar resources. In the Biblical sense, this is tantamount to saying that Saul is not among the prophets, whereas he is.

Education-Funding Bias: its Economic and Political Undertones

[21] See the gospel according to St. Luke, chapter two verse sixteen.
[22] See Merriam-Webster's Collegiate Dictionary, 10th ed. (Massachusetts: Merriam Webster, Inc., 2000), 358, in which one of the meanings of a dung is noted as "the excrement of an animal: manure."

Most of the political situations are caused by economic situations—some scholars have argued.[23] Funding of schools in the United States has been laughably science centered.[24] Open a state or federal scholarship/grant-sponsored program dossier or a similar volume; and the odds are that it contains a substantial amount of information on funding mostly students seeking knowledge in the sciences. Yet, by virtue of their contributions to the country's economic and political might, the art students in these academies are no less important or no less deserving of funding, than their science counterparts.

To some people, the bias might be acceptable, but to the academic mind—a grossly indefensible idea that raises a number of pressing philosophical questions I shall address later. By discriminately allocating revenue to schools in a greater ratio to the sciences than to the arts and humanities, sponsored programs undermine the very mission of academy as the domain which ought to produce manpower resources across disciplines, in such ways as to sustaining facets of our industry-based economy and unsurpassed political system. Colleges and universities in the United States fuel the country's need for manpower resources in three major educational, economic, and political sectors, and so under-funding studies in the arts and humanities hurts this sector, particularly given the manpower that this sector contributes toward building the nation.

As I have already stated, the art of tooling marked man's economic and political growth in the Paleolithic; art has since been man's educator. Ironically, due to changing trends and taste of culture in the State of New York, as are in many states in the United States, the tendency to focus funding of the state universities essentially on science-related fields of study is widespread.

[23] E. U. Aye, Old Calabar through the Centuries. (Calabar: Hope Waddell Press, 1967), Aye states that some European trading partners in Old Calabar chose the material for production of merchandise of interest. This created economic hardship situation that compelled the artist to change from designing, for example, on calabash to designing on steel.

[24] See the US government sponsored program funding Science, Technology, Engineering, and Mathematics (STEM).

The science fields of study in the State University of New York at Binghamton receive huge subventions from governmental and privately sponsored programs in amounts far more than those provided to the arts and humanities.[25]

Recent patterns of enrollment and graduation data in that university make the imbalance obvious. In fall 2005 a total number of 1, 030 (260 undergraduates and 77 graduates) Fine Arts Division majors was enrolled, versus a total of 2, 214 Science and Math Division majors (1, 915 undergraduates and 299 graduates). In the 2004 – 2005 academic year, the university granted 120 (101 baccalaureate, 18 master's and 1 doctoral) degrees to Fine Art majors against 679 (603 baccalaureate, 52 master's and 24 doctoral) granted to Science and Math majors. This raises the question of whether our schools are closing out of studies in the arts and humanities, or, might we assume there have been over the last few years fewer applicants seeking admissions to study in this field?

While it will require a separate study to determine a realistic ratio of funding and enrolment, perhaps it would be tolerable to recommend a proportionate 50:50% ratio, on account of the current huge art-engrained commodities in the consumer market—i.e., peoples' need for and dependence on a variety of artistic productions.

Contrary to proposing a Marxist idea of egalitarianism, the prevailing prioritization of funding the science-related fields of study is a major problem confronting us. This impedes equilibrium of supply of needed manpower resources, in the light of the important but recondite place of art in the orders of science. To use architecture to buttress this point, I argue, although explaining details of the entablature some architectural historians hold the view that form follows function, Horst Woldemar Janson (1913-1982), the legendary art historian, counter argues that

[25] Unrestricted data obtained from an informant employee of the university, unwilling to disclose "confidential information."

form precedes function in architecture. He states that it seems plausible to assume "at one time the triglyphs did mask the ends of wooden beams," and that "the droplike shapes below, called guttae," seen also in many twentieth-century architecture "are the descendants of wooden pegs.[26]" However, form as the primogenitor of function transcended architecture to transportation.

Even in the present state-of-the-arts automobile technology, the difference between a modern car and an ancient one is more in the fascinating aerodynamic form of the modern against the repulsive cubic shape of the ancient, than it is in the mechanics. Does this not suggest that art has a place in science? Are the graphics on the dashboards of automobiles and the associated accessories not elements of art? Were the different parts not first visualized as sketch prototypes existing in space and fitting into other parts prior to making the molds from which they were reproduced?

It is my position that the United States will continue to have the need for artists (graphic designers, illustrators, automobile designers and product developers). It will need town and urban planners, fashion designers, interior, communication and architectural designers, as well as philosophers, to note a few. Thus, perpetuating art/science dichotomy forces art to fade away into the landscape of science and is counterproductive in the joint effort of building a nation. On this count, the imbalance may be settled by rediscovering science as a culture of orders within which art is located and shall continue to be located as a constituent of such orders. This means rediscovering science as a historical descendant of art; or, as its inseparable twin about which I shall rely on historical data to demonstrate the advent and evolution of their relations.

[26] For a logical presentation of art/science relations, see H. W. Janson, History of Art, (New Jersey: Harry N. Abrams, Inc., 1995), 127, in which the author contends that art is a precursor of science.

How Art is a Constituent in Orders of Science

Art and science have intertwining relations. We have come to know that the connection between them dates back to the years preceding the Paleolithic Age, when ancestors of the prehistoric man thought of a stick as a tool with which to knock down banana from a tree, and a stone as a weapon for fighting against an enemy.[27] The natural formations of stick and stone might have been a scientific phenomenon (agricultural or ecological), but the perception and use of stick and stone as tools were certainly apes' demonstration of artistic consciousness. On this count, we might say that economic subsistence in that day and age was not entirely scientific but began as artistic perception leading to artistic decision and expression.

In another sense, it could be argued that apes were able to consciously balance their knowledge of art and science by figuring that a banana would fall if struck with a stick. A falling fruit was a scientific puzzle into which apes might not have been entirely absorbed as to be capable of analyzing the dynamics of physics in the motion; for quite an understandable reason—after all, Isaac Newton's law of gravitational force had not been propounded. But would we say that prehistoric anthropoids were not scientists in their own rights because they did not document their fervent knowledge of gravity, even though they discovered that a struck fruit would fall from a tree? Was this not what provoked "descendants" like Newton to engage in subsequent investigations that led to the formulation of his law of gravitational force?

Like his predecessor, the Stone Age man rose to philosophical prominence of the concept of art/science connections. He probably had no choice than to figure out that freedom from dependence on nature entailed thinking about an alternative means of survival. In this respect, survival was a case of life and death, i.e., a matter of cause and effect. The cause was an ideological investment of faculty in thinking about survival. It entailed thinking of a "useless"

[27] Janson, History of Art (1995), 48.

physical matter as that which could be modified to become useful (a philosophical/artistic ambition). The effect was ensuring that such a thought was put in action to make it realistically beneficial to economic and political life of the cave man. It entailed shaping pebbles into tools and using them as defensive weapons against predators in a hostile environment. It involved distinguishing a handy stick from a clumsy one (artistic selection) and discovering that a pebble had tougher rigidity than a stick (artistic analysis by palpation), and so, better for use as a weapon than as a tool (artistic intention by preference). Because the cave man realized that rigidity of stone made it more impact-resistant than the stick was, or, incomparable to the ductility of a leaf (artistic judgment by comparison), he set aside some pebbles for future use (artistic intention by elimination/selection and preparedness).

The next stage was man's thinking of pebbles as such physical matter that could be shaped into a variety of handier utilitarian artistic objects. Once he was able to do this, he began to connect form (the artistic) with function (the scientific) in a series of artistic activities, creating improved handier tools (artistic refinement of form), for application to more complex tasks such as cutting, chiseling and for shaping other tools (artistic technology).

Then came another phase of human development in which pebbles were shaped in such ways capable of being used for hunting (advanced offense technology), and for protecting against an enemy (advanced defense technology). With this, the cave man entered into a new phase in human civilization, the Neolithic Age. Would this evidence smell far too strongly to suggest the relationship between art and science had been with the prehistoric man? Given this development, could we rightly say that Stone Age tools were art proof?

A point worth considering in any discussion of matter of a scientific production is studying the sensual properties within to determine how they integrate, and analyzing them in

such orders as to finding out whether or not there is the artistic constituent. This assures verification of either hybridity or homogeneity of the production. Another is investigating origin of the production to rule out or ascertain cross-cultural adaptation.

There is the personifying method of explaining this. A culture is like a human body; made of jointed parts/fragments of a whole. These integrate and ensure physiological, anatomical and mental soundness of the body. When the body is alive, all of these parts are active and functional, but, in death, the parts are motionless. Given this analogy, would we truly say, as science purports, that mortality of the body is that of the brain and of the brain alone? Isn't it true that when we say a person is dead, we mean the entire body of that person is dead, not just the brain but the other parts of the person's body as well? This brings us to questions of meaning and interpretation.

Some scholars like T. S. Eliot have suggested that it is incumbent on the cultural historian to explain why there has been in the past four decades "a heavy and largely victorious assault on the sensible belief that the text means what its author meant."[28] To put Eliot's point in the visual art context, it challenges the notion that meaning of a work of art rests on the artist. He argues, against conventional wisdom, that the philosophical doctrine proposing interpretation of a work of art as personal, subjective and as dependent on the artist's control is outdated. The systematic autonomy theory has found home in the early twentieth-century Essentialist Theory and among those endorsing it, but perhaps for different reasons. Here, Minh-ha's theory corroborates Clive Bell's, in that a good interpretation may be one that decodes the meaning of something we have overlooked; indeed, we have overlooked the artistic as a constituent in orders of the scientific.

[28] See, E. D. Hirsch, Jr., "Validity in Interpretation" in Stephen Ross, Art and its Significance, (New York: State University of New York Press, 1994).

Since evolution of humanity, man has been creating art. This art was science.[29] Science was and continues to be with art; in it visual art first found expression through the earliest known tool making in human history, the stone tool. With the exception of stick-made tools that have not survived, and the invention of the earliest form of writing dating about 8, 000 years ago, the stone tool remains the earliest recorded evidence of technology, which, we are often told, set the path to some of the accomplishments of the 'historic' civilizations of Mesopotamia and Egypt.

The means of subsistence in post hunter-gathering age, marking one of the key differences between prehistoric and historic societies, rested on art and science. Even if overstated, toolmaking art marked the first stage of human civilization on which considerable aspects of modern "science" and "scientific" productions are founded.

Thus, our admissibility of homogeneity of science depends on a conditional form of interpretation. By this I mean—suppose we say that any American residing in North America would admit there is the artistic in a particular scientific production. We would mean that the test of whether or not the artistic and the scientific are constituents in orders of the production is not whether all such Americans have experienced the particular production and have found it to be partly artistic, but that, if in a thorough scholarly survey, they come to acquaint with the reality of the underlying cohesion, they would attest to it. Given this compelling possibility of art/science synthesis, how, then, might we answer the question of homogeneity of science without unanswering the answer to the question of constituents in the order of science, from a broad perspective of interpretation?

I argue that the realistic modus operandi of analysis should be one of a broad scope that would allow for the breaking down of parts of the production into forms of constituents. This is the crux of my critique of designation. Here, I analyze the scientific in terms of its constituents

[29] See Janson (1995) on such analogies of relations between form and function in Paleolithic Europe.

and question why, given these new developments, the artistic should be eschewed when designating the scientific and proclaiming its value. It is right to know on what premise must prioritized funding of education in the sciences be based.

Measurement of success of our schools on the basis of default assumption of unprecedented economic and political benefits from science and scientists is widespread, but must be reviewed for many reasons. This tradition has two major flaws: 1) it is superficial insofar as it under explores constituents of science that some people are not aware of, and 2) it perpetuates cultural inequality in that the very pragmatic and ideological matter constituents in the orders of science are not acknowledged to be an artistic factor without which many scientific productions would be worth nothing but carcasses.

Assumption of Exclusive Econo-political Significance of Science

Much as we are entitled to draw attention to science in the light of the view held by many that science is of dire economic and political importance, to the extent that the strength of our economy and democracy "largely" depends on it, we are not telling the whole story unless we reexamine a considerable number of scientific productions to determine they are art proof. Unless we ascertain that such productions are devoid of form and color, and not unless we prove that creative thinking was not part of the manufacturing processes, then can we rightly proclaim the production to be absolutely scientific. The truth of this rests, largely, on a simple logic, i.e., for a utilitarian production (artistic or scientific) to be marketable, it must be formally appealing to the patron before its function is considered. This explains why we say that form precedes function.

Could we say that a legal tender (the physical matter symbol that distinguishes prehistoric from historic societies) such as the Greek coin, the British penny, or, the Dollar has no artistic traits of economic importance? If the portraits of Caesar on the Greek coin and the image of George Washington on the one-Dollar bill are not artistics of economic and political importance, what then should we call them—the print media representations of scientific propaganda? If the beautifully printed fonts on the Dollar bill are not art, what are they—scientific prose?

Regarding cultural value, I will use the housing (form) and mechanics (function) of a cellular phone to illustrate the kind of inseparable contrast in value I am talking about. Since, as Stephen Ross posits, the intensity of contrast in value is a matter of kind, i.e., the kinds of form (graphics and color) versus mechanics (components) of the cellular phone are jointly valuable to the extent that its form cannot be separated from its function. The phone, in this aspect, is a scientific matter of a union of art and science—in that, the artistic constituents within pose as a valuable communicational factor enhancing cognition and comprehension of dialogue between the phone and its user. [30]

With the exception of those scientific productions that are applied to the health care, utility, and the transportation industries, many others are more pro-warfare than they are pro-life improvement. One of the strongest reassertions in the matter of science after the onslaught by the post conservatives is man's reliance on perceptive instincts as a means by which to realize it is largely through the artistic embedded in forms of production that we are to verify the artistic nature of science and its value.

Two major scientifically acclaimed productions, airplane and automobile, may be used to underscore this point. When we say that an airplane or an automobile is a scientific production,

[30] Without the aesthetic, handiness of form and the superimposed graphics, a cellular phone would be superficial in many respects, in that, it is by pushing the very artistically labeled, colored and formed buttons that the component mechanics within can be activated easily and correctly.

we literally mean to say it is made of and from science. But we may not quite fully understand the design and manufacturing processes that bring about the existence of an airplane, to justify referring to the production as exclusively scientific, or that which is strictly technology-potent. We might not realize that its form, which some call housing, is a work of art, as are the various components (the parts) which are assembled to form a three-dimensional object called an airplane.

Airplane and automobile as we know them were not invented at the tick of the clock by a single inventor, but by a painstaking process that occurred simultaneously across cultures. Since the invention of the first self-propelled road vehicle in 1769 by the French engineer and mechanic, Nicolas Joseph Cugnot (1725 – 1804), who powered the vehicle with steam engine, automobile design has undergone inventions and adaptations to its present day state-of-the-art technology. Through this process, with the exception of the Greeks whose classical ideals remain an unbroken tradition, artistic input to science appears to have been taken for granted in the United States. We seem oblivious to the art-prone multi-generational histories of aero and auto technologies.

While some may agree on the heterogeneity of the science culture, they will probably disagree on the relationship between art and science—the cohesiveness in which these may be inseparable. For such skeptics, science or art is distinct with no link to the external; the down side of this skepticism is the assumption that the two were not connected in the past, and will not be in the future. While Hughes, Trinh Minh-ha, Mazrui, and Stephen Ross have proven these skeptics wrong for judging cultures as a series of disconnected phenomena, perhaps the greatest danger here is the objectivity of these skeptics' opinion, i.e., the close-ended philosophical questions of their interpretation and definition of what is and what is not science.

If, as Hughes states, for an ethnic group to be one the peoples inside and outside of it must agree that it is, it should follow that for science to be escapable from art, the people in the art fields (designated as external to science) must agree that they do not belong to the science group. So far they have not.

Conclusion

In this article, I started with the claim that manipulated ascendancy of science was a demonstration of policy makers' irrational way of doing things, or an indication of a good sense of judgment they seem to lack. I close by stating that the mission of a school is to educate—not superficially but thoroughly and broadly. To achieve this, the policy maker has the responsibility to formulate policy in such a manner as to allow for funding of education across the widest possible spectrum of disciplines, for maximization of teaching and learning in the ever growing economic and political phases of our society.

This essay thus widens the scope of the search for rationalization of the relationship between art and science. So far, policy makers have not found the rationale—but have challenged the academic mind to continue searching for clues. Due to the assumptive basis on which the current public-policy model for measuring institutional success and funding education is based, which offers minimum assurance of an all-encompassing education-funding paradigm capable of fusing the significance of art and science in building the nation, government will continue to err and fail in its efforts to maximize training and use of the wealthy, prospective human resources in the arts and humanities.

Even if the United States Government were, in counter point to my suggestion, to insist on the maximization of funding studies in science as a way of enhancing its econo-political base,

it must realize that artforms are a necessary condition of commodificaton and politicization of productions essential to the sustenance of its democracy.

If the government continues in its prevailing ipsilateral funding of studies in Science, Technology, Engineering, and Math (STEM) programs and in science-related programs, to the disadvantage of those in the arts and humanities, it will self destroy its econo-political base. It would worsen the ongoing polarity of the inseparable cultural factors of nation building, thus, will destroy the very foundation upon which our civilization was built, the art foundation.

Institutional powers in cultural and philosophical studies like Hughes, Becker, Ross, Mazrui, Minh-ha, Morris Weitz, and their supporters have cautioned against art/science dichotomy. Weitz explains the danger in designating art as a separate entity from science in what he takes to be a telling conceptual point, which Stephen Davies interprets as meaning that objective definition of art will foreclose on future creativity. If art were to have some immutable essence, he argues, then "the art of the future could not, in this respect, challenge, alter, subvert, or depart from the art of the past."[31] While the narrowness of the current criterion for assessing art/science relations exemplifies policy makers' irrational way of doing things, and is indicative of the broader sense of judgment they need to exercise, it has challenged the academic mind to seek a lasting resolution of the matter.

Published by the Forum on Public Policy

[31] See Stephen Davies "Weitz's Anti-Essentialism" in Lamarque and Olsen Aesthetics and the philosophy of Art, (Blackwell Publishing, 2004), 64.