The History of Art and the Art in Economics

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Philip Mirowski has recently written about the influence of physics on the history of economics.[1] Society, however, has been done a great disservice by existing studies of the evolution of economics which treat it as if it were (entirely) a scientific discipline. Our purpose here is to right this wrong, and highlight the evolution of economics as an art form.[2] It is, to be sure, a complex art form, but any student of art will tell you that a true appreciation of painting or music or literature only comes after lengthy study of underlying principles. So it is with econ-art. Some pieces are of an easily comprehended beauty, while others will to the novice appear to have no artistic merit whatsoever. This is perhaps why society, and even the practitioners of the art itself, have been largely unaware of the existence of econ-art. This situation should be remedied at once, for just as music is able to evoke elements of the human spirit which the sculptor cannot reach, econ-art explores territories which none of the traditional art forms can venture into.

Econ-art is only beginning to show its great potential. Music, art and literature can all uplift the soul of humanity and transport it far away from the grime and toil of everyday existence. But such journeys are only temporary. The soul inevitably snaps back to earth. Econ-art is capable of so much more than mere momentary refreshment. The true aficionado can be carried permanently away from the cares of this earth, to run carefree through a world far more well-behaved than our own. The beatific smiles of the foremost practitioners can be observed at conferences. Despite - or perhaps because of - their lack of recognition as an artistic elite, they seem untroubled by the legendary traumas of the artist. It is the most peaceful of arts, the most contemplative, the most sublime. Having long pursued recognition as queen of the social sciences, it may soon recognise a higher role as the queen of the arts.

One advantage econ-art has is its use of multiple media. Rooted in a literary tradition, its use of diagrams (which, while only rarely featured in formal works, play a crucial role in undergraduate education and thus the shaping of the economist's world view) renders it also a visual art. More novel is the use of mathematic formulation to achieve purity of both insight and expression; this, we shall see, has emerged as the key element in modern econ-art.

"There is not a generally recognised definition of art" (Kung, 1981, 10). We might all think we know what art is, but cannot agree on a verbal formulation of the concept. This could provide a huge stumbling block to an attempt such as this to establish the existence of a heretofore unrecognised art form. There will be many who object to the very existence of econ-art. Indeed even the artists themselves in their ignorance may object to such a classification (though we will try to show in what follows that art is a loftier aim than science). I have long thought that the most useful - if tautological - definition of art is that which someone perceives as being art. The conundrum of whether econ-art exists is thus solved; the very perception of artistic value in the work of economists makes it art, and no amount of denigration by others can make it otherwise.

Greater 'proof' is clearly desirable if econ-art is to gain the full light of society's understanding and criticism. The obvious path to follow is to draw comparisons with the traditional arts. We are aided here by advances in the discipline of art history. While still a highly disputatious field, there is now a large body of work which describes the evolution of art forms as resulting from changes in society at large. We form a simple hypothesis: if econ-art is art, its evolution will have been shaped by the same forces which have shaped the evolution of painting, sculpture, film, literature and music. Clear parallels should exist.

Ideally, we would be able to draw on the work of historians of economic thought; we could then juxtapose their words with those of art historians to show that the same forces have been perceived to have been at work in both areas. With a couple of notable exceptions, though, such works have eschewed the placement of the evolution of economic ideas in any sort of socio-cultural context. Fortunately, the parallels are generally quite obvious. Indeed, we will limit our attention to only a handful of the most important concepts in modern economics; many more connections will leap to the minds of readers familiar with economic theory and practice. Even those who reject the sobriquet of econ-art may still recognise the value in reprising the cultural influences which art historians have identified as having conditioned the evolution of modern art, and discerning the effects these forces had upon the evolution of economics. This alone fills a notable gap in the literature.

The Question of Purpose

But surely art must be purposeful, and the artist self-aware of his role as artist? If thousands of economists believe themselves to be solely pursuing the goals of science, then surely this must be so? We need not pause here to note that many have in fact recognised non-scientific motives, for even if the whole discipline revelled in the mistaken self-perception of scientist, it would not mean that they could not be artists. We do, after all, admire the beauty of, and display in museums, many artifacts of the past which were designed primarily for their utility. Pottery is the clearest example. Generally, those distant craftsmen would not have called themselves artists; many would have taken a narrowly utilitarian view and considered the term derogatory. Not all would even have been conscious of the aesthetic sensibilities which their craft serves. The modern economist, then, would be in good company if they were to unknowingly produce works of art. Indeed,

Meakin (1976, 135-41) has forcefully argued that the dichotomy the modern mind draws between works of utility and art is mistaken (and elitist).

It might be thought odd that the pursuit of art could for so long be misinterpreted as the pursuit of science. Recent developments in the philosophy of science tell us that we can not know with certainty whether we are right or wrong.[3] Moreover, economists can not, in general, run experiments, and when we do we can not control them as exactly as the chemist or physicist. This does not mean that inquiry is useless. It does mean that knowledge advances through the collective evaluation of new information. Therein lies the danger. With no objective criteria, it is quite possible that subjective decision-making may serve goals unrecognised. Thus art may be rewarded, even though both rewarded and rewarder never use the word.

The work of Meakin implies that the goals of art and science need not be incompatible.[4] This point, at least, has recently been recognised by Dasgupta and Stoneman [both economists]; "Knowledge all too frequently is both a consumption and a capital good. A mathematical theorem is often valued for its beauty, as well as for its potential for the generation of other theorems" (1987, 2). Art, after all, is a different medium for understanding the world we live in; it could well be imagined that a symbiotic relationship could emerge between the pursuit of artistic and scientific understanding. A problem only arises when the artistic motive is not recognised, for while the two goals may not be incompatible they are hardly similar.

The Purpose of Art

If art involved the realistic portrayal of the world around us, there would be no reason why the cause of econ-science could not be served by the pursuit of art. Art, though, is anything but realism. Even those works of art which seem at first glance to be realistic portrayals of the world around us in fact capture our hearts through subtle misrepresentation. "Distortion of some kind is present in a very general and perhaps paradoxical way in all art. Even classical Greek sculpture was distorted in the interests of the ideal. The line of brow and nose was never in reality so straight, the face so oval, the breasts so round ..." (Read, 1968, 29). To comprehend art at all we must recognise that people derive pleasure from certain sensory stimuli. Even without knowing exactly what these preferences are, we can see that the purpose of art is to transform the world about us into a more pleasing form.

We must be careful to distinguish distortion from simplification, for the latter is a valid scientific exercise, designed to impose order on a complex world (though only a very misguided science would casually forget the simplifying assumptions it had originally made). The artist's distortions are not designed merely to simplify. Indeed the artist often adds complexity to their image: splashes of colour that were not there; the cubist representation of figures from many angles at once; the novelist's juxtaposition of unrelated events.

The very subtlety of much artistic distortion makes it possible that econ-art could go unrecognised for so long, and poses the greatest danger to econ-science. The work of the econ-artist, which *must* involve the transformation of the world we actually live in into one of superior aesthetic form, *must* inevitably distort the pursuit of econ-science. This is undoubtedly a lesser sin than the perversion through ignorance of the art form itself, but provides a further motivation for the present inquiry.

Art versus Science

Perhaps, though, econ-art and econ-science merely cohabit in economics departments, without either perverting the other? Such can not be the case. Just as the image of science hangs over all economists, the urge to create art must infect them all. Not all are blessed with equal amounts of either scientific acumen or artistic sensitivity, to be sure, and thus left to their own devices would pursue the two divergent goals to different degrees. But economics is a community, with its own standards of what is good and what is bad. These standards affect the individual practitioner in two ways. First, they provide her with important personal incentives; hiring, tenure, and promotion all depend on publication, and the latter depends on satisfying community standards.[5] The psychic benefits of scholarship also depend in large degree on meeting these standards. As Paul Samuelson has said, "In the long run the economics scholar works for the only coin worth having - our own applause" (in Breit, 1982, 107). Only the most heroic of scholars can be expected to battle against standards they consider to be misguided. The second effect is more subtle. Lacking objective criteria, the community decides which ideas are correct, and the emerging scholar can not help but be conditioned by the community values which she inherits.

Our focus here is on econ-art, so we can leave to others, at least for now, the question of what, if any, scientific standards guide the discipline. While much of the work to follow will highlight the role of artistic ideals in the evolution of economic thought, it is useful at this point to make some general observations about this pervasive influence.

McCloskey and others have in recent years stressed the role of rhetoric in economic discourse. Economists do not simply put forth new ideas unadorned to prosper or die in the cold light of truth, but use a variety of argumentative devices to present their case. Recognition of this fact must at least raise the possibility that science need not be the only arbiter of quality. "Shakespeare used 200 rhetorical devices; economists do with less, using mainly metaphors but also analogy and appeal to authority, to a person, a mathematical procedure, or whatever else might please a reader by its order or beauty" (Spiegel, 1991, vii). The use of the word 'beauty' by Spiegel can hardly be viewed as a slip of the pen. Nor for that matter should the frequent use of the word 'elegant' to praise this model or that. If scientific understanding of the world we live in were the only purpose of economics, there would be no place for such language in economic discourse. It is well known that econometric techniques are generally incapable of showing that one model describes reality better than another. How then do we choose one over another?; the appeal to beauty and elegance must be a powerful influence when scientific criteria are difficult to establish. The futile attachment of econ-science to a methodology which purports to be capable of precision and conclusive proof, when such are not possible, merely opens the door to the ascendancy of artistic values.

Of course, scientific merit alone is rarely if ever the sole reason for the ascendancy of a new view of reality in any field. Romain Rolland has stated this best: "Ideas have never conquered the world as ideas but by the force they represent. They do not grip men by their intellectual contents but by the radiant vitality which is given off by them at certain periods in history.... The loftiest and most sublime idea remains ineffective until the day when it become contagious, not by its own merits,

but by the merits of the groups of men in whom it becomes incarnate by the transfusion of their blood" (in Fleming, 1970). Ideas must always win through appeal to more than man's intellect, because man is not a computer but a being constrained to respond to feeling and intuition as well as logical thought.

It might be thought that the lack of willingness to eschew a model simply because an alternative explanation appears to provide a better description of reality represents false scientific values rather than artistic values. It must be an incredible perversion of scientific method, however, to disregard the clear implication that reality does not accord at all well with theory.[6] Who, though, that has ever taught international trade - drawn the Edgeworth box diagram, derived offer curves, illustrated the effects of tariffs with production possibility frontiers and indifference curves - who can have done that, that would not shed a tear if this elegant mass of theory had to be pushed to the background for the mere crime of only being a residual claimant on truth. We should not lose heart, though. If econ-science only has place for such diagrams in the footnotes, they will always have a prominent place in the annals of econ-art, for they are exquisite. The world need not work that way for us to treasure them.

We now take a slight excursion into biography to ask how the conflict is worked out at the level of the individual economist. Breit and Ransom (1982) asked Abba Lerner why he had chosen to be an economist. He spoke first of his concern with improving the condition of mankind, but also of the "keen enjoyment I have always felt, and still do, in the mental exercise involved in the achievement of elegant proofs and diagrams" (137). He noted that he could have satisfied the latter desire more fully by pursuing mathematics or chess (the authors later note Lerner's skill at constructing wire mobiles of animals, "a task that Lerner takes with the same seriousness that he does the elucidation of his most abstruse arguments on economic theory" (142)); it was thus the former desire which drew him to economics. It was perhaps the self-awareness of the aesthetic pleasure he derived from his work that allowed Lerner to shine as an econ-scientist; he moved freely from prose to diagrams to mathematics as the occasion suited.

Culture and Economics

As we shall soon see, art historians have made great strides in relating the evolution of art to broader cultural forces. As Kung says, "Art is related to society and every work of art is actually action on and reaction to sociopolitical conditions" (1981, 23). Historians of art have gone beyond such general observations to relate particular art movements to particular social forces. While this has only rarely been done in the history of economics, it is still worthwhile before proceeding to make note of the recognition which socio-cultural forces have achieved.

Blaug typifies the attitude of most historians of economic thought. He notes the possibility that, "shifts in emphasis within economics are due to changes in philosophical attitudes or dominant modes of reasoning", dismisses some attempts to do exactly that and then decides to largely ignore questions of social milieu and philosophical currents in order to focus on the momentum of economic ideas themselves (1985, 3-7). It is of course, no mistake to recognise that economic theories have a life of their own, and that today's theories must represent some evolution of

theories of the past. Historians of technology have recognised the interplay of social and technical considerations in the process of technological innovation, and have struggled in recent years to overcome their natural tendency to focus on the latter. Academic specialisation is not to be criticised lightly, but when both expertise and ease of exposition lead to an unnatural emphasis on one set of criteria, scholars must attempt to achieve greater balance. The standard portrayal of economic theory as developing of its own accord gives an undeserved paean of scientific validity to the entire enterprise.

We should emphasise that we would not want the pendulum of analysis to shift entirely in the other direction. The existing body of theory at any point in time creates a mindset which conditions the future research agenda. We will see that many schools of modern art - surrealism for example - had great difficulty in becoming established because the audience had to adjust their mode of appreciation. Likewise, new economic concepts can fail because they fly in the face of received wisdom:

> "a good deal of received doctrines is metaphysics [unverifiable]. There is nothing wrong with this, provided it is not mistaken for science. Alas, the history of economics reveals that economists are as prone as anyone else to mistake chaff for wheat and to claim possession of the truth when all they possess are intricate series of definition or value judgements disguised as scientific rules" (Blaug, 711).

Ideas which originally achieved currency due to their artistic merit may thus exert a continuing influence on the direction of both scientific inquiry and artistic expression. We will want to remain cognizant of this influence, while attempting to discern the artistic motives at work in the first place.

Roll (1956), Spiegel (1991), and Fusfeld (1977) are among those who have attempted to discern environmental influences on economic theory. "Economic thought reflects specific social or economic conditions, or the spirit of the age; this is confirmed by the observation that many advances in thought were made in the form of multiples - that is, independently by more than one author" (Spiegel, 1991, xx). Yet while the emergence, for example, of marginal utility theory contemporaneously in three countries with quite different intellectual traditions points strongly toward some common philosophical movement, it is not easy to discern what this movement might be (Blaug, 300).

We can safely say, then, that while the potential role for cultural determinants has been recognised, the actual role these may have played at particular times has been scarcely elucidated. We will not be misguided, then, if we attempt to uncover first what influences have conditioned the evolution of the traditional arts in the twentieth century, and secondly to see whether the same forces appear to have been at work in economics.

Modern Art

It is common in works of art history to speak of two broad movements which encompass most of twentieth century art. Without at all denigrating those who prefer to concentrate on the commonality in modern art, it will suit our purposes to

discuss these two broad movements separately, focussing in each case on the best-known sub-category. The first movement to be discussed is expressionism, which Fleming (1970) describes as art which looks within to the world of emotion and psychology. One common characteristic of such work is the use of bright colours to illustrate emotion, a technique which can be traced to at least Van Gogh. Expressionism includes such traditions as surrealism, dadaism, social realism, and primitivism. We will focus on the first of these, for it is not only the best known but the most pervasive. Indeed, Hauser (1956) has claimed that surrealism is the dominant art form of the twentieth century.

The second broad movement is abstractionism, which "implies analysing, deriving, detaching, selecting, simplifying, geometrising, before distilling the essence from nature and sense experience" (Fleming, 506). Examples include cubism, futurism, and nonobjectivism; we will look at the first of these later. Expressionism and abstractionism can be perceived as speaking to different aspects of the modern soul. Fleming feels the former expresses the heat of psychological and political revolutions, while the latter transmits the light of new intellectual points of view. We will find in what follows that it is easier to feel the heat than the light.

Surrealism

Precursors of surrealism can be found in the works of artists such as Chagall and de Chirico in the immediate pre-World War I period, and, of course, elements of surrealism can be found in works of previous centuries. But it is generally accepted that it is the horror of the First World War which gives birth to the movement. The previous sense that civilization was progressing was shattered during those four years, and many began to search for alternative philosophies. To a number of artists it appeared that if the outcome of rationalism was war, "the only cure for man was irrationality" (Hedges, 1983, xii). Spurred on by Freudian psychology, they turned to the exploration of man's inner self, in the belief that only there could the basis of a superior civilisation be found.

The first postwar reaction was Dadaism. This short-lived phenomenon focused on denouncing previous artistic sensibilities. Dadaist exhibits were designed purposely to shock the audience into a new world view by failing to fulfil their expectations. Poetry emphasised circular word games. Typical of dada activity was the issuance of manifestos denouncing manifestos. Never popular with either critics or public, this art form could on its own in any case have had little effect on econ-art, for it was only capable of destroying that which had gone before, and could not imagine what to replace it with. Its importance lies in illustrating the extreme disapproval of society which characterised the artistic avant-garde of the period. Moreover, dada provided the necessary dissolution preliminary to the recombination of elements into a new vision in surrealism (Hedges, 1983, 33).

Two elements can be discerned as the driving forces behind surrealism. The first is "an unrelenting revolt against a civilisation that reduces all human aspirations to market values, religious impostures, universal boredom, and misery" (Rosemount, 1978, 1). Surrealists described themselves as specialists in revolt. We must be careful, though, not to conceive of this attitude in the narrowly political sense in which the world 'revolution' is normally used. To be sure, many surrealists and

historians of surrealism had left-wing tendencies, and there were notable interactions between major surrealist figures and, for example, Trotsky. On the other hand, many saw surrealist irrationalism as supportive of fascism, and Stalin viewed it as decadent (Rosemount, 6).

While we can not ignore ideological overtones, surrealists were artists, not politicians. Their antagonism to the existing society was much less narrowly focussed than that of political activists. In such a world view, capitalism was at most a symptom, rather than the root cause, of the failure of western civilisation. The problem was with man himself, his attitudes, the way in which he perceived himself and his universe. Unlike dada, surrealism had an answer, and this answer was rooted in psychological rather than political theory.

This brings us to the second key element in surrealism. It was Freud, not Marx, that held out hope to surrealists. The problems of mankind were due to man's lack of understanding of his own subconscious. This was the mission of the artist in modern society, then, to reintegrate the conscious and subconscious minds, to bring the audience in touch with their own inner selves. "Members of the group believed in the superior reality of the dream to the waking state, of fantasy to reason, of the subconscious to the conscious" (Fleming, 521).

Surrealists, quite simply, aimed to portray a world different from the one in which we live. They attempted to describe a higher reality, the reality of our inner rather than outer beings:[8]

> "In their relentless pursuit of another world, the surrealists carefully avoid traditional forms of representation that in one way or another favour a mechanical adherence to the tangible world of experience.... Artistic manipulation and dream activity provide necessary mediations that encourage them to transform recognisable or descriptive reality into otherness. This does not mean that allusions to everyday existence cannot be traced in surrealist works in general and books in particular" (Hubert, 1988, 343).

While all art involves distortion, surrealism went a step further and purposely tried to create a world different from our own. While their limitations as human beings meant that reality often intruded, and at other times reality and unreality were intentionally juxtaposed, the overriding goal was to create a new and better world, totally cut off from reality. They responded to a "longing for the unattainable" (Fleming, 519). The world we live in was the basis only for flights of fancy. Hubert speaks of surrealist book illustrators: rather than taking the traditional view of the text as a model for which they were to provide a graphic equivalent, they viewed it only as a stimulus to their imagination (1988, 344). Never before had art been so detached from reality.

While surrealism was born and prospered in the France of the 1920s, its effect on twentieth century art was pervasive. The turmoil of Depression and Second World War could only encourage the international spread of the movement (in particular, various French surrealists were forced to take refuge in the United States during the war). Often under different names, the surrealist vision grew from inauspicious counter-cultural beginnings to influence almost all modern art: "Surrealists adopted ideas which seemed perverse.... Today, many of its principles, artistic, political, and moral have begun to appear more significant than the orthodox ideas which emerged during the period between the two World Wars" (Haslam, 1978, 6). "During the

1960s and 1970s artists throughout the world have acknowledged the influence of the movement" (Haslam, 237). Effects were felt in all fields of art: Joyce, Prokofiev, and Ravel were inspired by surrealism (Fleming, 523). We must conclude from its pervasive and lasting influence that surrealism has captured important elements of the modern psyche, and can therefore suspect that similar influences should have been at work in econ-art. As Rosemount has noted, "Surrealism never has ceased to expand its researches into every form of human expression" (1978, 2).

Surrealism in Econ-Art

While most of the classic works of economics were written in the 18th and 19th centuries, which Bertrand Russell characterised as "a brief interlude in the normal savagery of man", twentieth century theory has had to respond to world wars, mass unemployment, and barbaric despotism, all of which posed a threat to liberal philosophy (Spiegel, 599). While Spiegel focussed on the implications for economic ideology, we can now see that economists were part of a larger culture in which reality was being attacked on a much wider front.

Hauser defined surrealism as the discovery of a 'second reality' which, although fused with ordinary reality, is nevertheless so different from it that we are only able to make negative statements about it (1956, 223). Our minds are so accustomed to this reality that they can only consciously understand the other in terms of its differentness. Yet when we are truly struck by a surrealist work it speaks to us directly and transports us into that other reality. Since that other reality is in fact superior to our own, we should accept it; to denigrate its lack of correspondence to everyday reality is to entirely miss the point.

Lacking this insight, much criticism of modern economic theory has done exactly that. Of course it doesn't accurately depict the world we live in: consumers don't really rationally maximise utility, corporate managers certainly don't maximise profits, perfect competition (and thus supply curves) never exists, the economy is never ever in general equilibrium, any natural tendencies toward full employment are sluggish at best. The list could be extended almost indefinitely. What might once have been dismissed as simplifying assumptions serving scientific principles of investigation have long since coalesced into a body of unreal theory. Economists casually forget the original assumptions and apply the verdicts of the theory of competition to a very uncompetitive world. Experiments show that people don't behave at all the way our theory presumes: the results are ignored.

We need not rehash the standard criticism here; writers as diverse as Galbraith, Thurow, and Mirowski have made these points before us. Some have attributed nefarious ideological motives to economists; some of these have conceded that such motives are not consciously held. None of the critics, blinded by the illusion of economics as only a science, have been able to see that the humble econ-artist has been doing exactly what society wanted of them. Like surrealists in other media, they have created a world to replace the one we must live in. Econ-art has transcended reality, created order out of chaos, invented a world that works, that overcomes human greed, power-lust, vanity, and incompetence. It is not just real; it is much better than that: it is surreal.

Walk into the garden of econ-theory for a moment, and free your mind from the troubles of the day. What bothers you? Labour market discrimination? Not in this garden, for if some workers of equal ability are shunned by some firms, the competitive environment ensures that others will not only hire the discriminated, but beat up the discriminators in the market place. Perhaps nasty trade wars in this world make you fear for the future? The garden is peaceful; everyone accepts the free trade verdict of the theory of comparative advantage. Do you worry about unemployment? Involuntary unemployment, beyond some trivial transitory job search component, doesn't exist in the garden. Do you fear that modern man has lost touch with basic human values and is buffeted wildly by advertising and fads? All in the garden are rational independent utility maximisers. Does the onward march of technology cause trepidation? Relax; technological change occurs in the background in the garden; productivity increases virtually of its own accord.

Not all of the elements of economic theory are superior to reality. Indeed, homo economicus would be a rather boring species. However, it would be a serious error to conceive the purpose of surrealism as the creation of perfection. One does not consciously create the other world, after all. It must emerge from the subconscious. "The dream becomes ... in broad sense the paradigm of the whole world picture" (Hauser, 224). Dreams give only a partial insight. Just as dreams combine meticulous details in arbitrary fashion, so also must the surrealist artist. The subconscious world may be superior, but not every detail it yields will be wonderful. The artist, as unconsciously as possible, builds a picture of jumbled details. This is what gives surrealist art the appearance but not the substance of reality. It is what gives econ-art the appearance but not the substance of science.

One last side-effect should be noted. The essence of works of art, and especially surrealist works, is that they attempt to illuminate that higher reality by describing in detail some small aspect of that reality, and only sketching the broader picture. Unlike the economics of its predecessors, twentieth century econ-art has totally embraced this approach. From the late nineteenth century, "economics had ceased to be the proliferation of world views which ... seemed to illuminate the whole avenue down which society was marching. It became instead the special province of professors whose investigations threw out pinpoint beams rather than the wide-searching beacons of the earlier economists" (Heilbroner, 1968, 156). Econ-art did not need to fill in the big picture in order to create the illusion of completeness. It could shy away from questions of economic growth with which its constructs could not deal. Not only was this possible but the very methodology of the artist made it imperative. The intellectual may conceptualise the big picture; the artist must focus on the particular.

Before proceeding to examine in greater detail the elements of the surreal world, we are advised to meet again the criticism that economics is just bad science, not art. The continued refinement of abstruse unverifiable models proceeds on many fronts in a manner which hardly serves scientific goals. Clower dismisses the work on general equilibrium models since the time of Edgeworth in the nineteenth century as footnoting (1989, 28). We have in recent years seen a rash of rational expectations models. Such meticulous attention to detail in the construction of an unreal picture is more characteristic of surrealist art than positive science.

Toward a Better World?

Philosophers of art have suggested that art does not simply point to a better world but a world which may yet actually arise:

> "The work of art proceeds from the longing for that perfect existence which is not yet, but which man, despite all disappointments, thinks must come to be when the existent has reached its full truth and reality has been subordinated to actual entities. The tree on the canvas is not like that outside in the field .... The tree, however, is not sealed in its unreality, but rouses the hope - if it really exists - that the world as it ought to be will at some time actually arise. Thus art projects in advance something that does not yet exist. It cannot say how it will come to be; nevertheless it provides a consoling assurance that it will come ... we feel its promise" (Guardini, in Kung, 51-2).

Kung himself echoes these sentiments, though leaving alive the possibility that perhaps the second reality is more a dream than a realistic expectation:

> "Its [art] particular service to man consists in symbolising, without cold comfort or false solemnity, what is not yet, how man and society might be, what man's yearning awaits: in this world of purposes and constraints, a free space for the element of play which leaves open all possibilities. For a great work of art is ... more than a downright lie .... It is - particularly when it is aesthetically immanently perfected - more than a hint and anticipation of a world still awaiting its consummation" (1981, 51).

Surrealists certainly saw themselves in this light. The goal of surrealism was to lead to alterations in perceptions of reality which would carry over into life (Hedges, 1982, 58). Surrealist art was viewed not as an end in itself but as part of a social revolution (Rosemount, 1978, 43-4). We must understand, though, that they felt that society would only be changed if man was changed. To the extent that people were put in touch with their true inner selves they would be able to fashion a society without conflict.

Marxists generally shared a somewhat similar hope of changing man. They felt, however, that it was possible to change social institutions first and man's basic impulses thereafter. Some might be transformed by philosophy alone; the rest would change it they lived in a communist world. This was the long cherished dream; that mankind's tendencies toward non-selfish, collectively-oriented behaviour could be brought out by political revolution. If possible, this would be a much quicker path to utopia. Changing man is no simple task, and doing so through the subtle medium of art is certain not to happen overnight. "[Visual] art can indeed make its mark on consciousness and thus, indirectly, change society, but this cannot be brought about instantaneously, only as a long-term effect" (Kung, 24). We can not yet judge the success of surrealist art in changing man, though its continued popularity is indicative.

A generation of Marxists was scorned in the west for the belief that man's attitudes could be transformed by institutions. Economists of the mainstream chased their own dream in more subtle fashion. Perhaps the homo economicus of the textbooks could be created if we just collectively believed in him, if we shut ourselves off from the polluting thoughts of psychologists and sociologists who suggested not just that mankind was needlessly complex but - heresy of heresies -

that this was somehow important. If businessmen could be convinced of the inevitable return to full employment, perhaps investment wouldn't fluctuate so much in the first place. If politicians were convinced that tariffs were bad, perhaps we could get rid of them. If those with market power imbibed the notion of contestability they would satisfy themselves with normal profits.

We can not be sure to what degree a greater dedication to the principles of science might by now have bequeathed to us a discipline capable of providing helpful advice to governments on the crucial issues of the day: encouraging growth, reducing unemployment, controlling inflation, improving the income distribution etc. Given the pitiful record to date of econ-science in improving the state of society, we must be relieved that so much effort has been devoted to the artistic goal of changing man instead. Econ-science holds out hope for the quick fix, the blazing insight which allows farsighted political leaders to recraft our institutions in miraculous fashion to create a kinder, gentler tomorrow. Econ-art must pursue the slower path of fashioning a world toward which we might aim, and urging mankind to transform itself to suit the image.

The above comparison was biased against econ-art, for it took as its benchmark the ostensible goal of econ-science: the refashioning of society. We must never lose sight of the fact that art serves a loftier goal than science. If civilisation is tending toward any goal, it must be the realisation of man's true potential. Institutional restructuring is just a means; the goal is self-actualisation. Seen in this truer light, it is econ-science which pursues the indirect path, while econ-art speaks directly to the heart and soul of man. Econ-science still has a role to play: the release from unnecessary toil and discomfort is a prerequisite for the widespread discovery of man's inner spirit. But we would err greatly were we to exalt the piano tuner above the concert pianist or composer.

This leads us back to the question of whether the reality portrayed in econ-art must be the future which we actually wish to achieve. The answer, surely, is no. Elements of the picture may be exactly that, but other elements may merely represent a purposely idealised version of that which should be but never could be. The goal, after all, is to transform man; if man's reach did not always exceed his grasp there would be no place for curiosity, or hope, or striving, for much of what is best in the human spirit. Art must, in the end, hold out an unreachable goal; man grows and evolves and achieves some of the possibilities which lay before him, but it is not in man to achieve perfection.

Econ-art evokes the future in order to free man from the present. Writers as diverse as Tolstoy and Wadsworth had argued that artists transmit feeling and emotion in their work. While the artist expresses feeling, that which is transmitted is understanding, and such understanding takes the heat out of our emotional problems (Read, 262-7). Only by recognising how art inspires the best part of the human spirit, can we understand the ancient Greek equation of beauty with moral goodness (or simple truth). A man who absorbs the image of the econ-art world, of a world without discrimination or exploitation and where people get what they deserve, is free. The best of worlds, after all, exists only in our hearts.

At one level, homo economicus must seem to be quite a departure from the Freudian construct which inspired surrealism. Yet he reflects the constraints of the new art form. The painter, the novelist, and the sculptor can readily capture the

neurotic conflicts of the inner being. The economist has difficulty dealing with conflicting desires. Elaborate models of elegance and beauty can not easily be created unless people behave in predictable fashion.

At a deeper level, Freudian and economic man are one and the same. Haslam describes the surrealist discovery as the recognition that modern man was still driven by primitive instincts (1978:7). This, again, was a reaction to the received philosophical tradition in which civilised man was driven by higher virtues - philanthropy, good taste, philosophical introspection. Freud pointed to a different set of impulses. Econ-art echoes the return to emphasis on selfish motives (always, to be sure, an important element in the discipline). It echoes the desire to put the unmasked individual at the centre of artistic expression. It is, in its own way, a rebellion against the naivete of nineteenth century philosophy.

An Orderly World

Read describes art as an attempt to create pleasing forms (1968, 18). We can thus go beyond our discussion of the yearning for a better world to look at particular characteristics of that other reality. The first essential characteristic is order. "Art is an escape from chaos." (Read, 42-3). Surreal art has much of its impact through the very precision with which unreal elements are juxtaposed. Art can not be a jumble; every element has its place. Ideally, one should be able to say; "Ah yes, every piece fits. There are no loose ends". Only then can understanding be complete. In the real world there are loose ends. Moreover, there are always caveats. A may cause B most of the time, but not always, and it may be difficult to enumerate much less explain the various situations in which this causal link does not hold. In the higher reality of the artist, A can cause B all of the time. Indeed, in any work of art A must cause B all of the time. Understanding in art may be deep but must be simple.

We have, then, our first limited insight into the preference for mathematical discourse in econ-art. If scientific goals alone were to be pursued, one would imagine that it would soon be recognised that the precision of mathematics is ill-suited to our present highly imperfect knowledge of the functioning of the economy.[9] Maths has its place to be sure, but we would be well advised to devote more attention to uncovering the caveats than working out the mathematical niceties of a world in which A always causes B. For econ-art, though, mathematics is an unmixed blessing (ignoring the unfortunate side-effect of reducing the potential audience).[10] It guarantees order. Every element of the model is related exactly to every other. If one wishes cerebrally to work out the exact role of any element, this may take some time. But while the art historian may want to examine every paint stroke (or not), the connoisseur appreciates the work as a whole. So it is with econ-art. One does not have to recreate the work of the artist to appreciate the message. A model expressed in precise prose must inevitably encourage intellectualisation, and the subtler the message the more difficult it will be to by-pass the conscious mind and appeal to the intuition of the subconscious. Since we know a mathematical model must not defy logical rules, we are able to accept it as a whole. Unless we wish to use it as an input into further artistic exploration, we can accept the message without feeling any need to analyse the details. Elegance, simplicity, beauty, order: we are transported immediately to that other world.

We should not neglect the possibility that some of this appeal is misplaced. Philosophers as diverse as Socrates and Kierkegaard have argued that we should not choose order, but accept the inherent difficulty and complexity of life (learning that it is difficult but not impossible). We can be tyrannised by order, as when the laws of economics become excuses for the horrors of economic life (Arrington, 1990, 92). The difficulty here lies in the confusion of econ-art with econ-science. As art, economics serves a valuable function in transporting the audience into a better world. Only when art is mistaken for science does it limit our ability to cope with the world we live in.

The Quest For Understanding

Precision serves not just the aesthetic requirements of all art, but also responds to the desparate desire of modern man for hard answers in a world of uncertainty. The tight cultural net which bound our forefathers has been cut. Unprecedented rates of change in the world around us serve to cause further disorientation. "To be modern is to find ourselves in an environment that promises us adventure, power, joy, growth, transformation of ourselves and the world - and at the same time, that threatens to destroy everything we have, everything we know, everything we are". In the nineteenth century, writers struggled to deal with the complexities of the world they lived in; in the twentieth century they have tended to the extremes of admiration or condemnation. Postwar attempts to achieve some synthesis between these two extremes have failed (Berman, 1982:15, 24, 32). Seen in this light, the failure of dada and the success of surrealism can be attributed to the fact that the latter provided an answer whereas the former was anarchic.

While mankind can still revel in the subtle discourses of the great philosophers, we can not deny that there is a *taste* for the closed system, the feeling that, "this is *the* answer; we need look no further". Econ-artists, then, by the order and completeness of their creation, satisfy a basic human need. At its best, this can aid the ability of the recipient to cope with reality. The danger of course is that one must be able to separate reality from surreality. Art fails in its mission of understanding if its message is misinterpreted. The problem is not so much that econ-science and econ-art are interwoven, but that econ-art is badly presented. Nevertheless, the confusion of art and science must increase the possibility that econ-art is misunderstood.

We cannot speak of the understanding which is the aim of art in the same way that we speak of the understanding which comes from science. Still, just as scientific speculation can be erroneous, so too can art be misleading. Art should increase our capability to cope, to prosper, to grow. "Art is rehearsal for those real situations in which it is vital for our survival to endure cognitive tension" (Peckham, 1967, 314). While the critics may be right when they claim that economics is cut off from reality, econ-art ironically fails in its mission because it does not always *appear* to be divorced from reality. It thus unintentionally enters the dangerous arena of demagogues and religious charlatans, and provides false succour by acting as if easy answers existed to life's harder questions. Economics has a valuable role to play but cannot do so as long as she is unable to face reality herself.

An Antidote to Nationalism

Surrealism arose as an antidote to nationalism and militarism (Haslam, 237). From the outset, surrealist artists strove to achieve a worldwide movement, confident (at least hopeful) of the power of art to unite mankind. Visual art, especially, could easily cross national boundaries. And if humanity could share the surrealist vision, nationalist tensions must be eased.

The implications for econ-art were far-reaching. International trade theory concluded that trade barriers were bad policy (in a world of free trade, much if not all of the economic pseudo-rationales for military adventures would disappear) and this could not help but strike a responsive chord in a profession and populace both weary and fearful of war. It would not just be in international trade but across the discipline that the reaction to nationalism would be felt. In a time of ethnic turmoil there was a natural attraction of a 'science' that focussed on what mankind had in common rather than its diversity (Spiegel, 650). Tastes could be ignored in favour of identical utility - maximising consumers. Differences in cultures, institutions, and technologies could be ignored in product and labour markets with homogeneous labour and capital. The all-important question of why some countries grew faster than others, or had lower unemployment rates, could be pushed to the background; pure deduction of the driving mechanism of the typical economy would be pursued instead.

"Only during the past fifty years has there emerged a worldwide homogenised mass culture and, in conjunction with other factors, the acceptance of a mathematical economics world wide in its sweep that abstracts from the specifics of time, place, and national differences" (Spiegel, 1991, xii). Through the nineteenth century, different economic traditions were pursued in different countries; e.g. the German Historical School,[11] the Austrian School. Even into the interwar period, it was common for major developments in theory to remain unknown outside the country of origin for years. Mathematics provided an answer to that. Both by facilitating communication and glossing over national differences, it created one theory for all. It can be no co-incidence that Von Neumann, one of the earliest popularisers of mathematical economics, was, like Freud before him, a product of the protracted breakup of the Hapsburg Empire, nor that mathematical economics first caught on in the ethnic melting pot of the United States (Spiegel, 640, 661). Econ-art brought the world closer together.

Suspicion of Authority

The First World War could not help but cause people to question the wisdom of those in charge. The later rise of totalitarian governments encouraged an even greater suspicion of power. Not only was the state losing its credibility, but the natural authority of the church was in serious decline. Surrealism was in large part a reaction to the loss of legitimacy by both church and state; its goal to shock society into a new world view (Haslam, 1978, 7). In the cauldron of Depression, when much of the intelligentsia, especially in Europe, sided with authoritarianism, surrealists retained their suspicion (Hauser, 1956). While conscious thought could not always see any alternative, the subconscious yearned for images of a world in which the horrors which resulted from the abuse of power would not be possible.

The free market orientation of mainstream economics is often attributed by its detractors to ideological motives. Yet a deeper and less hostile interpretation is clearly possible. Econ-artists merely reflected the temper of their times: the clearest antidote to the abuse of power was the assertion that the world would function perfectly well on its own. Man did not have to consciously rule his own affairs, as the invisible hand would do this for him. Practical considerations might force politicians and some economists to argue for, and achieve, a haphazard accretion of government powers. This could not lessen the attraction of works of theory which argued that such was unnecessary.

The University of Chicago has long been the central outpost of the idea that state interference is generally counterproductive. The two leading scholars there during the Depression were Knight and Simons. Simons, like Keynes himself, was only too conscious of the justification which the latter's theories could provide to totalitarian regimes (Breit, 209). Knight has left us a clear statement of his views on the matter:

> "I mistrust reformers. When a man or group asks for power to do good, my impulse is to say, 'Oh yeah, who ever wanted power for any other reason? And what have they done when they got it?' So I instinctively want to cancel the last three words, leaving simply 'I want power'; that is easy to believe. And, a further confession: I am reluctant to believe in doing good with power anyway" (in Breit, 198).

It is not a belief in the market, or even of the rights of private individuals that provides the starting point of his philosophy, but a justified fear of the abuse of power which encouraged him to look for other mechanisms which could mediate men's lives. Both Knight and Simons were willing to recognise some role for government. The latter even suggested that natural monopolies should be operated by government, and that other corporations should be limited in size to prevent the exercise of market power. These are hardly the suggestions to be expected of an ideological lackey. They express rather a fear of power in all forms, and the hope that market forces could discipline man. We might feel that hope to be misguided or even naive, but can hardly be surprised that it strikes a chord in the soul of modern man.

The Deification of Technique

The role of artistic motives in economics helps us to comprehend one of the puzzles of the modern profession: the focus on technique rather than results.[12] This is a source of much hilarity among our brethren in mathematics and statistics departments who marvel at how a group of academics supposedly devoted to understanding how the world works can pride themselves instead on the mastery of techniques taught daily to graduate students, if not undergraduate majors, in mathematics.

The economist retort is, of course, that the real challenge is the application of these techniques: the subtle manipulations required to bend the precise tools of the mathematician to the explication of the complex world we live in. The initiated, however, know only too well that approximation to reality is not a standard which developments in theory are required to satisfy.[13] Perhaps it is inevitable that with thousands upon thousands of economists pressured to publish a steady stream of articles and books, all of which are supposed to contain something 'new', that the

profession must evolve a standard less demanding than that each article actually contains some net addition to our understanding of how the world works. Yet one can't shake the feeling that chemists and biologists, and hopefully physicists as well, are more focussed on the results, and less fixated on the means used to derive them.

Painters are often known by their brushstrokes, composers by their innovative use of various instruments, and novelists by their vocabulary or manipulation of grammar. While there is much debate on the issue, the style of an artist is still considered an important focus for the art historian. Jackson Pollock, and other modern artists, have indeed gone so far as to raise the process of creating art above the finished work, and invited their audience to participate with them in the creative process. Technique, then, while just the means to an end for the true scientist, is more than that for the artist. It must be a part of the latter's view of self. The novelist is ever-conscious of their flair with words, or peculiar skill in characterisation. The self-image of the econ-artist is likewise tied up with their ability to make mathematical symbols dance.

Two criticisms of the analogy can be raised, which on further inspection arise from the same source. The first is that while economists have undue pride in their mastery of the basics of mathematics, the musician makes no mention of his ability to read music and the novelist of her ability to read and write. The second is that true artists never entirely dissociate their technique from their purpose. An artist's virtuosity with the paint brush is only hailed when they are perceived to evoke some aspect of the human spirit. Nimbleness on the piano keyboard might be recognised in its own right, but the true artist is deified only for their ability to make the music come alive. The economist too is hailed on occasion for their view of reality, but are much more likely to be hailed for technical virtuosity alone (note, for example, the difficulty the Nobel Prize committee had in discerning any real-world application of the life work of Debreu).

Why do econ-artists go overboard relative to other artists in their focus on technique? Is it not simply because they deny their artistic side? Technique has a place in both art and science, and therefore putting it on centre stage does not require any discussion of the higher purpose of economics. Yet mathematics, which sometimes does and other times does not service the interests of economics as a science, is admirably suited to the pursuit of economics as art. While econ-artists have thus successfully blended technique and artistic sensibility, they have only generally been conscious of the former.

Automatic Writing

Mathematics is more than just a tool with which the econ-artist can achieve elegance of creation. Art is intuitive rather than intellectual. This is why econ-artists are never able to visualise more than small parts of that other reality. Only through intellectual activity can the big picture be imagined, and if the merely intuitive is lost the result is no longer art.

Surrealist artists had to struggle with this dilemma as well, but to differing degrees. Most difficult was the work of the novelist or poet, for writing must of necessity require some conscious thought. The technique devised to overcome this was called automatic writing. Rather than consciously deciding what he wished to

put on paper, the author should concentrate as little as possible, simply put down words as they emerged in his mind, and try to let the words take on a life of their own. Through this stream of consciousness approach, it was hoped, some of the true inner being would be transferred to the page. The surrealist manifesto of 1925 described the method as "pure psychic automatism by means of which one sets out to express, verbally, in writing or in any other manner, the real functioning of thought without any control by reason or any aesthetic or moral preoccupation" (Fleming, 521). Revolutionary at the time, such an approach to writing is now a staple of writing courses and how-to-write books worldwide.

Economists are not unaware of the appeal to intuition involved in mathematical formulation. An economist working out a theory in words must consciously conceive of each step. A mathematician can write down a set of equations and be surprised by the result the solution of the system throws out. The economist may attribute such moments to the fortuitous intervention of the gods. In the very form in which the original equations are set down on paper, the subconscious mind is able to work its magic. The conscious mind may receive a shock at the end, but this is only because it is not in better touch with the true inner self. Thus elements of unreality, which the conscious mind could never imagine, are craftily imbedded in innocent-looking symbols, and fused into a system which captures some aspect of the other world. Most of what passes for modern economic theory could never have been crafted consciously. It thus owes not just its widespread acceptance but its very existence to mathematisation.

Maths as Science?

We should digress again to deal with the contention that mathematics serves primarily scientific goals within economics. In 1972, Phelps-Brown could assert that economic theory was still not ripe for mathematisation (Spiegel, 666). Surely, nobody can doubt that there are still wide areas in which our understanding of economic processes is so limited that the employment of the precision of mathematics as an explanatory device is laughable. If economics were just a science, maths would be employed selectively.[14] It is only in economics as an art form that one technique could come to so dominate the discipline to the virtual exclusion of other forms of discourse.[15] Keynes used mathematics sometimes, but was well aware of the danger of losing track of the complexity of the real world in the use of symbols (Spiegel, 667). The fact that he therefore moved from one form of exposition to another to explain different elements of his theory was a source of confusion to his readers even in the 1930s. Since that time, of course, the mass of economists has only come in contact with those elements of his work which were or could be highly formalised.

Scientists are critical not of the use of maths, but of the use only of maths, of the view, "that the only scientific method worth the name is quantitative measurement; and consequently that complex phenomena must be reduced to simple elements accessible to such treatment, without indue worry whether the specific characteristics of a complex phenomenon, for instance man, may be lost in the process" (Spiegel, 646). "Mathematics is a language that can impose its own limits and structuring on our perception of reality" (Samuels, 6). The far-reaching speculations

of the classical economists could not be translated into the new language. "Obviously, the purification of the utility concept, the opportunity-cost doctrine, and the marginal-productivity theory of the productive shares are more appropriate to the neutral language of functional equations than were the doctrines of John Stuart Mill" (Roll, 463). The use of maths can of course be defended on scientific grounds. Its complete domination of the discipline can not. "The process of translation [into mathematics] required the abandonment of that tension-fraught world of the earlier economists, but it yielded in return a world of such neat precision and lovely exactness that the loss seemed amply compensated" (Heilbroner, 1957).[16] It is due to its artistic virtues that mathematics was able to achieve total dominion.

Cubism

While surrealists focussed on the unconscious, cubists were concerned with form and colour (Haslam, 6). [As with surrealism, cubism had influences not just on painting but sculpture, architecture, literature, and music - (Fleming, 513)]. It would be a mistake, though, to dismiss cubism as less important simply because it seems to emphasise style over substance. While the structure of a work of art is not always obvious, it is very important in the making of any work, even if it is not necessarily the deliberate choice of the artist (Read, 69). Cubists explored the meaning of form and colour. Their discoveries were often borrowed by artists in other traditions. Thus, the boundaries between expressionist and abstractionist art often become blurred. While it is less easy to describe the cultural influences behind cubism, its popularity indicates that it strikes some chord in the soul of modern man.

One way in which it did so has been suggested by Berman (1982, 30). He describes twentieth century modernism in art as the "quest for pure self-referential art"; it was felt that, "the proper relation of modern art to modern social life is no relation at all". The painter, for example, should focus merely on the flatness of the canvas before her. Berman may be extreme in crediting this desire to all of modern art, but we shall see that cubism followed a natural progression away from depictions of the world around us toward simple arrangements of lines and colours on canvas. It reflected, then, a desire to escape from reality in art. We have already had much occasion to note how successfully econ-art has responded to that yearning.

Progression in Abstractionist Art

Fleming (1970) provides a synopsis of the development of abstractionist art. For the early cubist, "Natural appearances play little part in his design that reduces a landscape or a group of objects to a system of geometrical shapes, patterns, lines, angles, and swirls of colour which achieve his desired abstract imagery". Reality, though, is still the starting point, no matter how seriously distorted it may become. Over the next decades there was a natural progression toward pure abstraction, "in which a work of art has no representational, literary, or associational meaning outside itself, and the picture becomes its own referent" (506). By the 1960s at the latest, abstractionist art no longer took reality as its starting point:

"Abstractionism was carried to its logical geometrical conclusion by Piet Mondrian just as expressionism had reached its point of pure abstraction in the work of Kandinsky .... Both artists are nonobjective in that they are nonfigurative and nonrepresentational, and that the pictorial content of their canvases bears no reference to recognisable objects or to anything outside the actual pictures.... The picture with its lines, shapes, and colours is its own referent" (Fleming, 530-1).

This was not the only progression. The early cubists took their inspiration from Cezanne. It was he who had first suggested that art not represent nature in the usual sense but rather impose upon nature geometric forms derived from the human mind (Fleming, 513). But Cezanne never mentioned cubes, and his works emphasised curves. Cubist art from the beginning was largely rectilinear. Again, Mondrian would represent the logical outcome; his art contained only straight lines, either vertical or horizontal. It was the guiding principle of his art that, "All references to the 'primitive animal nature of man' should be rigidly excluded in order to reveal 'true human nature' through an art of 'balance, unity, and stability'". This he could only achieve through using rectilinear forms (Fleming, 531).

It is no coincidence, then, that abstractionist art is characterised by both a move toward straight lines, and a move away from reality. The two were the same. Only through rigid linearisation could the abstractionist artist totally tear free (at least consciously) from the world around her and create completely self-referential art.

Progression in Econ-Art

The phrase 'self-referential' leaps from the pen of any historian of abstractionist art. So in econ-art, we value models not for their relationship to reality but for their own internal logic. Despite the emphasis on self-reference, expressionist artists created a body of work which evolved over time. Insights into form by one artist were built on by the next. So in econ-art, models evolve over time. Roy Weintraub's history of general equilibrium analysis is an excellent case study in this respect. Each work takes the preceding as given. One would search in vain for Cezanne's models in Mondrian. The lack of artistic purpose has perhaps prevented the total eclipse of reality in econ-art, but who could deny the trend?

Then there is the related matter of linearity. The artistic value of straight lines could only have supported the decision by mathematical economists to focus on linear relationships. I am told that earlier in this century, much greater care was taken in indicating the curved nature of demand and supply curves, even in undergraduate lectures. It is now commonplace to draw these 'curves' as straight lines (students, indeed, often ask why we call them curves). A small sin perhaps, though it does encourage the belief that supply and demand determine one unique price, whereas in the real world the forces of supply and demand usually determine only a range of prices over which bargaining can occur.

The Phillips Curve, grounded in decades of British data though it might be, is another example. The long run Phillips Curve is now assumed to be a vertical line. A science could hardly have embraced the natural rate of unemployment so quickly. As a work of econ-art, though, it is perhaps the single greatest creation of the twentieth century. It is simple; with only one or two unrealistic assumptions it

serves the cubist goal of replacing the curves which depict reality with the straight lines of true art. But this is not all. It also serves the surrealist goal of depicting a better world in which public interference is self-defeating. And, like any classic work, it spawned whole schools of imitation. Once one stops mistakenly searching for reality in it, one can not help but be struck by its beauty.

The Cubist View of Time

"The cubist theory of vision took into account the breaking up and discontinuity of the contemporary world view in which objects are perceived more hastily in parts rather than more leisurely as wholes. The world, as a consequence, was seen fragmentarily and simultaneously from many points of view rather than entirely from a single viewpoint" (Fleming, 513). The cubist realisation that side and front (and back) views could be presented at the same time is, indeed, one of the signatures of that art form. The fragmentation of time was not unique to cubism. From the late nineteenth century, art had increasingly focussed on, "the monetary, the fragmentary, the everyday occurrence" in, for example , novels which comprised a series of fragments rather than a logical whole (Fleming, 499). Hauser attributes the abruptness with which modern art describes life to the time experience of the modern age which is focussed on the present (1956, 230).[17]

Econ-art thus turned its back both on history and on dynamic processes. The historical tradition, which had argued the sensible and correct position that the present could only be understood as a result of the past, was forgotten. Economic historians still argue for path dependence - that economies don't naturally tend toward any one position of rest, but rather decisions made in the distant past may influence the course of events to this day - but this message is only weakly noted by theorists who continue to focus on ahistorical models with unique equilibria. The lengthy discourses of classical economists on the dynamic forces of growth have been forsaken for the minute inspection of short run allocative decisions. This last was Marshall's major contribution to economic discourse; Heilbroner (190-1) notes that he changed economists' view of time, and ignored the sudden changes (the motto of his 'Principles' was that 'Nature makes no sudden leaps') and dynamics which are the key to economic life. Perhaps this is unjust to Marshall, but economics has never looked back. Econ-science has thus lost much of its purpose in order that econ-art could prosper.

Ideally, in art, the focus on the momentary fragment of the present was not at all incompatible with the comprehension of change. Bergson, a philosopher of art, "ranked intuition as a higher faculty than reason, because through it the perception of the flow of duration was possible, and through it the static quantitative facts were quickened into the dynamic qualitative values of motion and change. Existence is never static but a transition between states and between moments of duration" (Fleming, 500). The moment would be transmitted, but the consciousness of the audience would comprehend motion. It would fill in the gaps in the music of Debussy, and join together the fragments in poems and paintings.

Such at least is the principle, and we might question how well the artist generally succeeds in transmitting true understanding of the broader reality of motion. In econ-art, as well, it is often claimed that dynamic processes can be understood

through static portrayals. That is, we start with a supposed equilibrium. We then change one or more elements and calculate the new equilibrium. In so doing, we purport to describe a dynamic process of action. But we can only do so by assuming that dynamics don't matter, that the process of change itself has no effect on where the system ends up. There is no place for the path-dependence (or disequilibrium) of the real world here.

But of course art isn't about the real world. It is about a better world. Change in the real world, at least with our present degree of scientific understanding, is unpredictable, and therefore both exciting and frightening. Society, Berman notes, has contradictory desires for growth and stability. Modern people, "are moved at once by a will to change - to transform both themselves and their world - and by a terror of disorientation and dissent, of life falling apart" (1982, 35, 13). We would not want to turn our backs on economic growth, but we would wish that economic change did not throw innocent people out of work, impoverish whole cities and regions, upset international trade and financial links, or jeopardise our savings.

Econ-art reflects these contradictory desires by describing growth as obeying simple rules. There is no danger that mistakes made today will deflect us from our pursuit of that better world, for we assume away path-dependence. Disembodied technological change gives us productivity advance without structural change. The fragments we focus on in econ-art are already idealised, and thus the vision of change which they evoke is naturally of a benevolent force for good. If econ-art were to actually devote itself to dynamic portrayal, it could only with great difficulty achieve such an advantageous result.

Technological Incursions

The development of motion pictures provided a new medium in which the emerging conception of time and place could be handled as never before. We speak here not of the simple fact that the eye is fooled into thinking a rapid series of still photographs represents motion. Rather, it is the way in which one scene is presumed to naturally follow from the other, or that intersplicing of separate scenes could create the impression of simultaneity. No other art form had ever been able to bridge the gaps of space and time so freely (though novelists could aspire to doing so). As such, the advent of this new technology could not help but give further impetus to the fragmentation of time.

The computer plays an analogous role in econ-art, for it allows the complex economic evolution of decades to be reduced to a handful of numerical series representing economic aggregates. Computers not only allow the compilation of the necessary statistics, but seemingly create the possibility of discerning the causal relations contained within. This both depends on and reinforces the view that the process of growth follows a regular and unchanging course. It is now widely recognised that econometric analysis of time series is incapable of solving questions of historical causality. The effort provides its own reward, however. The combined efforts of the mathematical modeller and econometrician gave witness to a belief in a simple world of straightforward, unchanging, unidirectional causal links. (Hume, or even Hicks' work on *Causality in Economics*, were quickly ignored). This would

have been barely possible without the development of the computer. It freed the econ-artist from the complexity that is reality and allowed her imagination to soar.[18]

Return to the Classics

Cubism, as well as surrealism, had precursors from the nineteenth century which were recognised by the artists in these later traditions. One of the best characteristics of modern art is in fact the willingness of artists to combine elements from previous (even primitive) art forms (Fleming, 544). In this way, the best of the past is retained, while the artist tries to improve upon it, and tries also to reflect modern desires. The twentieth century, and especially the 1920s, also sees a classical revival; numerous artists tried to reproduce works in the classical tradition (Fleming, 531). While not necessarily a negative development, we should note the false legitimacy which an appeal to the classics can give to a work of art. Hadjinicalaou (1978), indeed, views this as one of the major ways in which emerging social classes seek to justify both their artistic tastes and position in society.

Econ-art has often referred to the classics to buttress its legitimacy. Indeed it uses the word 'neoclassical' to refer to the main body of modern theory, even though it has jettisoned the concern with growth that formed the core of classical theory. From the point of view of econ-science, we could scarcely hope for a better example of misplaced reverence. Economists have not kept the best of the former traditions, but have selectively maintained those tenets of the faith which are supportive of modern theory. From the standpoint of econ-art, of course, it is highly desirable to ascribe the legitimacy of the past to works which achieve so many artistic goals.

Ideology in Art

Haslam characterizes the early surrealists as feeling that art was only valid if it denied middle class values and morals (1978, 11). Fleming (1970, 526-30) recognizes that many artists used their work to protest against economic exploitation and war (e.g. Picasso's 'Guernica'). Even the casual observer must note that mainstream economics has borrowed not at all from this tradition of protest. This raises the question of why econ-art appears so different from other arts in this regard. In this context, it is worth noting, as Rosemount does, that surrealism as transferred to the American market was largely sanitized of its revolutionary content; it was not Breton but Salvador Dali, who replaced revolutionary fervour with whimsy, who was identified with surrealism across the Atlantic (1978, 57-8). Since the United States increasingly became the centre of the world of economics as the century progressed, this could go some way towards explaining the less revolutionary orientation of economics, at least after the demise of American institutionalist thought. We have not in this work, though, suggested in the main that economists absorbed cultural influences from the world of traditional arts, though this is certainly possible, but rather that all art forms naturally reacted to the same evolution of underlying cultural influences. It could still be that American culture was much less hostile to the existing economic order, and this could explain both why surrealism was 'sanitized' and econ-art was developed in a very non-revolutionary fashion.

We have seen, though, that artists need not be conscious of the goals which their art serves. The intellectual predispositions of the artist may not be captured in their exposition of their intuitive side. The ideology which the conscious mind espouses may not at all be the ideology which the subconscious mind transmits.

Hadjinicalaou (1978) has forcefully argued that art (and art history) always reflects the ideology of the dominant social class. He rejects the idea that art transmits true understanding; rather it serves to legitimize the existing social order. The purpose of ideology "is not to provide people with a real understanding of the structure of society, but to give them a motive for continuing the practical activities which support that structure" (1978, 10). Since ideology of necessity provides a misleading view of the world, so must the art which represents it (100). The values of the ruling class permeate those of other classes; when we see a struggle between different artistic styles this generally represents differing views within the ruling class rather than the struggle between classes (102). Most importantly, artists who consider themselves radical may still produce works that unwittingly support the status quo (ch. 6). The subtle and intuitive nature of art can easily defy the revolutionary intent of the artist. Thus, Hadjinicalaou argues, David during the early years of the French Revolution painted pictures with a classicist composition and naturalistic figures, which reflected the views of the rising middle class. Later, during the Directory, he painted in the style of a return to antiquity which appealed to the upper middle class and aristocracy (116-20). Rembrandt also at times painted in the style of the aristocracy and at others in the style of the bourgeoisie (125-38).

While it is folly to deny the importance of other influences than class ideology - philosophers of art after all constantly refer to the influence of general social and intellectual conditions - it is also folly to ignore the effect such ideologies are likely to have on the artistic community. As Kung notes, even art 'revolutionaries' are funded by the establishment (1981, 12). We thus have good reason for suspecting that the revolutionary sentiments of artists were not always translated into their work, and that econ-art as well may to a large degree reflect ideological values.

Ideology in Econ-Art

We must approach gingerly the question of ideology in economics. Economists, if they serve the ruling interest, must do so subconsciously or they would feel that they had to dissociate themselves from it (Ayres, 8). Ideology, in order to operate, must do so subconsciously. If we are bending our thoughts in order to accept the existing social order we can not be aware that we are doing so.

Spiegel (1991, xix) provides a fairly standard definition of ideology: "the claiming of scientific validity for propositions that in truth are derived from one's philosophical preferences, subjective valuations, or material interests." Heilbroner argues, though, that the word need not have pejorative connotations. Since ideology is a framework by which order and legitimacy are imposed on social understanding, the analysis of ideology is simply another way (like the work of rhetoricians) of reflecting the fact that economists can not approach their subject objectively but carry a host of cultural perceptions with them (1990, 102). "Economics...is thus intrinsically normative in the sense of embodying, whether it will or not, the constitutive beliefs of the parent society." His key point is that ideology is not knowingly misrepresen-

tative. In this way, his analysis is quite similar to our own, excepting that he, like Hadjinicolaou, emphasizes just one sort of cultural influence.

We have had many occasions in this work to recognize that the pursuits of artistic and scientific goals have clashed. That which is pleasing to the subconscious need not always serve the interests of the conscious mind (as legions of psychoanalysts will attest). It is bizarre to suspect that the purposes of econ-science at least, if not econ-art, would not be furthered by economists becoming aware of their biases. It seems entirely possible that their hidden subconscious desires may prevent the profession from achieving key insights, either within the existing paradigm or by overturning it.

Ideological bias is easier to detect in the works of the past, for we can approach these with some historical detachment. The Iron Law of Wages, and the wages fund doctrine, both key concepts in nineteenth century economics, clearly served the interests of those in power by asserting that real wages could not permanently be raised (Spiegel, 1991, xviii). Yet it would be sheer folly to doubt that ideology is not still an important determinant of economic ideas. Even ideas which might appear 'radical' may still serve an ideological function. The surrealists, while talking revolution, may have unwittingly provided a release which helped prevent revolution from occurring. Keynes, while on the one hand seeming to propose a degree of governmental involvement antithetical to the interests of the business class, provided an answer to the problems of the 1930s which was much less threatening (if at all) to their interests than the interventions proposed by others.[19] Despite his eccentric and disrespectful behaviour, Keynes was quite clear on where his loyalties lay, saying in 1925: "How can I adopt a creed which, preferring the mud to the fish, exalts the boorish proletariat above the bourgeois and the intelligentsia who, with whatever faults, are the quality in life and surely carry the seeds of all human advancement" (in Spiegel, 599).

The Existence of Econ-Art

The work of numerous art historians has established that cultural influences affect artistic practice. The purpose of the artist is to express society's inner feelings; the successful artist will be one whose vision strikes a chord with a wider audience. It would be naive to expect that these social desires which manifest themselves in the arts would not also influence scientific endeavours which can not possess objective standards of evaluation.

Art historians have gone beyond the general to point to specific cultural influences which have had particular effects on artistic evolution. We have been able, by comparison, to detect numerous influences on econ-art: the depiction of a better world, the desire for order, the reaction to nationalism, the fear of authority, the elevation of technique, the pursuit of a methodology which would allow the intuitive to dominate the intellectual, the quest for linearity (abstraction), the fragmentation of time, the fear of change, the appeal to the classics, and ideological bias. There may be some readers who accept the role of (some of) these cultural influences in the development of economics, but still object to the label of art. But one implies the other. If economists aren't using scientific standards to judge their work, what are

they doing? They are creating works which satisfy some other faculties of appreciation, at least among themselves.

Econ-Art/Econ-Science

We must now turn our attention to the effects which econ-art and econ-science have had on each other through co-habitation. Since our concern has been with econ-art, we will first suggest ways in which econ-art might be improved by shedding its scientific pretensions. As we have seen earlier, art and science need not be completely antithetical. Positive fertilization of the arts by science has been noted in the literature. From the late nineteenth century:

> "Artists in all fields were aware of the extraordinary success of the scientific method. Realism and impressionism brought a new objective attitude into the arts, together with an emphasis on the technical side of the crafts and a tendency for artists to become specialists pursuing a single aspect of their various media....A painting for an impressionist was a kind of experiment, an adventure in problem solving....The literary realists were cultivating a scientific detachment in their writing and developing a technique that would enable them to record the details of their observations of everyday life with accuracy and precision" (Fleming, 1970, 498).

While art is intuitive, the intellectual side is not completely ignored. The greater the understanding the artist has of the world she lives in, the greater her ability to transcend that reality. As well, the technical apparatus designed to serve science can be of great value to the artist. Similarly, most of that which the modern economist knows aids naturally the work of the econ-artist. Indeed, we have seen that mathematical techniques serve the goals of art to a greater degree than they serve the goals of science.

The conscious pursuit of scientific goals must act to limit artistic expression, however. A parallel can be found in the world of architecture. "Experimental architecture is possible, but the discipline of sound engineering has kept architects from some of the wilder flights of fancy seen in painting, sculpture, literature, and music" (Fleming, 532). The parallel can only be extended so far. Architects must obey physical laws or their buildings will collapse. Econ-artists only think that they have to maintain ties with reality. As we have hinted many times before, the only factor holding back econ-art is the lack of self-awareness.

If poets were told that their purpose was to unravel the laws of physics, we would have been bequeathed huge masses of stilted and argumentative verse. Artistic temperament must win out often enough, we must suspect, to ensure that we would inherit some works which are truly sublime. Econ-artists, labouring for some decades under the mis-apprehension that they were actually scientists, have naturally fallen into a similar trap. While the artistic strain has thankfully dominated, the field is littered with works of no artistic merit.

If we wish to separate econ-art from econ-science (a difficult task as most work combines both elements), we could first sort works by this criterion. To be a scientist, one must focus on the world we live in, and thus turn one's back on the whole focus of art. The result can scarcely be beautiful, at least to modern eyes. This does not

mean, of course, that all work which fails as art should be viewed as science. Failure is necessary, but not sufficient. There is work which fails to meet either standard.

What must econ-art do to achieve its true potential? It must turn its back on reality in at least four major ways. It must cease to worry about the realism of its basic assumptions; indeed, it must come to revel in their un-reality. It must forego attempts to test its theories against the world we live in; any 'testing' which goes on should be based on elegant techniques incapable of determining whether the theory has any relationship to the real world. It should value economic models for their elegance and pursuit of artistic values alone. It should eschew questions which do not lend themselves to elegant expression (or which raise public fears), for artistic understanding does not require that each stone be uncovered. It is amazing how much of this has already been achieved under the false banner of science.

The Quest for Econ-Science

There will be those who will eschew the lofty heights of econ-art in order to tread the narrow path of econ-science. They will see economics as a vocation. The world needs the advice of scientific economists. Science, they will claim, is more valuable than Art. What can one say to such as these? Does not Art represent the highest achievement of our species? When one thinks of the most glorious accomplishments of the human spirit does one think of Newton or Beethoven, of Galileo or Michaelangelo? The case could hardly be clearer. Econ-science must forever live in the shadow of Econ-art.

Some will continue to follow the narrow path of science, to explain the world as it exists, not as it could have been. The contradictory details which the true artist brushes over are their focus. If theory and fact are in disagreement, they try to adjust the theory. Perhaps they quest for power and influence, the seductive embrace of the politician needing advice. The true artist never consciously panders to popular acclaim. Or they may be driven by some sense of social duty to try to make the world a better place through understanding it.

The critics of economic methodology might also be cautioned. Economics was in error, they had cried. The assumptions made and the techniques used were inappropriate for understanding the world we live in. But now we know what should have been obvious long ago: describing the world was not the point. Economists had been pursuing a much loftier goal. They could not, and did not, consciously respond to their critics, but knew in their hearts that they were right. Art provides its own reward to the artist.

While art is a much more valuable pursuit than science, it is nevertheless true that art can have deleterious side effects if it is confused with science, if the audience mistakenly feels that art is in fact describing reality. The best antidote to this misperception would be for there to be a strong scientific tradition alongside econ-art. Since we will never be rid of econ-science, we must strive to delineate its boundaries clearly, so that art is no longer misconstrued as science.

As hinted above, the cleansing of art is not the sole justification for the pursuit of econ-science. If we can separate econ-art from econ-science, the public will be much better served. Those with aesthetic tastes will peruse the works of the former genre with enhanced appreciation. Those of less heightened sensibilities can pro-

vide an audience for the econ-scientist. The present skepticism of the public can, in a narrow sense, be attributed to the fact that economists are generally seen in the public eye doing what they do worst — forecasting the future, or to the predilection of journalists for finding diametrically opposed opinions on every issue. In a broader view, the recognition that economists have lost touch with reality — albeit in pursuit of a higher purpose — makes skepticism of their policy prescriptions much more comprehensible. One would not, after all, engage a creator of modern sculpture to fix one's plumbing. The separation of art and science can not guarantee public support but must encourage it.

The Existence of Econ-Science

Has science actually progressed behind the scene-stealing activity of econ-art? We have seen that all economists have both scientific and artistic motives, but suggested that the internal reward structure has tended to emphasize the latter. The fact that economists perceived themselves to be performing science is no guarantee that they in fact did so. Certainly, much of the research output of this century has enhanced our understanding of reality not at all. McCloskey (1988, 290), for example, argues that there have been no big advances in trade theory since 1965,[20] no econometric success in deciding between alternative explanations of important issues since 1940, and no additional insight gained from the reworking of general equilibrium theory since 1950. He recognizes that some advances have occurred in some areas, though, arguing that economic history and labour economics have been most successful in this regard because they are forced to face facts moreso than other areas.

Our purpose here is not to catalogue the failures of econ-science but to note the existence of some signs of hope. The 'birth' of macroeconomics in the cauldron of Depression must be considered a scientific advance. We might regret that the classical focus on economic growth was not regained, but at least the profession was shaken from its undue emphasis on what would come to be called microeconomics. The contemporaneous elucidation of the theory of imperfect competition must also be considered an important advance (even if Friedman considered it irrelevant). On a lesser plane, we could note the important role econ-science has come to play in debates about such key issues as regulation and pollution control. Econ-science is still far from having all the answers even in these areas, but it would be a mistake to think that econ-art has so dominated the discipline that it has entirely ceased to be of any practical use.

Improving Econ-Science

While it has not been our purpose to do so, our analysis points to a number of ways in which econ-science can be improved merely by shedding characteristics imported from econ-art. First, it must face up to reality; it must both recognize and constantly strive to overcome the temptation to distort reality. Of course, this requires that economists become self-aware of the conflicting impulses which act upon them. Second, economists have to realize that the real world is complicated, and thus that economic theory must become less beautiful the closer it comes to approximating

reality. Third, they must return their attention to aspects of the economic question which had no appeal to the econ-artist. More effort must be expended on describing the big picture. Narrowly focussed studies must always have their place, but the discipline is destined to advance slowly if at all if continual efforts are not undertaken to tie the pieces together. In particular, the stress upon dynamics and growth which characterized the work of the classical economists must be regained. Fourth, and necessarily related to all of the above, economists must recognize that their present methodological biases are not firmly rooted in scientific principles, and open their minds to a greater variety of methodological approaches. Style and substance are not easily separable, and the insistence on one form of argument needlessly limits the scope of economic inquiry. These conclusions are supported by recent work in both the philosophy of science and in the analysis of the rhetoric of economics.

Reality

Art historians and psychologists are both aware of the fact that we perceive reality only in terms of our pre-existing view of the world. People develop frames of reference which allow them to impose some order on the complex events occurring around them. In the world of art, this means that the audience naturally expects new works of art to conform to the principles of previous works (e.g. novels will have plot, theme, continuous characterization). New genres, such as surrealism, will at first seem alien, and thus the reader/viewer will be forced to work harder until the new genre has become the norm (Hedges, 1983, 38-9).

In economics as well, once economists have come to accept mainstream theory as the norm, they must have a natural tendency to evaluate any new theory primarily by its violation of the norms of the existing theory, rather than its approximation to reality. Even though many of the tenets of mainstream theory are merely beliefs that have never been tested (Blaug, 701), they have a captivating effect on the minds of economists. While logical abstraction is necessary for the advance of science, there is a danger of this becoming the normative standard (Whitehead, 1985). For example, once the idea of self-adjusting equilibrium is accepted, then any real-world deviations from this are either ignored or attributed to institutional malfunction. Reality can only slowly, if at all, overcome such a belief system.

Ricardo's predictions as to the effect of the Corn Laws were entirely mistaken because his theory neglected the possibility of technological advance. Yet his theory survived for decades unchallenged. "Had the classical economists acted on Mill's urging to 'carefully endeavour to verify our theory' such weaknesses in the structure would have come to light and led to analytic improvements" (Blaug, 699). Later in the nineteenth century civil servants started collecting statistics which showed that investment was highly volatile, and thus a likely cause of business cycles, but economists stuck with Say's Law and continued to blame cycles exclusively on monetary policy (Fusfeld, 1977, 86-7). It would be hopelessly naive to think that modern economists are any less likely to choose theory over reality when faced with cognitive dissonance.

The answer can only be that we must constantly strive to confront theory with reality. The pursuit of artistic goals severely exacerbates the tendency to focus on self-referential theory. We must recognize that our present methods of 'testing'

serve artistic goals, and are at best an imperfect guide to the relevance of theory. We must open ourselves to other sorts of observation. Economic history, while far from immune from artistic temptation, has always been held in check by the fact that it must deal with particular historical events; this has meant both greater methodological diversity and more realistic explanation[21]. Economics in general has much to gain by paying similar attention to real-world events. Biology appears to advance through the working out of observation; Solow suggests that economics could well behave more like biology (1989, 39-40). To continue to devote the vast bulk of our efforts to refinement of theory and technique is to guarantee disaster.[22]

We can impose simple rules, such as that authors of articles indicate the practical relevance of their work. We can instruct our referees to rate relevance more highly than elegance. We can recognize that a partial answer to an important question is better than a precise answer to a trivial question. In the end, though, we can only succeed by changing attitudes. If the bulk of the profession remains wed to existing theory then it is highly unlikely that truly new insights will emerge, no matter how much better these accord with reality. A new theory is like an infant; it will not survive unless nurtured. This fact is widely recognized among philosophers of science. "An argument becomes effective only if supported by an appropriate attitude and has no effect when the attitude is missing" (Feyerabend, 1978, 8). Economists need to be more openminded, more willing to accept the seemingly obvious fact they don't have all the answers. If those with the greatest artistic drive devote themselves to econ-art, econ-science will be left to those who exalt the merely practical.

Truth, Beauty and The Big Picture

Science isn't pretty. Elements of a theory may be elegant, but real scientific understanding of complex phenomena can not be so. The problem with economic theory is not so much that it's wrong but that it's unimportant. Our quest for elegance has stood in the way of our quest for understanding. "As long as we're not willing to deal with the real messiness of our subject, we're going to live in a 'crisis' — not just in macroeconomics but in microeconomics. Economists are trying to say too much about things where they haven't the knowledge to improve on refined common sense" (Clower, 1989, 29). The complexity of the subject matter of economics may frustrate the fainthearted, but must appeal to the noblest yearnings of the human spirit.

The classical economists tried to comprehend how the economy as a whole functioned. This naturally caused them to simplify much, but their theoretical inquiry was always guided by their quest for the big picture. Economists in this century have turned increasingly toward narrowly focussed research. We would not want all economists to turn back to the big picture, but it is essential that some do so, if we are to avoid the pursuit of mere trivialities.

It is not uncommon for economists to bemoan the narrow focus of most practitioners. Indeed, the American Economics Association founded the *Journal of Economic Perspectives* so that economists could be aware of what their colleagues were doing. Yet big thinkers such as Galbraith are marginalized. The economist may accept

much of what he says, but wonders what to do with a man who discusses issues ignored by the mainstream, and which moreover do not lend themselves to the usual methodology. The answer, of course, is that you first recognize the question, and then realize that both the big picture and the exploration of new questions do not readily lend themselves to the precision of mathematical exposition. Once we choose reality over elegance, we naturally become more encouraging of those who think big thoughts.

It would be sheer folly to attempt an exhaustive list of the areas of inquiry which have been ignored by economists. Still, there are some areas in which there is a glaring deficiency in research.[23] Economists have over the last century turned away alarmingly from the analysis of economic growth. Closely connected to this is the minimal attention paid to technological change. The result is that in a world where the man on the street could tell you that the reasons for differences across time and space in rates of economic growth must be (one of?) the most important economic questions, and that understanding technology is essential to understanding the modern economy, the modern economist has little to say about either. The methodology-constrained attempts to date to deal with either growth or technology have yielded limited insight. Even those who recognize the need for a new technology-centred theory of economic growth feel constrained to develop that theory mathematically (see Dosi, 1988).[24] Economists naturally shied away from areas which they sensed would not lend themselves to mathematical exposition in the past, but the precision of mathematics is ill suited to the early exploration of any area of study. The question of scope of inquiry is thus inextricably linked to the question of methodological flexibility.

Methodological Diversity

We have seen that the methodological bias of economists serves artistic goals. It is thus only natural to suspect that this bias stands in the way of scientific inquiry. One does not have to look far to find economists who have realized that econometric testing leaves much to be desired[25]. "Econometric work often is done to demonstrate mastery of new techniques, rather than to answer questions" (Colander, 1989, 33). Eichengreen, following Cagan, has concluded that time series econometrics is incapable of solving questions of historical causality. McCloskey has suggested that econometrics has not settled any major debate in economics. Leontief argued that, "in no other field of empirical inquiry has so massive and sophisticated a statistical machinery been used with such indifferent results" (in Beed, 1991, 485). Solow has noted that the profession has refined econometric techniques beyond the capacity of the data; "The only possible solution that I see is to enlarge the class of eligible facts, or class of observations, that one is willing to take account of. I think you have to include anecdotal facts, impressions, and direct observation" (1989, 40).

The recognition that data does not exist with which their models can be tested often drives economists in exactly the wrong direction. A common practice is simulation, where 'plausible' values are inserted in a model in place of un-estimable parameters. Models can be 'tested' by seeing whether numbers can be chosen that will generate a result which resembles reality. The profession has no standards whatsoever for judging simulation results (McCloskey, 1983, 502). Yet they are

regularly used to evaluate policy proposals. In the recent Canada-United States Free Trade debate, for example, the Canadian public was justifiably bewildered by a series of general equilibrium simulations which predicted widely different impacts on incomes and employment (even though all took standard trade theory as their starting point). Notwithstanding this, some economic historians have felt that we can accurately simulate the working of eighteenth and nineteenth century economies about which we know even less. Science, it must seem, is less well served than Art by such pretense.

The development of econometrics, after all, witnessed the same confusion between the purposes of econ-art and econ-science as the rest of the profession. Some of its theory proposes solutions to real problems of statistical testing. The rest simply builds an impressive edifice of pseudo- testing. Beyond its own aesthetic values, econometric testing provides a pseudo-scientific rationale for the mathematical machinations of others.

Economists must only ask themselves how much of their belief set has ever been empirically established. Experiments, after all, regularly claim to disprove the basic tenets of microeconomic theory. The shreds of wisdom which the econ-scientist possesses are generally due not to the high-powered techniques of the artist but to informed observation of the real world. To bring collective common sense to the forefront of the evaluation of economic theory is to ensure that reality can not long be forgotten.

Methodological diversity should provide even greater gains in the long run than in the short run. We have argued that artistic and scientific capabilities are unequally distributed across the population. Solow recognized that most modern economists are ill-suited to the non-quantitative forms of observation which he recommended. Keynes spoke of the breadth of vision and knowledge required of the good economist.[26] To require that all economists be mathematically facile is to close the profession to those whose strengths lie in other areas.

Philosophy of Science

Economists are generally out of touch with recent developments in the philosophy of science, and economists have embraced the positivist point of view to a greater extent than any other discipline (Beed, 1991, 475). Thus, while scientists elsewhere have moved past a naive view that scientific theories can either be proved correct or at least falsified, economists cling to the fanciful notion that research can establish undeniable truths.

Since we can not confront reality directly but only through the lens of theory, the best we can hope to do is observe a variety of facts in a variety of circumstances to see if the theory holds (see Chalmers, ch.2). We can not even conclusively falsify theories; since observations depend on theory any clash between theory and observation may mean the observations are wrong (57-8). Even if difficulties with subsidiary hypotheses could be overcome, most theories have a probabilistic element which prohibits falsification (McCloskey, 1983, 487). It is a mistake, then, to criticize economic theory for having moved away from the possibility of falsification (see Blaug, 697), for this was a false god in any case. One can only conjecture that

confusion as to the true aims of modern economic practice contribute to this unwillingness to recognize the truth.

It may seem dangerous to abandon long-held scientific beliefs and to sail out upon a murky sea where common sense is recognized as the final arbiter of truth. In fact, though, we interpret statistical results in the light of prior beliefs which we form on the basis of a variety of evidence (McCloskey, 1983, 494-5). The best we can do is be honest with ourselves and accept that we as a profession have the joint responsibility of evaluating diverse pieces of information in order to arrive at our best guess as to how the world actually works. Once we recognize that we must rely on collective decisionmaking, it is essential that we be self-aware of our biases (see Chalmers, ch.12).

Rhetoric

McCloskey, Klamer, and others have recently begun to investigate the rhetorical devices used by economists. They have recognized that economic discourse is a continuous argument, and have suggested that economists would be well served by an understanding of the devices they and others use to persuade. Within this framework, the present methodological bias in the profession is seen as a collectively sanctioned set of criteria which have no inherently superior scientific validity relative to other modes of argument. Mathematics is a tool used by economists to lend scientific credibility to their ideas. McCloskey describes the present standards of consistency and prediction as "six inch hurdles over which the economist leaps with a show of athletic effort" (1988, 289). He and Klamer conclude that other rhetorical devices would serve the interests of Science just as well (1988, 17).

The rhetorical approach provides more than just a further rationale for methodological diversity. It highlights the fact that style and substance are inseparable: "What is the distinction of style and substance in ice skating or still life painting or economic analysis?" (McCloskey, 1988, 286). Aesthetic appeal becomes a natural goal of the economist in her attempt to attract others to her point of view. "Rhetoric, again, gives a way to understand the persuasive power of diagrams in economics, their metaphors and symmetries, which I came like so many others to admire passionately in my second year. For the same aesthetic reasons I came in my third or forth year to admire the mathematics" (McCloskey, 1988, 284). If the profession values artistic merit, then economists will naturally strive to achieve artistic value in their work.

McCloskey, though, does not recognize that the pursuit of artistic values may be antithetical to the pursuit of science. He completes the statement above with, "Its truth is its beauty, or it had better be." There is, of course, no necessity that this be the case, and we have seen at length that good art is not good science. The fact is that the profession accepts as valuable many characteristics of economic research which serve no scientific purpose.

Rhetoricians make a valuable plea for honesty. We must first of all be honest with ourselves and recognize the non-scientific motives we pursue. Then, we must be honest with others and try to present our ideas in as straightforward a manner as possible (whether ideas are expressed as words or symbols or diagrams). Rhetoricians have made a valuable first step toward both goals. We have taken matters a

step further by suggesting ways in which economic practice is opposed to the pursuit of Truth.

Concluding Remarks

Only by separating art from science can we hope to achieve an honest and progressive econ-science. We must recognize that that which we admire most about works of economics is not science at all. Econ-science must take as its sole standard the ability to 'explain' the world around us. Econ-science lives forever in the shadow of econ-art. Econ-scientists must consciously eschew the goal of art in their work, and mercilessly excise it from scientific discourse in the works of others. Econ-art, after all, has a much greater role to play in this world than mere interference with the pursuit of science.

While the aficionado of econ-science may wish to throw up his hands in despair, one can discern hopeful signs in many fields — trade theory, industrial organization, and macro are the clearest cases — that a much greater understanding of dynamic processes is required. Further, the study of technological evolution has shown that research along any one trajectory naturally encounters diminishing returns.

In this article, we have striven to plant the insidious thought that much of modern economic practice is driven by societal tastes rather than an objective pursuit of Truth. We have thus questioned much of modern theory as well as the methodological bias of modern economics and made suggestions on how the profession can positively respond.

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Notes

1.Mirowski (1989). For a powerful critique of this view see Walker (1991).

2.Some, who deny economics' role as a science, or even the existence of science itself, have used the word art, though generally pejoratively. Klamer and Amariglio have spoken of art as the paradigm of modernism, and argued that economics is modernist, but the modernism they speak of is a philosophy which predates modern art and economics by centuries (Wendt, 1990). None have started with the question of what art is, and whether economics truly is art. Economists ignore the insights of their fellow social scientists, and thus, "The suggestion that the study of literature or communication or even the nonliterary arts might speak to them would be regarded by many economists as absurd" (Klamer, 1988, 4).

3.Recent works on economic methodology recognise that the best ideas need not win out (Colander, 1989, 2). The lack of 'timeless criteria by which to judge' economic ideas was credited by Mirowski (1989) with encouraging economists to "usurp the legitimacy of science" by imitating physics.

4.Klingender feels the bond between art and science built up in the eighteenth century was destroyed in the nineteenth when political economy abandoned humanism to protect property. Still, artists glorified the railway, Samuel Smiles glorified the engineer, and artists employed the scientific method to evaluate the new materials made possible by technological advance (1947, 38, 100).

5.Many feel that "... in economics normal science has run amok. The invisible hand of truth has lost its guiding influence" precisely because the internal reward structure does not necessarily reward truth (Colander, 1989, 31-2). Colander notes that most social sciences have splintered due to an inability to define what is scientific advancement, but not economics.

6.Mirowski (1989) has argued that economics has been misled by the subconscious desire of its practitioners to mimic physics. It is entirely possible that misguided scientific values could co-exist with unrecognised artistic values.

7.Roll (1956, 14) notes that it is difficult to establish causal links between changes in the economy and changes in economic theory. This is a fact widely recognised by both economic historians and historians of economic thought. It would seem to reflect the loose connection between theory and reality.

8."Somewhat like the romantic revolt of a century earlier, the expressionist artist reasserts the primacy of the imagination over the intellect and takes flight from reality in order to find a superior reality in the world of mystery and fantasy. The tendency is anti-intellectual in the extreme, though the symbols and vocabulary are evolved by highly rationalist procedures". It should be possible to extend our analysis back into the nineteenth century.

9.Even Solow, defending the achievements of econ-science, estimates that we only understand about one-quarter of how the macroeconomy functions (1988).

10.We should note that surrealists, as well, refused to cater to public tastes or sensitivities. They, too, pursued the purity of their art form.

11."The rise of mathematical economics meant defeat for historical economics and removed the threat that historicism had posed to the unity of science" (Spiegel, 646).

12.Alfred Marshall, the father of neoclassical economics, was trained as a mathematician, and therefore likely less proud of his technical capabilities than those who were to follow. He asserted that, "The right place for mathematics in a treatise on economics is in the background", and left the equations in the appendices in his *Principles*. The high moral purpose he brought to political economy caused him to relinquish with regret purely speculative exercises which smacked of 'l'art pour l'art' (Spiegel, 1991, 553, 563).

13.Robert Clower, former editor of the *American Economic Review*, has noted that most models are presented without any indication of what real world phenomena they might actually explain. Most economics, he concludes, serves simply to make common sense difficult. Economists are more concerned with techniques and game-playing than ideas. Thus, most of the papers he received while editor should not (from a scientific standpoint) have been written, much less published (1989, 24-7).

14.The critics of mathematical economics all recognise that it has its place. Only its proponents often fail to see the advantage of using diverse methodologies. More cynical motives can be discerned. Mirowski (1989) speaks of an influx of mathematicians and engineers into the discipline in the 1930s. It was easy for these to produce papers which translated mathematical physics into economics. It is also easier for academic referees to judge techniques than ideas.

15.Rosenberg (1983) went so far as to claim that economics was no longer a science (due to its inability to make predictions) but merely a branch of mathematics devoted to examining the formal properties of a set of assumptions, just like geometry.

16."It was not all foolishness, though certainly much of it was" (Roll, 160). Colander suggests that "Economics is tied together not by a common set of questions, but by a common set of techniques" (Colander, 32). He notes that a survey of graduate students found that while 90% felt knowledge of maths and modelling was

important, 68% felt knowledge of the economy was not. Heilbroner has argued that if maths provides economics with rigor, it also provides it with mortis.

17.Other explanations are possible. While Fleming (542) recognises that "it is both impossible and undesirable to make any precise analogy between cubist principles and the mathematics of space-time", he suspects a causal link from the theory of relativity to artistic perception.

18.Kaldor (1972) argued that neither mathematical economics or econometrics were leading anywhere. He felt that economics was at a pre-scientific stage; since we do not understand the economy, we keep trying the same things over because we can not reject anything (in Spiegel, 665).

19.The interwar years had strangely little effect on economic theory, despite bringing its relevance into question; they induced a split between theorists and policy-oriented economists (Roll, 1956, 455). Heilbroner feels the attraction of Keynes was his non-radical response to the Depression (1968, 254).

20.Kindleberger has noted that the important concept of the Effective Rate of Protection only took off after a mathematic formulation was derived. Moreover, the acceptance of the concept was delayed because there was no place for intermediate goods in the elegant two country/two good/two factor model (in Colander and Coats, 1989).

21.In a recent interview in the newsletter of the Cliometrics Society, Jonathan Hughes has argued that economic history has to be more 'scientific' because of the existence of hard historical facts. If someone publishes a mistake, it will surely be discovered. Unfortunately, many economic historians do not start with important historical questions and then study the theoretical implications; rather they start with existing theory and methods and look for historical instances (often trivial) in which these can be applied.

22.Economists since at least the time of Marshall have suggested that biology provides a better model for economics than physics, but the profession has found physical theory more attractive. Samuelson "appreciates the fact that economic relationships are seldom as simple as the diagrams or equations would lead us to believe". Noting that much of his theoretical work was highly abstracted from the world of policy, he remarked that he would have to pay in heaven for the sin of stimulating much work in mathematical economics (Breit, 133, 111).

23."The [neoclassical] theory conceals either in aggregation or in the abstract generality of multisector models, all the drama of events - the rise and fall of products, technology and industries, and the accompanying transformation of the spatial and occupational distribution of the population" (Nordhaus and Tobin, 1972).

24.In the late nineteenth century, Jevons "recognised that the only practical problem which a mathematically rigorous theory was capable of handling was the static problem of allocating given resources to produce an optimum return" (Deane, 1989, 130). Modern theorists feel that advances in mathematics have facilitated the modelling of growth.

25.Blaug makes the important point that much of our knowledge is of a qualitative nature; models usually only predict the direction of change; "We must begin by disenchanting ourselves of the idea that economic predictions must be quantitative in character to qualify as scientific predictions" (1985, 701).

26.McCloskey and others have circulated the following letter, which has been signed by numerous prominent economists, including at least four Nobel Laureates:

"We the undersigned are concerned with the threat to economic science posed by intellectual monopoly. Economists today enforce a monopoly of method or core assumptions, often defended on no better ground than it constitutes the 'mainstream'. Economists will advocate free competition, but will not practice it in the marketplace of ideas".

"Consequently, we call for a new spirit of pluralism in economics, involving critical conversation and tolerant communication between different approaches. Such pluralism should not undermine the standards of rigor; an economics that requires itself to face all the arguments will be a more, not a less, rigorous science".

"We believe that the new pluralism should be reflected in the character of scientific debate, in the range of contributions in its journals, and in the training and hiring of economists".

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