

## The Rhetoric of Economic Expertise

Donald N. McCloskey<sup>1</sup> (University of Iowa)

In one of his last books the San Francisco dock worker and sage, Eric Hoffer, wrote that "The harm done by self-appointed experts in human affairs is usually a product of *a priori* logic.... The logic of events may draw from man's actions consequences which *a priori* logic cannot foresee".<sup>2</sup> Hoffer was no logician or experimenter, and was not using the words '*a priori*' and 'the logic of events' in senses that a philosopher of science would recognise. He meant only to distinguish what an economist would call a model from what a historian would call a story.

Hoffer was making, in other words, the distinction between metaphor and narrative, the synchronic and the diachronic, cross-section and time series, the differential equation and the solution (to run the gamut of the available jargon). One can look at trade negotiations between America and Russia as part of a game or as part of a relationship, as something timelessly similar to chess and cricket or as something timefully similar to marriage and destiny. The way one looks at it will matter. Hoffer was surely right that the '*a priori* logic' – the metaphor – can do harm even when it comes with the authority of expertise. The expert recommends a gaming approach to the trade negotiation, the metaphor gets pushed too far, and the *a priori* leads us to World War Three. The expert's fanaticism about his models provides a plot for an international thriller.

I wish to add merely that the case is symmetric: that expert history also can do harm. The story of evolution was made over into the story of racial destiny, with damage to us all. The generation young in 1938 has never forgotten Munich, and has imposed the logic of those events on each post-war crisis from Greece to Cambodia. Hoffer was wrong to suggest that the *a priori* metaphor is the only dangerous tool in the hands of experts. The logic of events, which is to say the story imposed on events, has its own dangers.

The problem comes as a pair, the problem of the misuse by experts of both models and stories. A model such as game theory or a story such as national destiny can be used with open eyes and yet still be misused, if the expert does not give a damn. People with careers to make will misuse whatever rhetorical tool is put into

their hands. Most experts, though, are not characters from *Yes, Minister*. Commonly they do not realise that they are misusing a story – they think they are simply taking history as their guide. They would be startled to be told that they are using, much less misusing, metaphors – they think that they are simply taking science as their guide.

Consider economics. Economists will tell you that they rely strictly on fact and logic. When pressed they will give an account of fact and logic derived from British empiricism and French rationalism long ago, the common if dusty heritage of Western intellectual life. A fact is the unit of things seen and a logic is the unit of links postulated. Economic science would seem straightforward, then, although the economic scientist can give no credible explanation of why a straightforward procedure of 'looking at' the facts and 'checking' the logic would so often lead to disagreement. It is not, by the way, the unscientific character of economics that causes the disagreement: paleontologists and biochemists disagree just as much, asserting stoutly that fact and logic stand on their side.

Disagreement in science shows that fact and logic are not enough. This is so even if 'science' is defined in the peculiar English-language sense, as 'fields of study that look like what non-physicists a century ago thought physics was'. English speakers since the early nineteenth century have used the word 'science' in a peculiar way: as in the British academic usage of 'arts and sciences' where the 'arts' of literature and philosophy are set against the 'sciences' of chemistry and geology. A historical geologist in English is a scientist; a political historian is not. The English usage would puzzle an Italian mother boasting of her studious son, *mio scienziato*, my learned one. Like Italian, other languages use the science word to mean simply 'systematic inquiry' (for example, French, German, Dutch, Spanish, Swedish, Polish, Hungarian, Turkish, Korean, Tamil, Hindi). Only English, and only the English of the past century, has made physical and biological science (sense 5b in the old *Oxford English Dictionary*) into, as the *Supplement* (1982; compare OED, 2nd edn 1989) describes it, 'the dominant sense in ordinary use'.

Economics looks like such a science. But in the manner of physics (and geology and history and philology) it uses daily the humanistic tropes of metaphor and story. Depend on it, fact and logic are admirable. Economics certainly makes ample use of them. But an economist or physicist confined to fact and logic would have nothing to say. Sciences require humanism, such as literary methods, right in the middle of their sciences; and likewise the humanities require fact and logic. Newton used logic and metaphors; Darwin used facts and stories. Science is literary, requiring metaphors and stories in its daily work, and literature is scientific.

Fact and logic, with metaphor and story, make up what might be called the Rhetorical Tetrad. Economists, like other experts, must use the whole tetrad if they are going to make sense. The supposedly scientific half of the tetrad, the fact-and-logic, does not suffice for a science of economics or even for a science of rocks or stars. Nor does the allegedly humanistic half, by itself. Scientists and scholars had better be factual and logical. But (and this is the point here) they had also better be literary, devising good metaphors and telling good stories about the first three minutes of the universe or the last three months of the American economy. A

scientist with only half the culture will do bad science.

The assertion is that an expert in economic science is like a poet in using metaphors and like a novelist in using stories – using them not for ornament or teaching alone but for the very science. The dependence on metaphor is the easiest to demonstrate. Economists, who talk incessantly of their models, are even aware of it. Once they have recovered from the insult of using so literary a word they can see that the models are metaphors, as they are in physics.<sup>3</sup>

During 1946 the agricultural economist Theodore Schultz, later to win a Nobel prize for the work, spent a term based at Auburn University interviewing Alabama farmers.<sup>4</sup> One day he interviewed an old and poor farm couple and was struck by how contented they seemed. Why are you so contented, he asked, though very poor? They answered: You're wrong, Professor. We're not poor. We used up the farm to educate our four children through university, remaking fertile land and well-stocked pens into knowledge of law and Latin. We get pleasure from this different wealth in educated children. We are rich.

The parents had told Schultz that the *physical* capital (which economists think they understand) is in some sense just like the *human* capital of education. The children now embodied it. Formerly it had been rail fences, hog pens and mules. Now it lay in the children's brains and in the parents' hearts, this 'human capital'. The farm couple was indeed rich.

The average economist in later years was willing to accept the simple but profound discovery of human capital as soon as he understood it. It was an argument in a metaphor (or if you like in an analogy, a simile, a model). A hog pen, Schultz would say to another economist, is 'just like' Latin 101. The other economist would have to admit right away that there was something to it. Both the hog pen and the Latin course are paid for by saving. Both are valuable assets for earning income, understanding 'income' to mean, as economists put it, 'a stream of satisfaction', pouring bits of happiness out year after year like an oil well. Both the hog pen and the Latin course last a long time but finally wear out. And the one piece of 'capital' can be made into the other. An educated farmer, because of his degree in Agriculture from Auburn, can get a bank loan to build a hog pen; when he raises his own children he can sell off part of the farm with the hog pen to pay for another term for the children up at Auburn.

Calling education 'human capital' might cause offence. The phrase takes the shaping of the human mind as something similar to the shaping of fences and concrete. So long as the economist knows that the metaphor of human capital is a human device and not a Truth – so long, that is, as he/she has learned somehow the chief humanistic truth – no harm is done. Such a metaphor makes thinking possible. It is not a luxury. Speaking of education as equivalent to investment in farm buildings allows an economist to ask sharply whether enough education has been purchased relative to farm buildings. Or it allows him/her to stress the high returns (relative to alternative investments) of teaching people how to read.

Economists go on this way, dancing among their metaphors half aware. When economists look at a phenomenon like 'childcare' they think of markets. 'Childcare' – which to other people looks like a piece of political control or a set of rooms or a

problem in social work – looks to economists like a stock certificate traded on the London exchange, a ‘market’. The economists are led by their choice of metaphor to identify a demand curve, a supply curve, and a price. If the economists are of the usual ‘neoclassical’ kind they will see also what they are pleased to call rationality in such a market. If they are Marxist, institutionalist or Austrian economists, to name a few of the alternatives, they will see something different, though still see it through their version of the market metaphor.

A rhetorician will note that the market is ‘just’ a figure of speech. It is, as we say, a commonplace. The economist uses his commonplace of the market over and over again. To be reflexive about it, I am now using the metaphor of ‘literature’ as a rhetorical commonplace for the language game of economists. The game is not trivial or stupid merely for being a game. Economics is not demeaned by being compared with the games of Homer, Shakespeare and Tolstoy, or even with those of W.G. Grace and Babe Ruth.

The metaphor, and the economic poetry that goes with it, is not ‘true’ in a simple way. ‘France is hexagonal’ is neither true nor false in the way a statement in arithmetic is true or false.<sup>5</sup> It is right, in a certain way of speaking, which is to say, useful for some purpose (though one could say that rightness, not Truth, is also what we find useful about statements in arithmetic). The methodology of Science that economists and other scientists believe they employ gives no way to evaluate the rightness of metaphors. The assertion of likeness, so important in biology and physics, involves standards that can only be human and cultural. How similar is the smooth pea to the wrinkled, the planetary orbit to an ellipse, Latin 101 to a hog pen? These are questions about our present use of language, constrained by the universe sitting out there, to be sure, but human decisions about human use.

That is where ‘rhetoric’ comes in, the discourse on the use of discourse. Only our rhetoric can provide standards of likeness. Paul Fussell notes ‘It has been said that what makes the world so hard to understand is that there’s nothing to compare it with. But that’s not right: there’s literature to compare it with’,<sup>6</sup> which is to say our words in practice. How smooth is the pea? It depends on how you want to argue with other people. If they are persuaded by simple proportions, then you will want to assign the peas in a way that makes the proportions come out simply (as Gregor Mendel did).<sup>7</sup> How close is a planetary orbit to an ellipse? It depends on the accuracy that observations have attained, which is again a matter of human arguing, such as Tycho Brahe’s argument for greater precision of celestial observation than was once thought worth the trouble. It is fruitless to argue for a complicated shape like an ellipse when the figures of argument are not accurate enough to distinguish a nearly circular ellipse from a circle. How close is a hog pen to a college degree? It depends on how deep in capitalism we are, and how plausible it is therefore to lump one kind of ‘capital’ with another.

We economists, or audiences for economists – not God – decide how useful a scientific metaphor is. It’s our little scientific drama, not written in the stars alone. And we decide, too, in every part of the rhetorical tetrad, deciding by our scientific conversations what is a fact,<sup>8</sup> what is a logic,<sup>9</sup> and what is a story.<sup>10</sup>

Talking this way about the social construction of economics or other sciences

does not commit one to dreaded Relativism. The Johnsonians among philosophers need not commence kicking rocks and pounding tables to show that the world is more than socially constructed. The world is still there. But we nonetheless construct it. The situation is like fishing. The fish are there by God’s command; but still the humans make the nets. To catch fish we need both. It is unhelpful to argue that the caught fish are ‘really’ or ‘ultimately’ either social or objective. They had better be both, or we are not going to eat on Friday.

So an economist is a poet but doesn’t know it. He/she is also a storyteller, who lives happily ever after. It is not hard to come upon economists, as good scientists, in the act of using stories for their science. Outsiders will find it easier to see the stories than will the economists themselves, because the economists are trained to think of themselves not as storytellers but as metaphor-makers, builders of models.

Economists spend a good deal of time retelling stories that non-economists tell about the economy, such as: once upon a time the economy seemed to be doing fine but had a secret monetary illness, then the illness broke out, and therefore everyone became poor. And economists have their own stories that they tell to each other: once upon a time there was a hog market out of equilibrium, then the sellers lowered the price, and as a result the market got back into equilibrium. Once upon a time the government cleverly reckoned it would drop taxes to achieve full employment, but the public had already discounted the move, and as a result the government ended up with egg on its face. Once upon a time a third-world country was poor, then it studied hard, saved a lot, and borrowed money and ideas from the first world, and therefore became rich. These are not going to dry up the market for *King Lear* or *Pride and Prejudice*, but anyway they are the stories that economists tell.

Not gods but people tell the stories. The stories are not facts made by nature. That does not make them arbitrary, merely various. A geologist is constrained by what in fact happened on the earth, and by what he thinks are relevant logics and metaphors; but nonetheless with the same facts he can tell the story in varied ways, as gradualist or catastrophist, for example. The same is true in economics. Not all the ways of telling a story are equally good. To criticise them, though, you have to know that they are being told.

Tale-telling in economics follows the usual constraints of fiction. The most important is the sense of an ending. One must go all the way to the third act. Gerald Prince used some ingenious mental experiments with stories and non-stories to formulate a definition of the ‘minimal story’, which has:

three conjoined events. The first and third events are stative [such as ‘John was poor’], the second is active [such as ‘then John found a pot of gold’]. Furthermore, the third event is the inverse of the first [such as ‘John was rich’.... The three events are conjoined by conjunctive features in such a way that (a) the first event precedes the second in time and the second precedes the third, and (b) the second event causes the third.<sup>11</sup>

One can use Prince’s examples to construct stories and non- stories in economics. Test the pattern:

Poland was poor, then it adopted capitalism, then as a result it became rich.

The money supply increased this year, then, as a result, productivity last year rose and the business cycle that began three decades ago peaked.

A few firms existed in chemicals, then they merged, and then only one firm existed.

Britain in the late nineteenth century was capitalistic and rich and powerful.

The pattern is story/non-story/story/non-story.

Many of the disagreements inside economics turn on this sense of an ending. To an eclectic Keynesian, raised on picaresque tales of economic surprise, the story idea 'Oil prices went up, which caused inflation' is full of meaning, having the merits that stories are supposed to have. But to a monetarist, raised on the classical unities of money, it seems incomplete, no story at all, a flop. As the economist A.C. Harberger likes to say, it doesn't make the economics 'sing'. It ends too soon, half-way through the second act. As the jargon has it, a rise in oil prices without some corresponding fall elsewhere is 'not an equilibrium'.

From the other side, the criticism of monetarism by Keynesians is likewise a criticism of the plot line, complaining of an ill-motivated beginning rather than a premature ending: where on earth does the money you monetarists think is so important *come* from, and why? The jargon word is 'exogenous': if you start the story in the middle the money will be treated as though it is unrelated to, exogenous to, the rest of the action, even though it is not.

Stories, then, are used by everybody, even by the economic expert. The second point is that the stories can be bad if they are used in ignorance of the other figure of argument, those models and metaphors. Bad stories yield snakeoil. The suckers gathered around the medicine wagon wish very much that the economist was an expert forecaster. They want him to sell them the simplest and most charming of stories: Once upon a time there was a newspaper reader who was poor; then she read a column by a very wise economist, who for some reason was making valuable advice available to her and two million other readers; and now as a result she is rich and happy. Or: Once upon a time there was a kingdom with people who did not like to study, preferring to sniff cocaine and watch rock videos on television; then the king hired a wonderfully expert social engineer who had done a great deal of studying; and then as a result the kingdom became miraculously prosperous, without having to study.

Economic snakeoil sells because the public wants it. The public wants it because of the fear that magicians and medicine men have always assuaged, and because the public does not know the limitations on economic storytelling. The economists, even the ones who do not plan a career in snakeoil, are disabled by their training from seeing how stories can go wrong. They do not know they are telling stories and therefore cannot distinguish good stories from bad.

A bad story of modern life, that is, has a final scene in which the expert, such as

the expert on the interest rate that will prevail next month, keeps us warm and happy. The analogy with physical engineering, which recently *has* in fact kept us warm and happy, is hard to resist. The social engineer promises to run the economy or the war or the culture with god-like expertise. But it is a naughty story, a wicked fairytale. Speaking about strategic bombing, Fussell notes the fairy tale of precision, which assumed 'that human beings could do without gross error anything they rationally proposed to do'.<sup>12</sup> Most social engineering is as impossible as bombing Uncle Harry's scullery in East London with intent.

The public and its experts would be happier (though not much richer) if they would grasp the silliness of relying on stories or metaphors alone. The way out of the muddle of over-specialisation in argument is to see that stories and metaphors can be used to criticise each other. Sir Arthur 'Bomber' Harris' story of precision bombing at night from six miles up can be criticised with the metaphor of Murphy's Law.

The stories that economists are asked to tell as advisers to governments or as social philosophers fit at best awkwardly and at worst disastrously with the metaphors they build elsewhere in their science. The metaphors, likewise, run up against the stories. Economic metaphors if pushed too far, as a 500-equation model of the American economy can be, produce silly stories. And stories, such as the story of America's tragic decline from Number One, contradict metaphors of maturity and of advantageous trade that we all know to be true. The badly used 500-equation metaphor can tempt us, as it did during the 1960s, into tricky policies rather than wise institutions. The bad story of America as Number One can tempt us, as it did the British a century ago, into figurative and then literal war with our 'competitors'.

Take the version of the Expert Story offered on some of the American cable TV stations, namely, 'You are now poor; but if you will send \$50 to the address that appears now on your screen, you will as a result become rich'. The story is a story by Prince's definition: three conjoined events, the first and third being states of being (poor and then rich), the third the inverse of the first, the second event an action, such that the third event is its result. In optimistic America such stories are common. There is actually offered a computer program for \$49.95 (available by mail order from Los Angeles) that calculates random numbers on which to place bets for the lottery. Europeans do not believe in such stories. Americans, by the millions, do.

Now consider the enrichment-by-advice story in the light of the economist's favourite metaphor, of people as calculating machines. The metaphor can be expressed as the Axiom of Modest Greed: if I throw a \$20 bill on the floor, someone will pick it up. If \$20 isn't enough, imagine a larger sum. True enough, we all stumble about in a fog, and often fail to see our interest. But \$20 is enough to pierce most fogs (by actual experiment it has been found that Manhattanites will not stoop for a dime or a nickel, but a quarter gets them every time). The computing in the metaphor of *homo computans*, you see, does not have to be perfectly accurate or methodical.

It is a rigorous theorem from the Axiom of Modest Greed, therefore, that \$20 bills will not lie around untaken on sidewalks. And there follows rigorously a

corollary, the American Question: If you're so smart, why ain't you rich? If a computer company knows how to pick lottery numbers, why is it selling such Faustian wisdom to you? Why isn't it unlimitedly rich? Why doesn't it pick up the \$20 bill itself? The offer to make you rich by sending in \$50 to the TV huckster would appear to be a false story.

So a story in economics is being criticised by a metaphor in economics. An exercise in literary criticism is serving to warn off the suckers. It goes further. For one thing, the same criticism applies to all manner of economic predictions. A broker with a plausible manner who advises you on stocks is pretending to know something that would make both you and him rich. But if he's so smart, why ain't he rich? And the same American Question can be asked of the more official and scientific predictions of economists: the price of soybeans next spring; the interest rate in six months; the date of the next recession; what will happen to housing prices in Normandy when the Chunnel opens? If economists were so smart they would be rich.

This does not mean economists cannot predict anything. They can: they know a lot more about the economy than you do. I am not asserting that economists are dunces or charlatans. They cannot predict, however, an event for which it would be profitable to have foreknowledge. That covers a lot of ground. Economists work honestly at social history and social philosophy, giving an account of the past and imaginative possibilities for the future. But when the journalists demand social weather forecasting in detail, the wiser economists resist. If they were so smart they would be rich. They are not rich. Consequently, they are not so smart. The American Question demolishes the claims of social engineering. It does so by using economics to criticise economics. It criticises an economic story with an economic metaphor.

The coin of profit need not of course be monetary – it needs merely to be coveted. For instance, political scientists whose theories of voting imply that they could predict the outcome of elections run up against the American Question. If they're so smart, why ain't they powerful? Critics of art whose theories imply an ability to predict (as many do) run up against the American Question, too. The Question curbs the ambition of a human science. It criticises all expertise 'Whose deepness doth entice such forward wits/To practice more than heavenly power permits'.

Notice that the American Question does not draw on the usual humanistic criticisms of science. It does not come from outside the tropes of science, affirming bravely that humans are very different from gas molecules. In fact, the American Question is an application of the very trope of the gas molecules. It shows that certain classes of foretelling are perpetual motion machines that violate the first and second laws of thermodynamics.

Likewise the stories can criticise the metaphors. An example is the counterfactual – what would have happened in world history if Lenin had died of food poisoning before arriving at the Finland Station or what would have happened to American national income by 1890 had the railway not been invented? Economists view counterfactuals as quite ordinary and necessary. One can only agree. If you are going to assess the cause of anything you are going to be involved in bits of

counterfactual speculation. You are going to have to imagine what would have happened without the alleged cause. The imagining will have to use a model, a metaphor that compares the actual economy of America in 1890 to a set of equations. One constructs the model of the American economy, then removes the railway and sees what happens. Whether the modelling is done explicitly or not, that is the reasoning involved. Counterfactuals are necessary for causal thinking, and the counterfactuals involve extrapolating a metaphor.

Too large a contemplated change, however, will result in *narrative* nonsense. The problem is that if an extrapolation reaches too far into the darkness it will inevitably produce contradictions of the actual history, the story we tell to ourselves about the past. In the railway counterfactual the trouble is that the world actually did invent the railway. In order to imagine an America without the railway in 1890 you have to imagine a Britain in 1825 failing for some reason to invent it. And then you have to imagine a world in 1760 that would lead to a world in 1825 that would not invent it. And then a world that would lead to that world, and then...and then...back to Creation. A world in which the railway would not have been available to Americans in 1890 might well have been a world in which the sea was boiling hot or in which pigs had wings, with different problems of transportation.

The more elaborated is the story into which, as Jon Elster put it, one tries to 'insert' the metaphor, the worse are going to be the contradictions.<sup>13</sup> In other words, there is a Basic Paradox of Metaphors and Stories. The more elaborate are the metaphors, the less well they will fit into a story of given complexity. That is, the more frequently will the metaphor of an American economy without the railway contradict the causes of the railway. But simple metaphors are often less richly persuasive than complex ones. A full 500-equation model of the American economy in 1890 will be more persuasive in detailing the effects of the absent railway. And yet (to return to the other side) in its very making the 500-equation model will more flatly contradict wider and wider stretches of actual, told history. Like most things, the selection of stories and metaphors about the same matter is subject to scarcity.

It is a pluralist's principle. Each part of the rhetorical tetrad places limits on the excesses of the others. If you are fanatical about stories alone or about metaphors alone (or logic or fact alone), you will start saying silly and dangerous things in the other realm. It is better to be moderately, reasonably committed to the observing of true facts, the following of true logic, the telling of true stories, and the constructing of true metaphors, which then can check each other's immoderation. Together they yield worthwhile scientific truth and sensible public policy (and, for that matter, prudent personal financial management).

Since the 1950s economics has believed itself narrowed down to the fact-and-logic half of the rhetorical tetrad. Economics shared then, belatedly, in the temporary narrowing of Western culture called 'positivism' or 'modernism'. Modernism has roots as deep as Plato and Descartes, but in full-blown form it suits its name. In the West around 1920 some philosophers came rather suddenly to believe that their whole subject could be narrowed to an artificial language; architects to believe their whole subject could be narrowed to a cube; painters to believe that their whole subject could be narrowed to a surface. Out of this narrowness was

supposed to come insight and certitude.

Insight did come, if not certitude. In philosophy after modernism we know more about languages lacking human speakers; in architecture more about buildings lacking tops; in painting more about paintings lacking depth of field. When the news of modernism got out to economics it yielded some insight, too. In economics after modernism we know more about economic models lacking contact with the world.

On the whole, though, the narrowing did not work very well. The failure of modernism in economics and elsewhere in the culture does not imply that we should now abandon fact and logic, surface and cube, and surrender to the Celtic curve and the irrational. It suggests rather that we should turn back to the work at hand equipped with the full tetrad of fact, logic, metaphor, and story.

The modernist attempt to get along with fewer than all the resources of human reasoning puts one in mind of the Midwestern expression, 'a few bricks short of a load'. It means cracked, irrational. The modernist program of narrowing down our arguments in the name of rationality was a few bricks short of a load. To admit now that metaphor and story figure also in human reasoning is to become more, not less, rational, because of putting more of what persuades serious people under scrutiny. Modernism was rigorous about part of reasoning and angrily irrational about the rest. The modernist experts cannot reason with their opponents; on most matters they can only shout and sneer. We need now, after modernism, to become more rigorous and more reasonable, about all the arguments.

In 1979, after much horror imposed by the arrogance of expertise, Eric Hoffer remarked: 'Forty years ago the philosopher Alfred North Whitehead thought it self-evident that you would get a good government if you took power out of the hands of the acquisitive and gave it to the learned and cultivated. At present, a child in kindergarten knows better than that'.<sup>14</sup> The learned tend to specialise in one piece of the rhetorical tetrad. Perhaps the child knows something better than the philosopher: that in isolation the metaphor and the story, the fact and the logic, do mischief without end, in economics or in any field of expertise.

## Notes

1. An elaborated version of the argument may be found in D.N. McCloskey, *If You're So Smart: The Narrative of Economic Expertise* (Chicago: University of Chicago Press, 1990), from which certain passages are taken.
2. Hoffer, E., *Before the Sabbath* (New York: Harper and Row, 1979) pp. 26, 28.
3. See D.N. McCloskey, *The Rhetoric of Economics* (Madison: University of Wisconsin Press, 1985); and M.B. Hesse, *Models and Analogies in Science* (London: Sheed and Ward, 1963).
4. Schultz, T., 'Are university scholars and scientists free agents?' *Southern Humanities Review* 22 (Summer, 1988) pp. 251-60.
5. See J.L. Austin, *How to do Things With Words* (Cambridge, MA: Harvard University Press, 1962).
6. Fussell, P. (1990) p. 154.

7. See R. Root-Bernstein, 'Mendel and Methodology' *History of Science* 21 (September, 1983) pp. 275-95.

8. See L. Fleck, *Genesis and Development of a Scientific Fact*, trans. F. Bradley and T.J. Trenn (Chicago: University of Chicago Press, 1979).

9. See I. Lakatos, *Proofs and Refutations: The Logic of Mathematical Discovery* (Cambridge: Cambridge University Press, 1976).

10. See S.J. Gould, *Time's Arrow, Time's Cycle: Myth and Metaphor in the Discovery of Geological Time* (Cambridge, MA: Harvard University Press, 1987).

11. Prince, G., *A Grammar of Stories* (The Hague/Paris: Moulton, 1973) p. 31.

12. Fussell, P., *Wartime: Understanding and Behavior in the Second World War* (New York: Oxford, 1989) p. 15. See also P. Fussell, *Poetic Meter and Poetic Form* (Revised edn, New York: Random House, 1979), and P. Fussell, *Thank God for the Atomic Bomb and Other Essays* (New York: Ballantine, 1988).

13. Elster, J., *Logic and Society: Contradictions and Possible Worlds* (New York: Wiley, 1978) p. 206.

14. Hoffer, E. (1979); as in note 2, p. 41.