

MEMORANDUM MARKING HIS SEVENTIETH BIRTHDAY

THE CULPABLISS ERROR

**A CALCULUS OF ETHICS
FOR A SYSTEMIC WORLD**

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SOURCES OF OUR PRESENT DISCONTENTS

Some forty years ago, the management of the largest departmental store in London's Oxford Street had a tremendous idea. If we divide the profit of each department by the floor area, we can determine the optimal use of floor space, they said. All we need to do is to copy the practice of the department that generates the most profit per square foot. So they did the exercise; and the most profitable area per square foot turned out to be the suite of rest rooms, with its coin-in-the-slot cubicles. For some reason, however, Selfridges was not turned into a gigantic public convenience.

I published that story in my second book, *Decision and Control* (Beer, 1966), exactly thirty years ago (describing it even then as "well known") - and the book has remained in print ever since. Alas, the lesson of that story, and dozens of others like it, has not been learned to this day. Perhaps people file it away as a *funny* story. But it is actually an archetype of the reductive technique in action. This is the approach that expects to understand wholes, which are integral systems, by breaking them down into smaller and smaller parts. We need to remember that the basic technique of Western thinking, and of the whole body of science itself, is reductive - or to use a term more readily understood to be pejorative, it is reductionist.

I need a pejorative word; because the technique of thinking we use, despite its spectacular successes, is also responsible for the appalling mess in which we find ourselves on every side. The technique is not systemic. Indeed, it is anti-systemic. The world however is very much systemic. It always was, of course; what I mean by 'very much systemic' is that our recent technologies have made the world effectively smaller and vastly more interactive. So there is now a strong emphasis on system. Thirty years ago, even the word 'systemic' was not in currency. People often asked me what it meant. Editors of my articles would routinely change it to 'systematic' - which word was regarded as the adjectival form -11 system. We know better now. Or do we? I think we do not; and this talk is dedicated to enquiring into the origins and the outcomes of a mammoth mistake.

When explaining this difficulty about the reductive technique to youngsters, I usually point out that if you take a radio set to pieces you can certainly understand how it works, and even build a duplicate that works. But although you may survey all the components, neatly spread out and labelled, you never seem to find the voice. And the same thing happens when you dismantle an engine: you cannot find the speed. But the voice and the speed are just the things that matter. We are using a technique of enquiry that causes the very attributes of the radio system and the engine system in which we are the most interested to *disappear*. Children had no trouble with this demonstration that something must be wrong forty years ago, which was when I started to use it, and today's children have no trouble with it either - providing I remember to say Oasis instead of Bing Crosby. But that is all that has changed. The first lot of children had themselves educated, and can therefore explain to the new lot that the problem is fictitious.

But it is by no means fictitious. We talk all the time about systems, but the systemic attributes of the system are not represented in our descriptions. The notion of a system in the public mind is quite static. As a check on this claim, we may observe how the word system has become an in- word - but its usage usually carries no systemic connotation. There was recently a spate of advertising, for example, for "the complete shaving system" - which turned out to be what we used to call a razor. In the academic context, we often speak of "dynamic systems". Whatever else would a system be but dynamic? When we inspect a flow diagram, we observe that the lines are marked with directional arrows. But they seem to indicate dependencies rather than movement; and if the diagram is at all complicated it is impossible to see what the consequences of making a change in the system will be a little further down the line without mounting a full- scale simulation. My complaint is that a root cause of our present discontents has to do with the reductive character of scientific explanation, and a resulting epistemology that regards consequences as inherent qualities of static systems. For a second time I risk having a diagnosis perceived as fictitious, and its illustration with the razor as a joke. And yet

- This is the flawed process by which we have flooded our planet with more than 100,000 industrial chemicals that have been tested for carcinogenic effects - but not as mimics of oestrogen. Unfortunately, the body is a total system. The consequences we are already seeing in lowered sperm counts are not fictitious, nor are they particularly funny.

- There again, I can easily recall being shocked to learn that ecological mismanagement was wiping out a species a day; but now the latest United Nations report has 150 to 250 species becoming extinct every twenty-four hours. That adumbrates the mass extinction of life. The logging companies are doing fine, and so are the oil companies. Unfortunately, the Earth is a total system.
- The people who are maximising return on capital in the business of armaments are doubtless doing a good job for shareholders, but they are not building gigantic public toilets. Would that they were - it would be more sanitary. For some reason people are blind to the fact that to keep the production of profits going, more and more armaments need to be sold - and in turn exploded. But the financial returns are perceived as qualities of the share portfolio, and not in the systemic context of death. I was just now talking about the mass extinction of life: in this context it is called genocide.

ABOUT SURROGATE WORLDS

It is easy enough to accept that we live in a culture in which terrible - possibly fatal - mistakes are endemic. It is fairly easy to see that one root cause of the problem lies in a reductive technique that is virtually powerless to handle an integral system. But now I draw your attention to a second root cause, which has to do with the kinds of models that we use in managing our world. I am not talking here about mathematical models or other forms, or esoteric statements. I *am* speaking quite simply about the image of something that we hold in our minds - the idea we have selected from a myriad sensory impression, endowed with coherence, and elected to call "reality".

Probably no one here would mistake such models of social, political or economic systems for "reality" - if only because the models do not work very well. But they are the only entities that we have to work with; and with the passage of time, the familiarity of persistent usage, and the professionalism of the experts who profess them, they come to be treated as if they were real, and respected as if they did work. These models are not systemic, as we have seen. Worse still, they are flawed in two other ways. Firstly, they are over-simplifications - in cybernetic terms, they do not exhibit requisite variety. Secondly, they are usually out-of-date. I described the whole problem in detail just twenty-five years ago (Beer, 1975) when I named these models "surrogate worlds". I hope it is obvious that if we are managing merely surrogate worlds, there is a great deal of scope for making mistakes. So much for what is no more than a reminder of a long-established diagnosis of our present discontents: let us choose a couple of examples.

I start at home, with the family. "Johnnikins is not at all himself these days", said of a son. Oh, really? Then who is he? The parents who said this to me were loving and concerned. But they were concerned about a surrogate son; and whether they would still love the actual son if they updated the model is a moot point. Who is this Johnnikins, anyway? John is 17 years old, fer heaven's sake. They are using the model that worked quite well when he was five, which means that the model is twelve years past its sell-by date. As to the model's not exhibiting requisite variety, a lad who has given up protesting about still being called Johnnikins as a lost cause is unlikely to seek parental discussion and advice about his raging testosterone. What happens next? Such models are not geared to adaptation, so the mismatch is handled qualitatively. These parents will be quite satisfied with a small addition to the static, non-evolutionary, non-systemic model they have enshrined, once they are provided with a label for the mismatch. The label will be inscribed: The Generation Gap

Here is a second actual example. Two relatives were discussing the condition of Granddad in his presence and pretty offensive terms. "Should you be saying these things in front of him?" - I asked the question sotto voce. "Oh, his mind is wandering nowadays, and besides he's as deaf as a post." When I was left alone with the old man, and standing behind his chair, I asked in the same soft voice: "How are things?" He chuckled, and knocked out his pipe into the fire. "Very entertaining." Of course, he had heard every word; and of course there was nothing wrong with his mind. We finished off his Crossword Puzzle. This time the model was a convenient extrapolation into a forecast surrogate world, which was relevant neither in time nor in requisite variety. Let us leave the intimacies of family life at that, drawing the curtains gently on the surrogate models that spouses typically nurse of each other - and of their marriage. Perhaps a little more cybernetic insight and a little less psychoanalysis would help there.....

But whether we can afford to ignore exactly parallel situations in the Third World I should seriously dispute. Anyone who has actually been involved in the socio-political scene there well understands that

governments have to operate according to models set up by the International Monetary Fund and the World Bank. This means that everything is steadily improving in the surrogate world of the bankers, while in the mouths of the poverty-stricken they are getting steadily worse. I have verified this statement for Mexico as an example within the last month.

THE EXAMPLE OF EDUCATION

I shall now make a first excursion into public policy by relating these thoughts, albeit briefly, to education. Here are a few characteristics of the models that between them appear to me to constitute a surrogate world, against which my diagnoses might be tested. Firstly, it is constantly said that education is the prerequisite of all social advances. Secondly, this education must be 'relevant', which seems to mean that it should be adapted to the job Market. Thirdly, society has become de-skilled, and huge efforts are needed to raise the level of skill to 1979 levels - in order to stop the rise in unemployment.

The argument then is: the world is a mess, and this mess can be ameliorated only by education. Pray consider the following scenario. In a hundred years from now, which is a virtual split second in the history of humankind, pretty well everyone alive today will be dead. It follows from this that in a mere hundred years from now, since the planet is by no means short of resources and the technology is already available, it might be possible to have an equitable society, in which truth, beauty and goodness prevailed, hunger, poverty, war and crime were outlawed, and the currency of life was love. Education exists to make sure that does not happen. After all, we can teach only what we know. What we know is how to generate the mess that we have. The models of management that we espouse are disastrous.

As to making education strictly vocational, why should our models of the job market suddenly become predictive and adaptive? They are neither. The concept of what should constitute employment in a post-industrial society has been mooted (Beer, 1986a), but the political climate that pertains belongs to the end of the eighteenth century. There are huge inequalities in both wealth and income; there is widespread job insecurity - an unregulated employment market whereby short-term contracts and freelance activity provide no continuity and there is a consequent lack of protection. These are the very conditions into which the Trade Unions were born. They fought for decent conditions, became overly powerful, and thereby have since fought their way down into desuetude - so that today membership comprises only a third of the workforce. They will have to be reinvented.

The argument about the de-skilling of society is tangled to say the least, as Will Hutton (Hutton, 1996) has recently pointed out. First of all, it seems likely that this factor contributes only 20% to the long-term increase in unemployment in Britain. Secondly, job creation schemes have no effect on the problem. And thirdly even if it were effective to re-skill society by educational means, we could not possibly afford it. To bring the lower half of the US population up to 1979 levels of income in equality, according to research at the University of Chicago, would cost two trillion dollars.

I have been messing with the models and finding them confused and confusing, which is because they refer to surrogate worlds. Outcomes, as this implies, are full of contradictions. We wish to grant access to education to every individual, which means broadening the catchment base, which means that the proportion of exceptional students will go down - and then we penalise the institutions that do as we ask because they score too low on a scheme of points that measures precisely the wrong thing. This applies to A-levels and goes on through the whole system, beyond graduation, to include points awarded for post-graduate research. This uses positive feedback to concentrate the monies available for research with elite institutions, while at the same time complaining that less fortunate places fail to build research teams using the money that no-one will provide.

We seek to give responsibility for educational advancement to the individual, and then take our best and brightest and refuse to fund them properly. Doctoral students often give up, and then they are blamed for not displaying brilliant thinking while in the process of flipping hamburgers to eke out derisory grants. We do not like to fund research for matters that are not of obvious and immediate benefit, whereas the whole history of science demonstrates that the discoveries that make all the difference are seen as valueless by the generality - and even by those specially appointed in quangos to detect them. Please understand that I am not simply -moaning about the under-funding of education: I am still firmly on the track of the original enquiry into wrong models and their consequences

The misunderstanding about the value of basic and apparently 'pointless' research stems from a bad model of how progress happens, and that comes up for discussion next. Meanwhile, let us make sure that we take due note of experience. It has been endlessly repeated, from Hero of Alexandria's invention of the steam turbine in the first century, right up to lasers today. Hero's invention was banned; and when I had a laser installed in my office in Holborn in 1966 in order to demonstrate the principle of holography, my colleagues scoffed at the contention that it had practical value. In between came computers. A few years ago in New York I met an old lady who said that she had been Alan Turing's only doctoral student fifty years before. When I then referred to her as 'doctor', she shyly apologised and said that she was not entitled to more than Miss. It turned out that she was awarded only a Master's degree; the doctorate was refused on the explicit grounds that the computing engine she was writing about was unworthy of serious attention. Mind you, the university concerned was one of those two sleepy old places out in the boondocks to the North of London.

But it is much the same in industry unhappily. I wrote in 1972 (Beer, 1972) that you could be sure that the only people who had the vision to save a threatened company would be the first to be fired as an economy measure. In the spate of downsizing, resizing and general mayhem that we have been witnessing in the last ten years, this has been a repeated experience world-wide. Of course, if the individual student were seen correctly as embedded in the community, and if the community were seen correctly as embedded in the wealth generating context of industry and business, we should be embarking on a set of viable systems recursively working up to a newly empowered nation (Beer, 1986b). Instead, we are stuck with an inarticulated collection of dislocated bad models, the mighty clashing of their respective surrogate worlds - and of the mighty egos that inhabit them.

Finally in this example, let me suggest that inside this set of embedments that my work on viable systems has tried to make explicit, at the level of the city, should be found a university; a university that prizes scholarship and novel ideas as well as 'relevance'; a university that understands and is organised around the holistic principle of universus - whence comes its name - and which is therefore immune to the dire disease called the Hardening of the Faculties; a university led in societary terms by a business school acting as a powerhouse for change - while at the same time venerating those values and propagating them within the community. Needless to say, I long ago designed one of those too - a business school fully integrated within its environment (Beer, 1970). The design has never been implemented - and for the usual reason: "We don't actually run a business school like that." No we don't; and as a US legislator once said of the need to teach foreign languages, "if English was good enough for Jesus, it's good enough for me".

SOURCES OF OUR MODELS

If the models we use are so inept, and if our decisions are therefore so defective, how has this mismatch come about? What we call 'progress' turns out to be a recognition of advances in technique, and has little to do with advance in understanding. In short, we have become very good at following our technological nose - regardless of where we shall end up. But understanding is a product of modelling, and the useful models change very little over the millennia. Of course, and because we believe in progress, we disregard early statements of crucial models. This is technological hubris, and I believe that it should be abandoned. It seems to me that the crucial models arise from experience as mediated by a central processor - the brain - which has not changed in millennia, and that therefore understanding is timeless. Thanks to fads in the usage of technology, this does not look to be the case. Thanks to fads in the language of philosophy, this does not sound to be the case. But it is the case.

Take the atomists of ancient Greece, for example, working in the golden age of the fifth century BC. Their intellectual progenitors had already modelled the universe in terms of an infinite mass in internal motion: this was Anaximander, in roughly 600 BC. Lest you should think that his detailed theory of how the universe evolved was probably nonsense, you should hear that he knew that the moon is lit by the sun, and that the earth is round. Possibly you have been attributing that discovery to someone else. On such foundations as this, Empedocles declared that the four basic elements of earth, air, fire and water must be in complex combination to construct the universe, and that therefore billions of very tiny particles of each of those elements must be available, from which to fabricate the universe by a combinatorial dance.

Anaxagoras went on to contend that in that case the traditional four elements ought to be replaced in the model by billions of elements. Then bone, for instance, would be formed as the result of billions of

bone-elements coming together. Such thinking paved the way for the atomic theory proper, usually associated with Leucippus and Democritus. Matter is not made of tiny particles of bone, or hair, or whatever, but of tiny particles - period. That is, the atoms are devoid of quality, which is just what physics 'discovered' at the turn into this century. Whether you regard what the Greeks did as an extraordinary feat of the mind, or modern physics as a shared limitation of the brain, is a non-trivial question.

This is not a history of philosophy, but an enquiry into the roots of our present discontents, so forgive me if I take a thousand years' holiday before picking on a second example of this thesis. By about the year 400 AD, and having had some seven hundred years to digest not only the pre-Socratics but the further advances of Plato and Aristotle concerning the union of matter and form, we find St Augustine contemplating the universe. The form of the universe existed before the beginning of time, he said. At a given instant, an act of creation started time going. Matter was created out of nothing in the same instant, bringing with it the space into which that matter could explode. No wonder the process made a Big Bang, as its recent "discovery" was named. Augustine also had a name, with a similar notation, which was God. Now physics is hard at work on the Theory Of Everything, T-O-E, which I suppose will be called the Big Toe. So it may turn out that the forms that Augustine needed to make impressions on matter are super-strings. Anyway, 1600 years further down the line, physics is coming close to an Augustinian universe: providing us with a complete theology - minus God.

You may have noted that these crucial models usually come equipped with the key concepts arranged in antagonistic pairs: matter and form, substance and accidents, waves and particles, not to mention good and evil. The pairs stand in need of Hegelian higher synthesis, as for example Einstein's equivalence of matter and energy; or the complementarity principle that handled the wave/particle contradiction; or the frequent appearance of trinities in theologies. Perhaps a brain in which every neurone is at all times either firing or not, with a uniform spike potential, is committed to the dichotomy of its outputs. This would suit my thesis; but I have several times tried to prove the point mathematically, and failed. It does seem, however, that a diadic logic is not adequate to account for the brain's performance: a triadic logic is required. Be that as it may, pray consider our problem about the roots of contemporary malfunction in terms of a contradictory pair of concepts: it is one of the oldest such pairs, pervasive through time, and it remains one of today's hottest topics: the question of change itself. The pre-Socratic philosophers spent about 250 years examining the matter - remember, Plato was not even born.

The most famous of the believers in change was Heraclitus, working in Ephesus, best known for teaching that everything is in constant flux. It was he who wrote that you cannot step into the same river twice. But just down the road the philosophers of Elea were contending that change is impossible. Parmenides, for example, taught that all change is inconceivable - its appearance an illusion. All this in 500 BC. The argument rages on. Today's management scene is typified in my experience by people fervidly preaching change to people who fervently embrace change - on condition that nothing alters.

But change as defined by events is a main feature of our contemporary world. In that we deny it by inaction, it happens to us - instead of our working with it, planning for it, and creating a better world, a viable future. That is the very reason why we don't like change: it is the name of a stasis that is by definition not adaptive. Society is Heraclitian; but Parmenides is in charge.

A COMMONALITY OF ERROR

We have uncovered some of the sources of difficulty in handling change sensibly, in that the models underlying action do not exhibit requisite variety, are not timely, and therefore do not recognise change that is actually occurring - while seeking forms of change that are inappropriate because they refer to surrogate worlds. All this is bad enough. But it is no more than a preamble to the key notion, which requires elucidation. It is embedded in these four stories - all true - and I ask you to try to detect what such dissimilar scenarios have in common.

- In one of the Prairie Provinces of Canada, legislators became concerned for the safety of solitary women hitch-hiking for long distances on their own. If a solo male driver were to woman a lift, then there was a risk of assault - some incidents had indeed come to public attention. In the nature of the case there were no witnesses. A law was therefore passed that if a charge of rape were laid, the testimony of the woman must be accepted. There is biblical precedent of a sort. We may read in

Deuteronomy (122; 24-27) about the situation of betrothed women alleging rape. A distinction is drawn between an incident that occurs in the city, in which case if no screams are heard the woman is assumed to be complicit, and one that occurs in the fields. Since there is none to hear a scream, the woman is assumed to be not guilty. It makes all the difference to her, since she will not be stoned to death; the man is done for either way. The man in the modern example is also in deep trouble - so much so that only an idiot would risk offering the lift in the first place. So in the effort to protect their womenfolk, the legislators left them abandoned by the roadside.

- Let us lighten the atmosphere for the second story. A man taking daily medication for diabetes used to tip his tiny pill out of a bottle onto the palm of his hand. Experts in hygiene then came along and improved the packaging. Each pill was now encased in its personal cocoon within a blister pack, the whole backed by heavy metal foil. This was a very expensive innovation, but no expense is spared when a pharmaceutical company wants to assure a health service about its product. Now diabetics typically have peripheral neuropathies that make them clumsy with their fingers. So nowadays, in the interests of hygiene, I frequently take my pill - not straight from the bottle, but straight from the floor.

- I move from the trivial to the far from trivial. Two of the major objectives of domestic policy in the United States, which are shared by both parties, are the reduction of the fiscal deficit and the reduction of atmospheric pollution. A small step towards both was taken earlier this year, when Congress passed a law increasing the tax on gasoline - albeit by a trivial margin. The President, in election year and for obvious reasons, vetoed the measure. Now suppose that the United States paid a gas tax equivalent to the British tax - which is far from the heaviest in Europe. The deficit would be wiped out in a single year. Secondly, a tremendous incentive would be imparted to the automotive industry and to its market to make smaller cars with more efficient engines, which would rapidly and significantly reduce pollution. Remember that these are bipartisan objectives.

- The fourth true story concerns various states in America, perhaps also if less extensively in Britain, and the young men who violate the law in fairly small offences. When he is committed to prison, such a young offender will himself be violated. Everyone concerned in penology knows that this is a certainty. But we may imagine the public outcry, national and international, if a judge passing sentence on a persistent minor offender ordered three months of daily gang-rape.

I invited you to detect the common characteristic in these four stories. It is of course that in each case a decision is taken or a decision is neglected with unacknowledged but perfectly predictable consequences. These consequences are disguised by the models in use: the consequences are not apparent in the surrogate worlds generated and supported by those models.

BLAME AND THE GUILTY MIND

When someone takes a wrong decision, then, is s/he to blame? Perhaps most people would agree that we are quite evidently living in an absolute morass of wrong decisions, for which no- one seems to be to blame. It has to be said that modern management, whether in industry, business or government, has made a specialty of avoiding responsibility. From the disingenuous naivety of "I knew nothing about it," through the sophisticated demonstration that "it was not my responsibility", to the deeply sinister "I was only obeying orders" the excuses are all to hand - and more than to hand, since they come straight out of the mouths of anyone accused of anything these days. So long as the claim can be made that *due diligence or due process* has been observed, anything is acceptable - but these concepts themselves belong to a model of decision that is inoperable. The excuses are accepted, because decisions are no longer taken by individuals, but by institutions working in committee, and because the institutions to which the accused belong can well afford expensive lawyers - who themselves come in teams. Thus is responsibility dissipated into a miasma of corruption.

This is not idle rhetoric. How about a general who did not know that documents had been suppressed, although his hand-written memo on one of those very documents attested to the fact that he did? How about the managers of a mine that exploded killing twenty people who did not know that a report had been submitted to them declaring the mine unsafe? Or the safety inspectors who confirmed the fact, but did not consider that it was their responsibility to see whether any action was taken? How about the ghastly serial murders in which the female partner was accorded lenient treatment because she was dominated by the man and 'had no choice'- whereas later on it begins to look as though she was the

leading spirit? These are all current matters of concern in Canada, and under my daily scrutiny as I prepare this speech. And I read equivalent stories when the British papers arrive.

Well, I used the word corruption just now. It is not too strong. People think of corruption as the collection of illegal acts, and respectable people do not commit illegal acts. I was in Columbia in June, and renewed for the government there a definition of corruption that I had offered to the Mexican government some years before: Any act that does not validate the system of values that we support is corrupt. Which decisions that are made by ostensibly respectable managers can survive that harsh criterion?

If this is true where is the onus? Ethical philosophy has for a long time argued that it lies with intention. In theological terms, it is not possible to commit a sin of which you are unaware that it is sinful. You must intend to do this wrong. And so the notion passed from theology to law. The concept of *mens rea*, which means a guilty mind, derives from criminal law. What does it mean to be guilty? Modern thinking about this seems to begin with the social philosopher and jurist Jeremy Bentham who was living about two hundred years ago. He distinguished between direct and oblique intention. There is little problem about assigning guilt to someone who directly intends to commit a crime. But suppose we are dealing with an action that carries with it consequences that the subject argues that s/he did not foresee? For this is precisely the question to which this enquiry has led. Bentham talks dismissively about the "mere foresight of consequences", and does not consider "inseparable consequences". But this is just what concerns us here. And of course it is obvious that if there is an hiatus between action and consequence, then we are dealing with something that may be *just a bit* separable..... In other words we are dealing with a probability.

Now the law does not like probabilities. When I offered evidence in a landmark criminal libel action, it was based on a variety of different statistical techniques for assessing the probability that a given statement was true. It used the argument that since all the methods indicated that the likelihood was approaching certainty, the court could have confidence in the statement as veridical. Counsel threw this evidence out with some vehemence. He said that the law deals only with facts. I replied that judges often asked juries to consider the "balance of probabilities". He countered by saying that I was neither a judge nor a jury, but a so-called expert witness. And a scientist, who did not know for certain what the facts were, or even what was the correct technique to use to reveal the facts thereby demonstrated his incompetence!

Back to the fabric of the criminal law itself: The doctrine surrounding *mens rea* began with the introduction of the term itself some thirty years after Jeremy Bentham died. The only place in which the notion of separable but genuine consequence seems to have entered into it is with the imputation of constructive malice. Here is the very notion that we have been trying to track down, since it allows that the intention to do wrong may in principle be inferred as a probability. But as I said, the law does not like probabilities. The availability of argument from constructive malice was abolished in Britain by the Homicide Act of 1957 - and we are back to requiring evidence of direct intention

The ethical question of whether or not a decision-taker or a policy-maker should have known the disastrous outcome of that decision or that policy may or may not be a criminal matter. So it is easy to understand why lawyers do not want to admit elements of argument that might well have the effect of becoming entangled in their basic categories. Let us then move on to the difficulty that the enquiry so far has uncovered. I am thinking about the direct and indirect consequence distinction, and the issue of inseparable consequences - which turn out to be *just a bit* separable after all. The notion is horrifyingly imprecise. Let us see if the history of thought can come up with relevant ideas that might remove the horror.

THE CORE OF THE ERROR

We have already had occasion to talk about the pre-Socratic philosophers, and I remind you now of Parmenides, who considered change to be impossible. A colleague in that view was Zeno. Six Zenos figure in Greek philosophy, and this is the eldest of them - Zeno the Eleatic, who was both pupil and friend of Parmenides. His technique of argument was to draw contradictory conclusions from the premises of the opposition, thereby demonstrating the premises to be unsound. And so he came up with Zeno's Arrow, which never can move because it has to reach the mid-point of its flight before it can reach the target, and before that it must reach the mid- point of that half-flight - and so on indefinitely.

Even better known is the model of the hare that could not overtake the tortoise for a similar reason: the hare is perpetually trying to halve the lead that the tortoise was given. In the original, it was not a hare condemned to this fate, but Achilles himself - not that this made any difference.

When Aristotle got his teeth into Zeno's paradox, which must have been a hundred years later, he knew that something was wrong, but pronounced himself unable to say what it was. So Aristotle was content to nominate Zeno the inventor of the dialectic - thus paving the way for Hegel and Marx. But he also left the field wide open for Newton and Leibniz to invent calculus, and by failing to do it himself there and then held up the development of human insight by some two thousand years. I have always wondered what difference it would have made if Aristotle had not let himself down in this way. He should have realised that to freeze a changing variable artificially and then to debate the status of that variable as if it were characterised by its very stasis rather than by its relative rate of change, is an inoperable model. What is needed is calculus of variations, in which finite differences converge on a limit as the increment diminishes toward zero. That leads to the concept of an instantaneous rate of change of the function with respect to the variable, which is to say the derivative of the function.

What has all this to do with the problem of recognising consequence? I submit that society is trapped in an ethical version of Zeno's fallacy. It treats an intervention in a changing situation as if that intervention had coupled to it something known as a consequence, and handles the evident uncertainty attached to the coupling in terms of likelihood. Unfortunately, no actual measures of likelihood, statistical or otherwise, are applicable. So in order to give the likelihood some semblance of rigour or respectability, society has invented the ethical concepts of The Prudent Man, of The Reasonable Man, and of The Practical Man, which are operated as ethical norms in accountancy, in law and in business respectively. In a given situation, how would these gentlemen be likely to react? There are no measures involved but there ought to be some social consensus about their meaning in actual situations. But is there?

Very recently my partner, Allenna Leonard, looked up from a study of auditing that she had undertaken, and exclaimed in exasperation: "The Prudent Man is out of his depth". I replied: "Well, The Reasonable Man is a bigot". This interchange triggered an immediate and fond recollection of hearing Bertrand Russell say to someone who was thumping the table and shouting about practicality: "I define The Practical Man as the man who has no idea what to do in practice". All this being so, I cannot help thinking that it is just as well that there seem to be no prudent, reasonable or practical women. Discussing the issue recently with my friend Don Burrill, he summed up with a generic character - The Hypothetical Man. His definition needs to be shared: The Hypothetical Man is one who has explicitly and willingly suspended disbelief about something that is evidently implausible. These concepts, in short, on which so much i - and ethics depend, are not very much use outside their own dysfunctional models; they could easily be lumped in with The Calculated Risk, which I realised early in my business career means a risk that no-one can calculate.

It is not surprising that these ethical notions are defective, because they belong to a model in which consequence is actually coupled, however insecurely, to a decision or policy. But the insecurity of the coupling is not due to intrinsic properties, as the ethical models imply, but to future uncertainty. The model that society is using by no means recognises this. It is making the mistake that Aristotle made when he failed to account for incremental change. And this comes down to a failure to perceive a decision as an instantaneous rate of change, which is to say a derivative of a function formulated with respect to time, instead of as an event - defined as frozen in time, like Zeno's arrow.

To recognise consequence in a policy or decision, we need not to analyse the worth of its construction, but to synthesise its systemic evolution.

THE ERROR IDENTIFIED: CULPABLISS

About 250 years ago, Thomas Gray completed his poem occasioned by a distant view of Eton College with words that have become famous over the years. They declare: -

where ignorance is bliss,
'Tis folly to be wise.

This is sad but true; and I dare say that the practical wisdom the remark enshrines has been treasured by Etonians ever since. We have however been discussing a very special form of ignorance. This is the ignorance of consequence, which, according to my examples, has really no excuse. That this kind of ignorance is so common is due, I have been contending, to the pervasive use in society of a faulty ethical construct - one which has no systemic referent. And whether it was Aristotle's fault or not, the fact is that the faulty model is deeply ingrained. So a huge effort will be needed to dislodge it. An understanding of the way systems behave, and of the underlying principles they obey even when they are probabilistic systems, has to be developed in the public consciousness. It is not that the knowledge does not yet exist: it is called cybernetics. I myself have been an advocate on its behalf for forty years. So perhaps the way forward is to make it clear (as I am attempting to do here) that although ignorance is bliss it may yet be indefensible.

Thus I offer you a new word: **culpabliiss**. It means culpable ignorance of consequence. Culpa is the Latin word for fault, and ignorance is bliss - an acronym for **BL**ind **I**n **S**ystems' **S**ensibility .

Perhaps Thomas Gray will forgive me for adding a metrical foot to his rnetre - and for reversing his meaning - in order to say: -

where ignorance is culpabliiss,
'Tis folly to be less than wise

or else you may end up in jail. As I said before, society must bring it home to managers and ministers that the culpabliiss error will not be tolerated any longer. As we have seen, there is no professional regulatory machinery in place in the overarching disciplines, not in law, not in ethics; nor is there any sign that individual professions themselves recognise culpabliiss - by any name. We took a quick look at education, and have mentioned several other activities in passing. A whole book could be written about culpabliiss in medicine. After all, many have realised that far too high a percentage of disorders is iatrogenic - caused by the doctor. Moreover, and because of this, the whole shape of the profession is adjusting to the threat of litigation. If you don't know what to do, order tests. The cost is crippling health services, and the likelihood that test results are wrong is higher than the risk that the patient has the condition that the test purports to detect: that is culpabliiss squared.

It is in the absence of hope that the professions will detect their vulnerability to culpabliiss that I call upon the free press to establish public recognition of this particular category. A weekly column, for example, instancing the worst examples, under such a heading as "They should have known" might do the trick. Only the journalists concerned need to understand the editorial principle involved, and there is no need to explain any underlying theory as I have tried to do. The public would gradually learn, by repeated ostensive definition, the connotations involved and the editorial criteria for selection. We repeatedly see the public as auto-didactic when its attention is captured and finally captivated. Even so, the whole idea might seem too intellectual for the tabloids and the Practical Man. I don't think so. Try the alternative heading: "They shoulda damn well known". Surely that has some verisimilitude. But the media may have to swallow hard in pursuing this proposal - they are hardly strangers to culpabliiss themselves Besides, it is now the free press that is being invited to make a change involving actual alteration. Oh dear.

In closing, and because we are here in an academic setting, and despite my expressed misgivings about the current academic scene, I must point out a major conclusion. It is that the culpabliiss error derives from a failure to understand cybernetics, which is the science of the regulation of large, probabilistic systems. Especially needed are a cybernetic insight into epistemology, with its emphasis on the role of models, and a mastery of cybernetic technique in respect of systemic consequence. This criticism, happily, does not apply to this institution - or I should not be here. In the customary absence of this discipline, however, it is fair to say that a university, and especially its business school, is a Professor short of a Faculty.

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