REITH LECTURES 1970: Change and Industrial Society

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Lecture 2: Dynamic Conservatism

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In a book called *Men, Machines and Modern Times* Elting Morison describes the introduction of continuous-aim firing into the United States Navy in Theodore Roosevelt's time. The problem was to keep your guns trained on an enemy ship when both your ship and the enemy's were going up and down with different frequencies in different directions at the same time; the previous method entailed a rather heavy set of gear. There was a sight which was attached to the gearing mechanism, but you didn't dare put your eye on the sight because of the recoil of the gun. You therefore didn't use the sights A naval officer stood behind the gunnery team and gave it orders: two degrees to the left, two degrees up, and the like. If the gunnery team was extremely well-trained and the naval officer extremely skilful, you occasionally hit the enemy ship. There was a young officer in the Pacific theatre named Sims, who had discovered a method for the introduction of continuous-aim firing. It consisted of a cluster of relatively simple inventions, one of which was to take advantage of the inertial movement of the ship and to use a highly simplified gearing mechanism. The second was to arrange a sighting device through which the moving parts of the gun could move.

What previously a whole troupe of well, trained men had done, now one person, keeping his eye on the sight and his hands on the gears—could do. The effect was to increase accuracy by possibly 300 per cent in the Pacific theatre. Sims was very excited about his discovery and wrote to the Navy Department in Washington telling them all about it. He received no answer. He was, however, a very persistent sort of fellow and he wrote again and again, and finally the Navy Department agreed to test the device. The test consisted in taking it off the ship and strapping it to a solid block in the Washington Navy Yard. And of course, deprived of the inertial movement of the ship, it did not work. This proved scientifically that continuous-aim firing was for the birds.

Sims was the sort of person that tends regularly to be associated with the entrepreneuring of new technologies. He was a person who congenitally hated authority; he was irritative and disruptive to his superiors. He bootlegged, he lied, he did everything that he needed to do in order to win his battles, and he managed to get directly to Theodore Roosevelt. Theodore Roosevelt shoved the device vertically down the Navy's throat. It was then adopted in the Atlantic and Pacific theatres and achieved a 300 per cent increase in accuracy in all theatres.

The question arises: why did the Navy behave as it did? Elting Morison points out that it was not a Bourbon distemper of the military mind, but that, by introducing continuous-aim firing, Sims represented a massive threat to the hierarchy of the ship. He was destroying what had been a very high-morale outfit; he was taking away the reason for being of one of the major officers of the crew. He was quite correctly and

understandably perceived as a threat to the coherence of the social system of the ship, and they made every effort to reject him on that ground.

The example is characteristic of social systems, whether it's the social system of a ship or an industrial firm or a business firm or a community. The system always contains at least three elements or dimensions which are locked into one another: a social structure—which is a set of related roles and authority relationships—a technology and a theory. And by a theory I don't mean an academic or sociological theory about the system: I mean what it is that's believed that causes people in the system to do what they do. The theory consists of the views which are held within - the system that determine pictures of the environment, of what our competition is, of what our future is, of what we are heading towards, and of the ways in which we are to cope with it. Both the structure and the theory reflect the prevailing technology, just as the social system of the ship reflected the technology of firing before the introduction of continuous-aim firing. These dimensions all hang together. They cannot be broken apart.

The system as a whole has the property of resistance to change. Sometimes we talk about this property as though it were inertia: that's a metaphor drawn from physics and refers to the property of an object to tend to remain where it is unless there's a force exerted upon it. But it is a rather passive metaphor and I propose instead that organisations are dynamically conservative: that is to say, they fight like mad to remain the same.

This is such a pervasive characteristic of social systems that it may be used in effect to define what a social system is: namely, a social entity which has the property of preserving its integrity and boundaries in spite of the many internal and external threats to both. It's always futile to look for one reason for a system being the way it is. Walter Cannon points out about biological organisms, and Gunnar Myrdal points out about poverty, that it's inappropriate to seek a single cause for either one, that they are always in every way their own cause. The vicious circles of poverty reinforce themselves. There is no single entity to which one can point which is the cause of poverty.

The same is true of organisations and of the dynamic conservatism of organisations. Morison's story suggests two further correlates. One of them is that we discover the depth and complexity of organisational resistance to change when we seek to change it, as any of you who ever tried to change an organisation may have discovered. You have in fact been engaged in an experiment—perhaps the only kind of experiment in which you could be engaged —to discover the nature of the organisation. The second correlate is that organisations resist change with an energy that's roughly proportional to the radicalness of the change that is threatened.

Stable State of the American Building Industry
Some of this is made clear by an example, and my example is drawn from the American building industry. In 1963 I worked with a man named Herbert Hollomon who went to the Department of Commerce in the United States to develop a programme called the Civilian Industrial Technology Programme. I had done a piece of research on the American building industry. The research said in effect that in the

United States we do no building research. We do occasional product development, we do some research on materials, but we don't do any research on building at all. The Civilian Industrial Technology Programme was based on the notion that because there is no research done in certain industries derived from the Industrial Revolution— sick industries, backward industries, industries that are research-poor—governments should be supporting some research for them. The response of the industry was instantaneous. They immediately produced a report and said indeed they did do research. They did a million dollars' worth of it a year, against a background of some several billion dollars gross. The industry also claimed that this was an assault upon the free enterprise system and represented a form of incipient socialism and should be opposed. A representative of one of the pieces of the industry appeared in our office one day and said that in effect he would control the programme or kill it.

We interpreted this as amusing bravado until he proceeded to do exactly that. In doing so, however, he revealed a great deal about the dynamics and structure of that organism which is the American building industry. The industry includes contractors and building suppliers, people who make iron, steel, bricks and lumber. It includes architects and engineers and their associations. It includes craft labour unions, at the national level and particularly at the local level. It includes speculative developers, building-code inspectors, government purchasing agents; it includes bankers and financiers, active and diversified building journals, and a few crosscutting bodies such as the Building Research Advisory Board.

What Hollomon's little effort in government-supported research for the building industry had done was to lift the web so that you could begin to see the way the strands interrelated. It turned out that the man who came to our office represented the brick industry, and that the brick industry manages relationships to craft unions, whose future depends upon bricks, and to clay producers, whose future depends upon bricks, and that it has made a kind of coalition of support with other materials-suppliers whose future depends upon similar old materials. It also turned out that one of the members of the Appropriation Sub-Committee for our Bill came from the State of Ohio, which is the major clay-producing State. That representative was able to get to the head of the committee, a man named John Rooney, who is known in Congress as Mr Economy and who was only too delighted to find a club with which he could beat the Department over the head. And in fact they were able to reduce the entire appropriation to a million dollars—to be spent and to be terminated in three years. There is a dynamism which is sometimes on the level of unconscious activity, and sometimes on the level of conscious conspiracy, to employ the web of the building industry connections to maintain the stable state of the industry. Its aim is to prevent the introduction of new technology and new institutions if these threaten the industry's arrangements.

It's not only the building industry about which this may be said to be true. If you think about the system of services to the blind in the United States, it turns out that blindness services are designed on the assumption that blind persons are young, and of working age, and are absolutely blind—have no residual vision. In fact, the population of the blind over the last 50 years has got to the point where 60 per cent are over the age of 55; almost all of them have multiple disabilities; a great many have residual vision. Yet the blindness system manages to continue to behave as though that were not so. It manages to serve only 20 per cent of the blind. How does it

manage to do this? Through a series of devices which have to do with the selection of clients, with the willingness to take only those 'best clients' that meet the ideology of the service system, with keeping good clients for a very long time in order to make up for the fact that there aren't very many of them, and so on.

These are all strategies of dynamic conservatism. They're not, I think, to be put down as venal or stupid: they are central to the life and survival of organisations. And we manage to sustain them through a variety of strategies which are very like the strategies which sustain our illusions about the stable state, except that these strategies have a kind of sequence to them. The first response is the response of selective inattention—our ability not to perceive what would be disruptive of the system. Ralph Ellison illustrated the strategy in *The Invisible Man*, one of the first novels about American Negroes, in which he pointed out that the Negro is an invisible man because no one notices him. I would also point out that selective inattention is what makes consultation possible. A stranger can go into almost any organisation, and see things which people who have become accustomed to the life of the organisation do not see.

When notice of a threat cannot be avoided it may be possible to launch a counter-attack, or even a preventive attack before the threat has materialised. The nature of the counter-attack will reflect the culture and traditions of the organisation that is doing the counter-attacking. If you can't successfully counter-attack, then you seek to contain and isolate the threat in order to ward it off. The organisation that responds in these ways pays a certain price for its strategies, and I'm reminded of D'Arcy Thompson's statement about biological forms, which was in effect that the form of an object is a diagram of forces in this sense at least—that from it we can judge of or deduce the forces that are acting or have acted upon it. And similarly, organisations tend to reflect both the forces that act upon them and the internal forces that seek to combat those incursions. When an organisation cannot repel, ignore, contain or transform the threat, it then responds to it. But the characteristic response is that of least change: nominal or token changes such as reorganisation or the renaming of a department. In all cases the rationale for the response is similar: it represents minimal compliance with the demand for change. It is particularly effective where those pressing for change cannot distinguish significant from token compliance, or can muster their forces only for an initial assault. Established organisations have this advantage in combating any threat: *they* persist, *they* remain, while the threats tend to be ephemeral.

The roots of dynamic conservatism, I think, are not as easy to understand as the phenomenon itself. One sort of explanation is that offered by Elting Morison when he says, in effect, that military organisations are societies built around and upon the prevailing weapons system. Intuitively and quite correctly, the military man feels that a change in weapons portends a change in the arrangements of this society. The explanation is powerful: it helps to trace multiple connections between technological change, or the threat of it, and the social structure of institutions in which innumerable self-interests have their base. But it doesn't do justice to the rigidity or tenacity of the resistance, and it doesn't take account of what appears to be the non-rational character of that resistance: after all, Naval ships did survive the introduction of continuous-aim firing, and not only did they survive it, but in some ways they were more effective because of it. It's sometimes tempting to describe dynamic conservatism in terms of

stupidity—it's particularly tempting for those who are trying to introduce the change. This is feasible only if we ignore the high intelligence, very frequently, of the individuals who are part of the system that appears to behave in stupid ways. Nor is it adequate to say simply that they're good individuals with bad systems, because that begs the question as to what it is we're looking at.

Things Fall Apart
It helps, I think, to refer again to the concept of uncertainty, because the threat of change is unpredictable in its effects. It plunges individuals into an uncertainty that's more intolerable than any damage to vested interests. And in many ways the function of dynamic conservatism is to protect against that uncertainty. Whereas it's true that the Navy might have been better off after the introduction of continuous-aim firing, that was a perception that came after the fact—and before the fact one didn't know. Before the fact, what one could see was that the ship was in trouble and the system was being disrupted. A social system tends not to move smoothly from one state to another: something has to come apart in order for it to come together again in a new way. And while it's apart one does not have in mind a clear picture of the next stable state to which one is moving. One only has a clear picture of the last stable state from which one moved and of the awful disruption that we're in now.

Now it seems to me there are some consequences of this, consequences for the nature of social change, but in order to get at them we need to spend a minute thinking about the process of social change itself. In the broadest sense, and in the relatively trivial sense, social change is simply any change in a social system over a period of time. But there's a more important sense in which we can speak about it as a transformation. Malinowski talks in this way about cultural change and about tribal societies. He talks about 'the process by which the existing order of a society, its social, spiritual and material civilisation, is transformed from one type to another': this is the kind of change in which he's interested. Walter Rostow talks in this way about technological and economic development. These, he says, are the stages of growth which can be distinguished once a traditional society begins its modernisation: the transitional period when the preconditions for take-off are created, generally in response to the intrusion of a foreign power, and converging with certain domestic forces making for modernisation, the take-off itself, the sweep into maturity, generally taking up the life of about two further generations, and finally, if income rise has matched the spread of technological virtuosity, the diversion of the fully mature economy to the provision of durable consumer goods and services, as well as to the welfare of its increasingly urban and suburban population. It's worth noting that Rostow links the transformation of developing societies to new stages in the development and use of technology within those societies. In his manual of guerrilla warfare, Che Guevara talks about the transformations that occur in the guerrilla band as it perseveres in the war of liberation and moves from the small, informal insurgent group to an organisation which has a structure of its own and is, in fact, the head of a large movement with all the characteristics of a small government.

All these kinds of change represent a change of state, they are transformations of society. These changes tend to have certain kinds of dynamic patterns and the patterns are such that the notion of dynamic conservatism helps us to understand them. First of all, there are thresholds of change, critical levels of energy, that have to be reached in

order to precipitate a change of state. You can bang away at an organisation for a long time without reaching the threshold. If you reach the threshold you may suddenly see events go into a highly volatile and transient mode, and then the further input of energy may have no effect at all because the thing has begun to take off. In between this below-threshold period and the saturation point when input of energy begins to have a kind of diminishing return, there may be a zone of exponential rise in which the process grows critical, becomes, in effect, self-sustaining. For any given system it takes a certain level of energy before you can break the dynamic conservatism of the system and permit it to take off, and then it tends to reach a new kind of equilibrium: a new sort of dynamic conservatism begins to operate, and further input of energy begins to have less effect. But the more important consequence of the notion of dynamic conservatism for social transformation is the very great unlikelihood that institutions will undertake their own change of state. Major changes tend not to come from within: they tend to come about in response to the system's failure or to the threat of failure.

Insurgents, Invasions
The energy required to reach the threshold of systems transformation tends to take the form of disruption and to lead to crisis, and I'd want to define crisis here as the inability of the organisation to carry out the essential functions that it performs for the persons who are within it. Given the dynamic conservatism of institutions, change then occurs in two ways: through insurgency and through invasions. One of the nice examples of this comes from the American Military. If you look over the last thirty to fifty years at the sources of major technological change within the American Military, what you find is that with remarkable 1requency these can be attributed to individuals of a peculiar type: individuals quite comparable to Sims.

Jim McLean, who developed the Sidewinder missile, began by attempting to convince the Navy that the missile was desirable as a way of combating aircraft; they were committed to a contrary system; he was unable to convince them; he built it anyway in his shed at Indio. He stole the parts, he bootlegged the money he needed, he did not tell his superiors what he was doing; but by the time he was in the midst of doing it, the prevailing system had gotten into some trouble. The Navy became interested, they adopted the device, they flew it, it worked, and he was awarded $20,000 for his contribution to the national interest. McLean's Sidewinder story is like Hoover's ribbon-writer in the sky; it's like Rickover's atomic submarine; it's like Goddard's rocketry. These are individual champions who have in effect functioned as guerrilla warriors within the organisations, within the systems. If they succeeded, they became heroes; if they failed, they died a figurative and sometimes a literal death. They were willing to take the whole burden of failure upon their own shoulders, they became insurgents within the system. Nothing short of that was a feasible basis for a major transformation of the system.

If you turn your attention for a moment to the concept of impetus for change from outside, the notion of invasion is of great importance. If you ask where major technological change has come from in the last thirty to fifty years, and if you pay particular attention to traditional industries, whose roots go back to the Industrial Revolution—textiles, graphic art, shoes, leather and the like—the answer is that by far the greatest number of those technological changes which are significant either

scientifically or economically can be traced to the small number of science-based industries. That is to say, they occurred through invasion of the established industries. In textiles, for example, the major development of the last 30 years has been nylon, which came from Carothers at Du Pont. Melamine-finished cottons—another science-based industry invasion—and the whole range of developments from stretch fabrics to crimp yarn that came in the Sixties, were ringing the changes on what you could do with the chemical industry's synthetic fibres and finishes. And it's worth mentioning that Du Pont was making 13 per cent on the sales, while the textile industries were making 2 per cent, during the period of the technological invasion.

I once asked a group of paper chemists what the major technological innovation had been in paper. Faster Foudrinier machines, better ways of getting the white water out? No, no. Polyethylene? I was booed. It turned out that this paper company had made its money by introducing craft paper bags, displacing cloth: they were being threatened by the introduction of polyethylene bags. They retaliated and took their craft paper and coated it on one side with polyethylene. But the polyethylene developed pin holes and the water seeped through: they had a magnificent water trap and it was used for fertiliser bags, and the fertiliser would get wet and it didn't work. So they coated the paper on two sides with polyethylene, which worked beautifully until they discovered that they had enough polyethylene in there to make a polyethylene bag, which they did and on which they lost money—an experience which coloured their reaction to invasion.

Industrial invasion is not the only thing; migrations, too, are of considerable importance as a source of novelty. Think about the impact on American society, and especially the impact on American science, of the migrations of World War Two refugees from Germany. Think about the impact on the culture of American cities of the migration of Southern Negroes. And besides the migration of ethnic groups, cultural travellers—travelling artists, scholars, warriors, troubadours—are virus sources of innovation. During World War Two in the United States, groups of physicists, biophysicists and mathematicians congregated in Washington around problems like bomb-tracking and submarine research. The resulting disciplines were called operations research, which I think you call operational research here. These scientists then migrated back through industry, and the introduction of linear programming and the other devices of operations research can be traced to that cultural migration.

Invasion and insurgency belong to a broader class of roles of change, roles which share in the metaphor of war and battle, rather than in the metaphor of rational process, and these also come in turn from the notion of dynamic conservatism. The family of roles includes the manager who drives for a change from above; the champion who works within the organisation, usually at lower levels, to press for new courses of action; the guerrilla, who is the champion gone underground; the advocate who represents, and seeks a voice for, the powerless; the organiser who unites individuals round issues of common concern; the revolutionary who seeks in open or hidden warfare to overturn existing patterns of authority; the consultant, teacher or bard who transmits the seeds of one culture to another. These are vanguard roles, roles of change, and the dynamics of organisations make them the critical roles of change. All of them put the individual at risk, all of them put him out on a limb, and all of them make of him a marginal man who does not have a central position anywhere.

It is therefore an uncomfortable place to be. What is it that enables a person to sustain that sort of thing? My own view is that—at least in America—the model of the missionary is a very great power. The role draws on deep commitment to a message, a sense of vocation to transmit the message, a willingness, indeed an eagerness, to encounter the danger of efforts at major systems transformation, as long as the religious content and vitality of the message holds.

I think if we take seriously this way of looking at organisational change, we explode the myth that change occurs in rational ways. The notion that it occurs by analysing problems, by evaluating options, by choosing the most effective one and implementing it—that notion doesn't work. Significant change requires sources of power and energy sufficient to combat the dynamic conservatism of institutions, and institutions are not vacuums: one never introduces technology into a vacuum, one is always dealing with the plenum, and a dynamically conservative plenum at that. Change, therefore, is always in the nature of a fight.

If we put together with the earlier discussion what we have been saying here, there is a kind of troublesome consequence. If we have indeed reached a period of loss of the stable state, and if dynamically conservative institutions yield to change of state only through crisis and disruption, then we must look forward to a period of continuing disruption, to a period of continuing coming apart, and it seems to me that these two considerations taken together set some criteria for what it is that a learning system must be. For, given its centrality to what an organisation is, dynamic conservatism is not about to disappear. Institutions will continue to have that character. The question we then have to ask is: on what basis can they have that character, at what level can they have it, so that their dynamic conservatism will be consistent with their ability regularly and continually to transform themselves? This, I think, is another way of asking what a learning system is.