

REITH LECTURES 1967: A Runaway World

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Lecture 6: 'Only connect . . .'

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As an introductory text for these lectures I might very well have taken E. M. Forster's magic phrase: 'Only connect...' All the way through I have been urging you to keep on remembering the total interconnectedness of things as distinct from their separate isolated existence. But there is more to it than that. In most cases the connectedness is dynamic, not static.

The starting-point of any scientific inquiry is exact description, and description always leads us to break down big units into little ones and then stick neatly classified labels onto the component parts. But in complex systems we are inclined to oversimplify the pattern by which the parts are fitted together. A static complex such as the interlocking arrangement of the gear wheels of a watch, is a much easier kind of model to hold in the mind than a dynamic complex, such as the organisation of a machine in which all the component parts function in three dimensions and are made of elastic. Because of this, our education, which lays so much stress on tidy, over-elaborate classifications, makes us think that society ought to be organised like a watch rather than like a jellyfish. This bias produces conservative-minded people who take fright whenever they come up against the fluidity of real-life experience.

But there is also another reason why the traditional emphasis on classification has become inappropriate to contemporary education. It is becoming less and less important for the scientist to understand just what are the component parts of the natural world; the essential thing now is to know how the system works, how the bits fit together. If you give your son a radio kit for Christmas, the bits and pieces are just so many black boxes. Unless he is a very unusual boy he does not understand in detail what these objects are; but he doesn't need to. Provided he follows the instructions carefully, he can assemble the parts into a radio set and it will work.

Now I realise that the assembly of prefabricated machines is usually considered to be a very low-grade kind of activity. At school the first introduction to science consists of taking something to pieces—dissecting a frog, for example; the much more creative operation of putting things together so that they work as a system is rated child's play, not learning. I suggest that it is time that we turned these values back to front. 'Only connect...' It is not the bits and pieces that matter but the evolving system as a whole. And we are part of the system. I keep on repeating this, but it really isn't so easy. For centuries our whole education has been built up around the assumption that we rational human beings stand outside-the system and that the human capacity for understanding the processes of nature by taking things apart has no limit. But it has. The runaway world is terrifying because we are all gradually becoming aware that simple faith in the limitless powers of human rationality is an illusion. Quite ordinary unsophisticated people are beginning to be made aware of the implications of Gödel's Proof.

That sounds like a piece of one-upmanship. I must explain what I am talking about. Kurt Gödel is a mathematician who, in 1931, demonstrated that there are limits to what can be shown to be true by mathematical logic. The implications of this are very complicated but one aspect of the matter is this: Gödel seems to show that because the human brain is an apparatus of a particular kind which is only capable of ‘thinking’ in a particular way, there are limits to what any particular individual can know to be certainly true. Gödel also shows the importance of distinguishing within any field of our experience that part which is ‘consistent’ and which is on that account susceptible to completely rational analysis, and that part which cannot be shown to be consistent and which therefore might contain elements of choice, uncertainty, imagination and so on.

One inference from all this (which is relevant to what I have been saying) is that we shouldn’t always expect the products of human imagination to fit tidily with the categories of thought which we possess already. We should expect the total framework of knowable truth to keep on evolving and expanding and changing shape along with the developing refinement of the categories which we use to describe it.

Let us consider how this affects my earlier proposition that ‘men are machines and nothing more.’ First we must get away from the idea that the concept of ‘machine’ can only appropriately be used to describe artificial pieces of inorganic apparatus like motor-cars and radio sets. The important thing about a machine is the way it works and what it does. And my point is that we can ask these questions— ‘How does it work?’ ‘What does it do?’ —not only about things like motorcars and radio sets but also about organic processes and even about social institutions. But, having said that, we must then understand that there is a difference between machines which are fully ‘consistent’ and machines which are not. For example, if I have a mechanical calculator and I instruct it to add together two and two, then the form of its response is exactly predictable; the apparatus behaves consistently. If, however, I ask you to write on a piece of paper the sum of two plus two, I can’t predict what you will do—not even if I am quite sure that you know the right answer and that you are willing to co-operate: for some of you may write the word ‘four’ in capitals and some in small letters, or if you were to write the answer in figures you could do it in all sorts of different ways. But the striking thing is that this variation in behaviour on your part would make no difference: you would still all be giving the right answer.

The general point is this. It is a peculiar feature of the human communication system that if an individual A wants to say something to another individual B, he can convey his message through an indefinitely large number of alternative channels. Yet, provided A and B both share the same cultural background, B will always understand what is being said. That is a very astonishing kind of circus trick which no man-made machine could as yet come near to achieving. You may be a machine of a sort but you are not just a piece of clockwork.

This human flexibility, which permits us to respond to external stimuli in a variety of different ways, should be very reassuring. We are not completely bound by what has happened before. It is natural to man, just as it is natural to any other animal species, to order his environment by fitting it into the categories of his expectations. We thus come to attach emotional value to the descriptive words by which our parents and our

schoolmasters have explained the circumstances of existence. As more and more data accumulate we try to fit it all into the simplified slots which early education provided; when we fail to do this, panic ensues; the world seems to be running away, we are rushing headlong to chaos. The jobs we have to do just won't fit any more with the official regulations and the trade union rule book. But you don't have to rely on the old established categories; you can invent new ones. Your reserves of intellectual capacity are very great, and if things seem chaotic this can only be because you have never seriously tried to make use of your potential ability to cope with the unexpected. Believe it or not, every one of you is astoundingly inventive and resourceful. Your linguistic behaviour demonstrates this quite clearly. When you are chatting to a neighbour on a bus or gossiping over a cup of tea, a great many of the things you say are simply repetitive phrases which you have uttered many times before, but every time you engage in serious argument you can spontaneously invent huge chunks of brand new sound pattern which no one in the course of human history has ever heard before, yet you and your listening audience can both immediately understand what is being said. Creatures with god-like powers of this sort have no need to be afraid of the complexity of changing situations.

I am not asking you to be smug. There are factors in the situation around us which scare me out of my wits, but it is not change that fills me with dread: just the opposite. What is really alarming is our immense reluctance to alter our expectations. Take weaponry, for example. The monstrous arsenal of modern armaments is manipulated by politicians who talk as if the concept of national sovereignty had remained completely unchanged ever since the 18th century. Generals who can fire rockets to the moon conduct their debates as if everyone were armed with bows and arrows. The real danger here is not the sophistication of the technology. It is the antediluvian mentality of the military advisers, and of those whom they advise. These prehistoric attitudes have their repercussions right across society and in particular they demoralise the young.

For example, one of the more surprising features of the contemporary scene is that, despite lavish financial prospects, large numbers of exceptionally able young people resolutely decline to pursue an orthodox scientific career. Candidates for university social science courses are turned away in their hundreds while vacancies in the traditional natural sciences go begging. The phenomenon is quite recent, and it may be temporary, but it isn't peculiar to Britain: it has been reported from all over Western Europe and from the United States. All sorts of explanations have been suggested: some are just silly, such as that schoolboys think social science is easy and that they would rather not go to university at all if it means doing some hard work; other explanations seem more plausible, such as the argument that the great demand for trained scientists ever since the war has meant a decline in the quality of science teaching in schools, so that schoolboys get the idea that pure science is dull. But quite a lot of the trouble seems to result from straight emotional distress. The young are just appalled at the way that science is being used: Hiroshima, Vietnam, Dr Kahn's calculations of mega-deaths... And even when the experts give over planning the total destruction of humanity, they contemplate quite casually the destruction of nature itself. 'Let's build an airfield at Aldabra. It will only cost about 20 million pounds, two or three rare species of animal, and the lives of several million birds. No one has ever heard of the damned place anyway.'

Aldabra, in case you don't know, is a small island in the Indian Ocean, the principal home of the Frigate Bird and the Giant Tortoise and one of the very few natural zoological laboratories still remaining anywhere on earth. Until a week or so ago, despite the most vigorous protests by the whole scientific community, the British government had planned to destroy the place just to provide a temporary staging post for the air. It is only the sterling crisis and the reluctance of the United States to join in which has at last persuaded the authorities that this is an extravagance we cannot afford. So devaluation has at least prevented you from aiding and abetting an international crime. What horrifies is not that air marshals should contemplate such things but that the whole administrative machine of our country, including ministers in the Cabinet, should operate with a system of values which makes such action seem morally respectable. It is the bland unquestioned assumption that national interests always override human interests and that what is man-made and artificial always has priority over what is wild and natural.

For me such attitudes are criminal - criminal in just the same sense as Hiroshima was criminal and Hitler's attempt to exterminate the Jews was criminal. The scale is different but the offence is of the same kind. It is the monstrous misuse of man's newly discovered supernatural power. Actions of this sort can only occur when the decision-maker is totally disorientated about the relations which link ourselves to other people and mankind to nature. But it is men who are blameworthy, not science. Science in itself is neutral: It is neither cohesive nor disruptive. In the hands of men of good will it intensifies understanding and connectedness; in the hands of the sick it is an instrument of violence and alienation. The young observe the sickness of their elders and they refuse to be corrupted. But this is a grave matter, for the future certainly lies with the men of science and it is altogether essential that they should be men of imagination and men of good will. The last thing that we can afford is to abandon the laboratories to military maniacs and politicians.

What then is to be done about it? My purpose in these talks has not been to preach a sermon but to try to show you how things are—that is to say, how you are in relation to the rest. Of course, there are lots of aspects of the world around us which are, on the face of it, 'in a runaway condition': population growth, technological growth, the destruction of Nature, to name only three.

The popular delusion is that such issues constitute problems which can be solved by pursuing the right policy. What I have been saying is that there cannot be any right policy in the traditional sense, because any policy to which values like 'good' or 'bad' could be attached would simply represent the advantage of some particular group of people—the whites as against the non-whites, the haves as against the have-nots, the old as against the young. But you will find no respite to your anxieties by trying to opt out. The 'it's-none-of-my-affair, let-them-get-on-with-it' attitude will, in the long run, only make you more panic-stricken than before. What is needed is that you should come to see where you fit in. The more that each one of us can come to understand the over-all interconnectedness of things, the more likely it is that we shall collectively generate an attitude which will not result in self-destruction. What is important is not that you should know what to do, but that you should feel really deeply that all parts of the system are of equal importance.

Let's go back to the beginning. All animals cope with existence by fitting their experience into categories which they expect. This essentially is what we mean when we say that, by the process of evolution, animals become adapted to specialised environments. If the experience cannot be fitted into the expectations, then the animal cannot behave in an appropriate manner and it fails to survive. Human beings, like all other animals, are strongly motivated to try to fit new experiences into old categories—to make it seem as if what was happening corresponded to our expectations.

In this respect our human ability to form verbal concepts and share them with others provides us with enormous flexibility, and this seems to be the principal factor which has worked to our adaptive advantage in competition with other animal species. Human beings are superior to other animals because they have wider choice in the way they can slot experience into expectation, and because they have developed a greater variety of systems of communication. It is our capacity to communicate rather than our capacity to interbreed which has in the past saved the species from disintegration into a number of specialised sub-types, and if we are to maintain our human cohesion and human dominance it is essential that we allow these two advantages to go on evolving. We must act positively so as to inhibit the tendency for individuals and groups of individuals to separate out as specialised non-communicating systems, and we must stimulate the young to elaborate and enlarge their expectations in imaginative ways, so that even the most bizarre new experience can be treated as plausible, and therefore subject to control.

These are simple phrases, but they have deep implications. They imply that every manifestation of national consciousness is an evil; that respect for tradition is an evil; that every vested interest is at all times open to challenge. They imply a political philosophy of continuous revolution, a persistent disrespect for all forms of bureaucracy. And of course very few of you could possibly accept such a doctrine. But there you have your choice. You can go on believing that the world ought to be an orderly place even though the quite obvious absence of order fills you with terror, or you can revel in the anarchy and thereby recover your faith in the future instead of hankering after a long dead past. Most of us are far too deeply embedded in our conventional orthodoxies to embark on such an adventure, but at least we have a duty to show the next generation where they might choose to go. It is the underlying attitudes implicit in our educational system that need to be changed.

European learning over the past 2,000 years has rested on the assumption that all the essential categories of thought had already been devised by the fifth century B.C. The art of civilised living has consisted of slotting all new experiences into Ancient Greek categories and then we knew how to cope. This expedient has worked surprisingly well for a surprisingly long time, but it has now completely broken down. We must face up to this. Education must show quite explicitly at every level that the battery of concepts borrowed from Plato and Aristotle and the Bible, which served so well in the past, is not adequate for the 20th century. If the old want to regain the confidence of the young, then the first thing they must do is to give up the pretence that they know everything already.

Education should also pay much closer attention to the way our attitudes are controlled by language. The young are taught to think that they are permanently engaged

in a military campaign—they must ‘triumph’ over their adversities, they must ‘conquer’ outer space, they must ‘gain victory’ over disease, they must ‘defeat’ international communism—but this is the language of fear, of petty-minded people who suspect in their hearts that they are going to be overwhelmed. What is needed is greater confidence. Young people need to be shown that they are already in a position of supremacy: their problem is not to conquer the environment, but to look after it. And we must get out of the habit—which arises from the way our schools are organised—of thinking that reason and imagination are two different kinds of ‘thing’, that the truth of mathematics relates to one kind of fact and the truth of poetry to something quite different. We are all together in one world and what we are conscious of is one experience.

The unique and astonishing thing about human beings is not simply their capacity to observe and analyse the contents of the world around them, but their capacity to create. Every one of us is an artist with words. We create brand new sentences; we don’t just imitate old ones. And, as you speak, you generate consciousness; what you create is yourself. That is a god-like activity.

It is time that we had done with the idea that humility is a virtue. As long as we are taught to be humble we shall go on using our imaginations to create enemies on every side—communists, vermin, bacteria, viruses, flying saucers—and we shall go on feeling that we shall only be safe if we sterilise our surroundings with bombs and chemicals and lethal disinfectants. What the young have got to learn is that they are masters of the situation; they can afford to come to terms with their surroundings, rather than obliterate them.

This is a lesson we have had to learn many times before. Ever since human language first created a world full of separate species, human beings have been trying to understand just where they fit in. Are the wild animals our friends or our enemies, our neighbours or our relatives, our masters or our servants? Today’s monsters are of a different kind—strange political systems, new diseases, new drugs, machines which think—but the old problems remain. Are the ‘others’ enemies or friends, servants or masters?

Well, what did we do about it in the beginning? We do not know much about how our first ancestors lived, how they talked, or how they owed respect to leaders, whether they had organised families or whether they killed one another; but there are one or two rather odd and surprising things. We know for certain that even 30,000 years ago there were artists in the south of France, who could paint bulls and horses with the assured mastery of a Picasso, and we know—or at least we think we know—that long, long before that men began to cook their food instead of eating it raw.

Now it isn’t a biological necessity that you should cook your food, it is a custom, a symbolic act, a piece of magic which transforms the substance and removes the contamination of ‘otherness’. Raw food is dirty and dangerous; cooked food is clean and safe. So already, even at the very beginning, man somehow saw himself as ‘other’ than nature. The cooking of food is both an assertion of this otherness and a means of getting rid of the anxiety which otherness generates.

But what about that Stone Age Picasso? Just what the prehistoric artists of Lascaux thought they were up to when they painted their bulls and their cows and their horses and their swimming deer is anybody's guess, but here too it is a case of taming the Other. The pictures show large and dangerous wild animals, not men. To make a painting of an animal is to transform it—the painted animal is like cooked food; it may be powerful but it has ceased to be dangerous, it has been brought under control. And it surely deserves remark that although, with rare exceptions, all the animals depicted in the ancient cave paintings of southern France and Spain have their modern farmyard descendants, these species were tamed by the magic ritual of paint many thousands of years before they were tamed by domestication.

Art and poetry are the power to transform, the ability to take nature to pieces and recreate it; it is dangerous but it is magical, and it has been man's heritage from the beginning. The moral of my prehistoric parable is that if you really want to find a way out of our modern dilemma, you should talk with artists and poets rather than with university dons. But let me repeat once more: divine inventiveness is latent in us all—in you and in me—it is not reserved for genius. But do not forget that it is the power of destruction as well as the power of creation. By all means let's make the most of our powers and enjoy our struggles with confusion, but at the same time, whenever we assert dominance over the universe, let's remember how things are connected up. The good and the bad, the weak and the strong—all have a right to exist. When next you spray those beans with insecticide, just pause to think how impoverished the world will be when the hawks and the owls and the butterflies have entirely disappeared—which won't be very long either. And likewise when your good liberal conscience next leads you to support some political crusade for the rights of national minorities, bear in mind that the other side of that penny is the fragmentation of the world, the violence between black and white, Pakistani and Indian, Sinhalese and Tamil, Turk and Cypriot, Jew and Arab. It is nationalism, not technology, which is our contemporary disaster, the lamentable delusion that only the separate can be free.

And that is the sum of what I have been saying. We can never be separate. We live in an evolving society as part of nature. In nature species do not evolve in isolation but in combination. The species which survive are the 'fittest'—but fitness to survive is a very complicated matter, it is not just the equivalent of ruthless efficiency and aggression—'Nature red in tooth and claw' and all that stuff. A species which is so efficient that it eliminates all its competitors is likely to find that it has destroyed its own food supply. To be fit to survive you must be content to share your living space with other living things. You can be as free as you choose; but only if you choose not to carry freedom to excess. If we choose always to ignore the interests of our neighbours, whether they be human or subhuman, we shall in the last chapter, simply be dead.

'Live and let live' is not a heroic creed and, as a panacea for a world out of control, it hardly seems adequate to the circumstances, but the problems ahead are too big for heroic solutions. It is attitudes, not actions, which matter now; and certainly if all men believed in tolerance we should not need to fear the bomb.

But tolerance is not such a negative creed either. At the beginning of these talks I said that we must recognise that we are now responsible for the future. We cannot 'leave it to Fate'. But that does not mean that we must plan the future in detail: the

most that we should try to do is to determine the general direction in which things move, we cannot inhibit the curiosity of the scientists; they will explore the secrets of the universe as they choose. But we can determine, in a general sense, how the knowledge of the scientists is exploited so that it affects the lives of the rest of us. If we had all been educated so that values of toleration instead of values of aggressive competition were uppermost in our minds, we would take it for granted that long-term problems of nature conservancy were much more important than short-term problems of air defence; we would recognise at once the absurdity of building aircraft carriers and the utter barbarity of flogging schoolboys. Since we were not educated that way, we are still frightened and vindictive but at least we can ensure that those who come after us are a little more civilised than ourselves.

But if tolerance is too difficult, let us at any rate be optimistic and self-confident, If the prospect of a runaway world fills you only with dread rather than excitement, If your private prognosis of the next 50 years includes mass murder, mass starvation and the dictatorship of a nameless machine, then I can only beg you to take courage:

Men at some time are masters of their fates.

We *could* act like gods. That does not mean that we can control the universe but that we can act confidently with a sense of purpose. I have said it before. Gods are no more likely to achieve their private ambitions than are mere men who suffer the slings and arrows of outrageous fortune; but gods have much more fun.