

“THE RENAISSANCE” (talk to engineers)

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Gentlemen, I think you probably received my paper. When I came back from the bush on Monday, I had a look at the paper to see whether I could read it and how I might read it to you and I decided that it was an impossible task. The paper is too convoluted and goes too much into detail. So what I intend doing in the next fifteen minutes is talking to the same matters and saying pretty much what's in the paper but saying it just straight down the line.

In trying to make any sort of forecasts that are going to possibly hold up, you have to look at the broadest sweep of changes that are taking place. It's no use looking for the details of changes. They are pretty unpredictable. If you are going to make any sort of reasonable forecast, one that might hold, you have to find some sort of broad change which is already well under way, because most of those things that determine the shape of our future, twenty or thirty years from now, you will find at any time of history have already been well underway. Now there is such a change taking place, a change that concerns you as individuals, citizens and certainly concerns you as a body of consulting engineers. There is a very broad change taking place which is a major historical change.

You can put it very simple if you like. It has been a shift from a position, where say in the early part of the 60's anyone who was professionally consulting on the design of a production plant, taxation office or how to construct a major piece of gear like a bridge, would have felt that there was only one model which would provide an efficient solution for organizing large numbers of people of varied skills, with large amounts of money and equipment to get the job done. Only one efficient way was recognized and seen in the early 60's.

Now throughout the 60's we saw something quite different starting to occur. People were beginning to recognize that there was an alternative way. An alternative way, which went back culturally to the way in which the engineers built the canals and railways of Britain; back to the butty gangs system and so forth, but standing in marked contrast to what we had come to take as necessary. Come to take as necessary because engineers like yourselves and Frederick Taylor at the turn of the century identified a form of working which would make the stuff go, and go profitably. The label for that form if you like is the one we generally use which is a bureaucratized form of working. At the heart of the bureaucratized form of working is the master servant relation. The assumption that there are some people who are fit only to take orders and there are others who, for one reason or another, are capable of giving those orders and giving them in time and with sufficient accuracy.

That assumption came very much under challenge and since the 60's, working from the first instance in places like Scandinavian and some of the key places in British industry, that has become the overwhelming trend. So now in the 70's we can find that, throughout the Western World and throughout the Soviet Union, on our latest information, there is a determined effort to replace that form of organization; to do in all their plants, whether it is white collar or blue collar work, what Volvo tried to do at Kalmar and pretty successfully tried to do. If you look at this in terms of the degree of quantitative evidence, of shifts and changes of governments and employers and unions and those who are connected with employers and unions, in the production business, and

managers' with you engineers, your personal officers, your time and motion study people and so forth, then the quantitative evidence is overwhelming.

Even in the last couple of months, last September somewhere around this town, the Australian Council of Trade Unions adopted a National Trade Union Policy on the democratization of the work and the elimination of the master servant relation. Now that's not a bad effort for a union movement like ours. On the 2nd August last, the British Public Service Commission, of all people, publically gave a press release to 'The Times' of London indicating that they had adopted, as a policy for the British Civil Service, that the master servant relationship had to go out of their social security offices and all the other places in their territory. Now from a body with a history of conservatism and elitism, like the British Public Service, that is not a bad effort and that statement did not just come out of the blue. It came after five years of experiment in their various offices up and down the country and five years of negotiations to get the blinking unions out of the way, because the unions had built their defences around the assumption of a bureaucratic system.

Just last month the Norwegians and the employers working for the Norwegians in the North West Gas and Oil fields, felt the teeth of Article 12 in the new Norwegian law on working environment. It was made very clear to them in closed sessions that any further production platforms built up, from Statfjord 'A' further north, are going to have to be designed and manned in a non bureaucratic fashion. In other words designed with the master servant relationship out of them. The quantitative evidence of that sort of shift is there. We also know the dangers of making predictions into the future which are simply extrapolations of quantitative trends.

Now that worried me and my major Norwegian colleague, Einar Thorsrud, quite a bit so that when we published our report on the first experiments in this field, on the first major set of experiments which we were done in Norway through the 60's with the support of employers, governments and trade unions, when we published that report, even as recently as the last edition which I think was early 75, we closed by saying we had some doubts. What is going to happen if the western countries run into an economic decline and recession and we again face the possibility that labour is cheap. Because when labour is cheap there are positive advantages in moving towards a bureaucratic form of organization, to adopting the basic threat of the master servant relation. And we had some bad doubts.

I no longer have those doubts because I have been involved in the past year or so at the request of the national Youth Council, who had Toffler in here a couple of years ago to tell them what their future is and what youths should be looking for in Australia and all the rest of it and that was a pretty disappointing thing apart from being a future shock. And in going back in detail over the history of what has happened in our societies in the post-war period, it has become clear to me (I think amply evidenced although I am not going to give it all here today naturally), that it has not just been a revolution in organizational forms, a revolution shifting from bureaucratized to democratized form of work, but that in fact a much deeper cultural change has taken place in our society. A cultural change which undoes many, many centuries of accepted ways of organizing ourselves.

That cultural change you can put in simple everyday terms that we throw around. One, this notion of affluence we throw around. I would say it has become clear since the

massive build up of war-time production in 1944 which affected not only the Germans, despite all the constant heavy bombing raids but the Russian and certainly affected our side. Where the Generals were literally given more blinking material than they knew what to do with and when they came home from the wars, what did they do? They left the stuff rotting on Pacific islands because it wasn't worth bringing home. We demonstrated to ourselves that we have reached the stage where it is not necessary for any man to starve. Now many go on starving, sure. The picture is grossly distorted. That doesn't really matter. Many go on to starve but we know that the potentiality is there in our ability to produce and organize ourselves around production and distribution. Now when people know that ability is there, that effects the way they think, even before they realize it themselves. One of the major things it does, when you take the notion of scarcity, necessary scarcity, out of a cultural system is that you have lost the justification for saying, 'well some people are going to have to starve because we have to keep some alive for survival of the race', and therefore you set up an institutional structure which makes sure that the nicer people and the best people get well fed. That assumption drops out.

The second one. The Russians and the Yanks within 10 months of each other, between 52 and 53 blasted off thermo-nuclear weapons. They weren't weapons, they were devices at that point but they knew the weapons were on the board. Now the leaders in the countries at that time, this is talking about Eisenhower, we're talking about Malenkov and so forth, they very quickly realized that with the advent of thermo-nuclear weapons, in the hands of both those parties, there was no way that any issue was going to be settled that might require a major war, because a major war would mean destruction, not victory to anyone. With that you pulled out another basic prop that has underlain certainly English societies, since the 11th century when the justification, the *raison d'être*, for establishing control (they were feudal controls then) was that the lord and master of the feudal territory had the right to enforce individual sacrifice for the survival of the group. With that going out another of the basic props has gone.

We saw some rough attempts through the 60's to try and build another alternative supplementary justification for maintaining those sort of hierarchical forms of domination. So in the 60's we had the great wave, and very temporary wave, of meritocracies. Planning became the great thing all over the world. If you had planned to put men on the moon then you could plan to get efficient garbage disposal you could plan to eliminate delinquency you could do this and you could do that, and Lockheed of course sent their systems boys out taking up contracts all over the States trying to do precisely that. That was a very short wave enthusiasm. It is a dead as a bone now. No self respecting body or government at local, State or Federal level in America would publically go to bed with those sort of planners again. They were broken on the backs of demand for participation.

This is what I think has happened, through no one's planning, because the military boys did not have this in mind certainly when they pushed ahead to develop their thermo-nuclear weapons, the production people did not have that. It was like when they pushed for the full utilization of the resource capabilities of the land, mostly unused through the 30's but still gradually growing. The people who pushed for that did not think that they were undermining the society as they knew it. I think in fact that they have done precisely that and I don't think that there is any way of turning back unless someone can devise a new form of going to war where you might win. And all of the argy bargy we get

from the military scientists seems to have done nothing more than provide themselves with a good market, because as soon as the Russians start doing something the Americans go to their president and say, 'well we've got into this weapons system too', and the President has to say, 'yes'. So they are off again.

In Krushchev's memoirs, which Crankshaw thinks are probably genuine, there is a beautiful discussion, a person to person discussion, between Krushchev and Eisenhower showing precisely how they play this game one military system against another, when no one in their right mind does, for one moment, believe that anyone of them is ever going to undo what was produced in that brief 10 months, 52-53. Those people can play their games, but, what I am saying is that the ordinary people, right back to the youth and not necessarily the very educated ones, are well aware that this is a different society. They are well aware that there is no good rationale for demanding that the individual should sacrifice himself to the State and be prepared to train himself to go to war. That is Gallipoli's are not on again.

And such a follow up from that, a sequitur, they do not believe that they should in any such way sacrifice themselves to those vast institutions which have always propped up the State. You try to scare a Roman Catholic about going to hell and burning for eternity. You're not going to get anywhere. And when the priest tries to do it to stop them using the pill, they don't get very far either. And if one Pope wants to turn the clock back, while he is busy turning the clock back you can look at the statistics of changes in behaviour and attitudes of the people that are supposed to be the loyal obedient servants of the church. I just take the church as an example. You could take the Australian Cricketing Board or you could take the RSL. Wherever you turn you find the same thing. The very notion of loyal subservient members of institutions – it doesn't even apply in Mr. Fisher's organization. The old concept of the civil servant is very far gone. That's why I suspect it's not Mr. Landsdown's paper he's giving either. It's happening everywhere.

I mean mention this now because it's clear that there has to be much more discussion about the re-interpretation of the years since 1944-45. I do think this is why we get the pressures for participation, not only in the work place which is where I have been studying it and working at it since 52 but why we get it throughout the community in every aspect of our society. Whether it's women refusing to be put back into their rightful positions or children. It doesn't matter. Whether you turn to trying to plan as an engineer to advise a government or local authority how best to solve a traffic problem, then you know that you can't do it in the old ways not in quite the old ways, because there are going to be people who say, 'well look, we want a say in this because this is going to effect us'.

Let's go straight on to the implications. There are three major implications. Firstly, I do think that it is relevant to you in a very immediate sense in the way in which you run your own organizations, right from your partners, who are the consulting engineers, to the draughtsmen and the office boys and the typists you have in your own organizations. I think you have to look to your own ship and get it in order. Now that should not be difficult for you, because you know yourselves that the better partnerships have practically always in the past, allowed for the individual partner to be very much his own boss; that the notion of self management in professional groups like yours has been the tradition. And when I say professional groups like yours I would extend it to lawyer's

offices to management consultant's offices and the like. It should not be very hard to capture that, provided you can get over the difficulty that you don't need servants, not even as typists. You need people who are prepared to type and pull their fingers out and get a job done smartly when it needs to be done; to react to the requirements of the group. That's I think essential, because I do not think you can go out, if you find yourself in a position where you are going to have to give consultant advice, and advise persons that they had better man plants in a democratic way. You cannot very effectively do that if in your own household you run it like a mini-bureaucracy. We had that at Tavistock over to re-establish those roles because we had fallen into the trap of having an executive committee and then the gradings and the rest of it. With the Centre of Continued Education in Canberra the same thing. We found that we would live with this contradiction of saying this, 'is good for you', and yet continuing to behave in the way we did, with all the academic strata structures and a so called 'director' and that sort of stuff. So we had to undo ourselves some three or four years ago and it certainly had the results we wanted. We got about a 75% improvement in productivity over the past 3 or 4 years without even paying for it. Now that's simple and straightforward.

Secondly, and this goes a little closer to the bone to your professional pride, there has been some discussion in your journal, (because I have been looking at your journal to see what you are all about and also to see what my own son's gone into – to see what sort of world it is), and it's clear that you are beginning to recognize a wider responsibility for what kind of advice you give. A responsibility that goes beyond your immediate responsibility to the client. I do not think that you should give advice about any sort of structure, plant or machinery, that is going to be used by people, unless you give advice on what is in fact the socio-technical system necessary to make it productive or effective. I think you cannot afford to stop short with just giving a technical design, doing the Pontious Pilate act, and say, 'well go ahead and do it'. This is still happening here and we have got a couple of prize examples in this country which are going to cause us major headaches, and I'm not thinking of Redfern, that's another engineers' delight. I am thinking of the recommendations made by bridge consultants to your NSW Transport Commission for the setting up of the Chullora centralized workshops. That was done as straight engineering job. They wiped their hands without even thinking what is necessary for that to be an operating, working, productive, useful contribution to this life here in NSW. They just did not even consider to think that that thing they are recommending had to become an effective socio-technical system. It was enough to them to recommend a technical system and when you look more closely at it you can see that you couldn't have given worse advice.

We have another one, the Westgate Bridge. The Westgate Bridge is going to be like that thing down in Rio de Janeiro, beautiful, magnificent, when it's finished and you can see it in a large photograph. But when that design was put in they did not even stop to think that that was going to take some years to construct and therefore the construction of that bridge was going to be a socio-technical system. It wasn't going to be done by cranes without crane drivers. It wasn't going to weld itself together. And when they got half way through the blinking thing, after the crack up and they tried to get it moving again, then, belatedly, they started to look at it as a socio-technical system and then, belatedly, tried to work out how to do it. Well of course by then they had got themselves a massive network

of union controls over the job and while something was done it had to be done all around the back and in the dark, literally in the dark. Those sort of things are still occurring.

On the other hand we have got some outstanding examples, where right from the Board decision, or the primary decision about the level of investment and the product areas they are going into, and possibly the supplies, where in fact socio-technical designs has entered right at the scratch. Not just the technical design and then throw it to the personnel officers to man the thing. No way. The Tees port refinery that Shell built in the UK in the latter 60's was a beauty, because it started right at that point and worked like a charm. The Kalmar plant, the same way. They ran into a bit of strife later but that was because there was a mismatch between the industrial culture that the general manager brought in and what the planned intentions were for that socio-technical system.

The third point is to recognize that along with all this other demand for participation, along with this basic reversal in the relationship between individuals and organizations – a reversal where individuals will not accept that they should sacrifice themselves for organizations but on the other hand in reversing if they expect organizations are there to serve them – the role of the expert in just about every walk of life, whether he's looking after your soul or advising you about a bridge or a plant, the role of the expert has been very thoroughly eroded.

It's no longer possible for any of you, I should think, to go down to give advice about building freeways or road systems through Geelong in the way that Wilbur Smith did some 10 or 12 years ago. Wilbur Smith could come in and give their expert advice then run up against the fact that the people of Geelong, or many of them, were not going to buy Wilbur Smith's expert advice and they demanded that the thing be re-opened. And they demanded that they participate in looking at the re-opening of that question, and came out with a rather better solution for Geelong.

This erosion of the role and respect for the expert, does confront the consulting engineer with having to be prepared, not only come up with good ideas, but also to be able to work with other people whom those ideas are going to effect, to help translate them into practice. Many places of course are writing that into your starter's orders. It was written into starter's orders when they re-opened the question of the Geelong Freeway and I guess it is being done in an awful lot of other places now. That trend is not likely to reverse unless you can reverse this major cultural revolution which has taken place.

Something I did not touch on in my paper and I realized afterwards that I should have, is that you have one way in which you might be able to make your own future. That is in the way in which you contribute to changes in the education of engineers. You know at the present time yourselves, that the education still falls so short that you are not in a position in a small consultancy anyway, to take a new graduate into your organization. You just haven't got the scope to do all the necessary educating that he needs, to be able to effectively go out and do the sorts of things you do. And it is not just experience it is lack of education.

There are several items I think should appear in the education of any engineer. I don't care whether it is mechanical or electrical or anything else. Any engineer who is going to give advice, or bring into being something that people have to work with, or use, I think that engineer, before he gets out of university should, (1) have had some degree of training in socio-technical analysis. Now that is possible. Eindhoven were doing it for

many years (that's in Holland – a place along side Phillips headquarters). Groningen were at it for quite a period of time and the University of Bath in Britain were at it. It can be done and it is every bit as meaningful as teaching English and report writing to engineers.

(2), I don't think any engineering student should come out unless he has had some experience working out in the field with workers, in these workshops where the workers are actively engaged in re-designing their own work and the interface... or whether it's for community design. It's a proven technique. Some of you may have some interest in aviation. Well that Hawker Siddeley 146, the BA146, which was unveiled about 2 years ago, was designed in a search conference back in 1960; the essence of it was designed there. It was a break from the tradition in aircraft design. I could mention a series of other British industries that have been pretty fundamentally transformed by engaging in this. I think that engineers, before they come out of University ought to realize that that is the kind of process that they are going to have to get involved in if their expertise is not to be a waste of time.