Acting in an Uncertain World

An Essay on Technical Democracy

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Prologue

Friday, 17 December 1999. French Prime Minister Lionel Jospin is simultaneously celebrating the end of the century, the New Year, and the renewal of ties between France and Japan after years overshadowed by the resumption of nuclear tests. In front of representatives of the French community assembled for the occasion at the French embassy in Tokyo, he embarks on the summation of his speech: ''In my name, in the name of the French government and of the French people at home, I bring you my most sincere calves [*veaux*].'' Surprise in the audience, and then mild amusement. The prime minister, who, like everyone else, knows from the great Sigmund that no action is more successful than those we call slips, immediately corrects himself: ''No thoughts about mad cows will be admitted. Please accept all my good wishes [*vœux*]. There you are, this shows how weighty this issue is.''

Not content with frightening European consumers and poisoning relations between France and England, the mad cow trips up a French prime minister on a foreign visit. This peaceable ruminant is suddenly transformed into a dangerous political animal that everyone should be wary of! Beware of the cows for they are no longer guarded!

By escaping from the enclosed pasture where it grazed in peace, the mad cow helped to spread the news that some had already had a premonition of for a long time: relations between science and power will never be the same. To make the right decisions, we thought, all we had to do was rely on indisputable knowledge. Now we must take decisions—no one can avoid doing so—just when we are plunged into the greatest uncertainty. What exactly are these prions that in a few months have become as famous as Saddam Hussein? What are they capable of doing? How far are they ready to go to make our life unbearable? An insidious, invisible enemy is amongst us. What is to be done when no indisputable fact or expert can reassure us? And as if there were only prions to torment us! The bustling

whirl of radioactive waste, genetically modified organisms, and greenhouse gases give us sleepless nights.

The politicians are helpless. Some lose their heads, as if already affected by prions. In order to calm that new god, public opinion, an English Minister of Agriculture invites television cameras to witness the spectacle of his young daughter Cordelia biting into a British hamburger with gusto! How brave! But more to the point, had he taken care to get her to sign a statement of informed consent? In former times a king did not hesitate to sacrifice his daughter in order to placate the gods. But he had the decency, dare we say civility, to explain to her the gravity of the situation, indeed to convince her of the grandeur of an action that should save the country. Agamemnon is hard, but he hides nothing from Iphigenia, who ends up sacrificing herself for the common cause.

Every nation reacts in its own way. France with its slips of the tongue, England by playing Russian roulette for the media, and Japan—the Japan from which Lionel Jospin cannot hide his concerns—by importing procedures devised in the West for dealing with these difficult and increasingly numerous cases which mix together sciences, technologies, and societies without restraint, infinitely complicating the political decision makers' task.

The anecdotes that follow are drawn from Michel Callon's notebook.

We are no longer in Tokyo, but in Nara, a few kilometers from Kyoto. It is no longer the French Embassy, but a majestic conference hall in one of the most recent technopoles in Japan. As president of the Society for Social Studies of Science (4S), I have been invited to participate in a public symposium in which the conclusions of the first Japanese consensus conference on gene therapy are presented.

On the stage, several rostrums have been set up. Mr. Kiba steps up to the microphone and says:

> The development of science and technology has a considerable impact on the lives of ordinary citizens. It gives rise to many new problems which are grouped under the heading of the social acceptability of technologies. These problems are raised in many domains, such as nuclear waste, the incineration of household waste, organ transplants, or even gene therapy. Political, economic, and ethical problems arise with regard to each of these issues. And it would be wrong to see these problems as secondary, or as separable from scientific and technical questions.

Kiba takes a breath, because he feels that the most difficult remains to be said:

Their formulation and resolution presupposes the direct involvement of citizens. But how can we ensure that laypersons, non-specialists, can give their views on technical subjects of such great complexity? Let us recognize, Kiba adds, that this cannot be left to the responsibility of existing political institutions. These were designed to protect the experts and not to allow the participation of non-experts.

Kiba breaks off. He seems alarmed by what he has dared to say. I have the impression that he is aware of the incongruity of his remarks. A Japanese giving public lessons on democracy? Now we have seen everything. I imagined the Japanese fixed on technical progress, concerned only with technological innovations. And here they are having uncertainties! However, if they ask questions that we imagined were reserved to Westerners, in the solutions they devise they are where we expect them to be: on the side of technology transfers, but in this case, the transfer of social technologies. The speaker continues:

In Europe, many experiments have been carried out in order to resolve the problem of the social acceptability of technologies through greater citizen involvement. We have made a careful inventory. One of the most interesting procedures seems to us to be the one devised by the Danes, which they call the consensus conference.

Kiba embarks on the history of this procedure. Invented in the United States, but applied there solely to the question of the definition of medical practice, it was taken up by the Danes, who transformed it profoundly. Kiba mentions that several countries have already been inspired by the Danish experience. He cites the United Kingdom, New Zealand, and the Netherlands. France is not on the list, because the citizens' conference on genetically modified organisms (GMO) will not take place until the following year in Paris.

A good Japanese who makes the cultural exception of Japan a constitutive feature of its culture, Kiba continues:

It is often said that Japanese culture does not lend itself to the organization of a democratic debate on technology. But this is not inevitable.

Kiba explains how the idea arose of organizing a consensus conference on gene therapy, an emerging and already hot subject that raises a number of ethical problems. He tells how the support of Toyota was obtained in order to make up for the lack of commitment from public authorities, and how it was decided to transform this first endeavor into an experiment. The aim, he emphasizes, was not to arrive at results that could be used, but to evaluate the procedure itself in order to figure out its limits and identify possible improvements. The Japanese are past masters of the art of transposition and

enrichment, and they know that the adoption of technologies—including social technologies, as in this case—is above all a matter of adaptation.

Speakers follow one another to the rostrum, observing a regular protocol. One speaker gives a detailed account of how the panel of citizens was selected, how the training sessions and the question-and-answer exchanges with the experts were organized, then how the final proposals were drafted, and finally how this final session and the dialogue with a hand-picked but wider audience were constituted. This speaker ends his presentation with a commentary that demonstrates the extent to which the organizers have been able to distance themselves from the experiment they have conducted:

> It is important to introduce ordinary citizens into the debate and to get them to participate in working out the measures that will be taken. But this is not an end in itself. The consensus conference is certainly a procedure that aims to increase the democratization of decision making, but this is not its only purpose. The content of the decisions it allows to be taken is not without importance. From this point of view, it should be compared with other, existing procedures.

It is precisely in order to facilitate the evaluation of this procedure that the organizers have asked some foreign figures to give their point of view both on the overall project of the democratization of decision making and on the procedure itself.

Now it is Sheila Jasanoff's turn to speak. Sheila was a professor at Cornell University, where she headed the interdisciplinary Science, Technology, and Society (STS) program, whose objective is to train students who will be able to take up the new cultural, political, economic, and organizational challenges posed by the increasing importance of the technosciences in our societies. Sheila, a jurist by training, is a recognized authority in our field. "The achievement of a half-hearted consensus," she states, "is the worst objective we could have in our complicated societies." She is insistent:

> Agreement is often reached to the detriment of opponents or the recalcitrant who have been unable to express themselves or who have been silenced. And then agreement reached at a given moment may very well no longer be valid a bit later when the circumstances have changed. Agreement is only rarely desirable!

Sheila is right. Consensus is often a mask hiding relations of domination and exclusion. Democracy will not be increased by seeking agreement at any cost. Politics is the art of dealing with disagreements, conflicts, and oppositions; why not bring them out, encourage them, and multiply them, for that is how unforeseen paths are opened up and possibilities increased.

Now she comes to the procedure itself:

A consensus conference only has point when it is carried along by a wider current and is immersed in multiple, constant debates. Gene therapy has been discussed in the United States for twenty years, or rather, all the problems it raises either directly or indirectly, questions of intellectual property, of clinical experimentation, have been and continue to be debated in different institutions, commissions, forums, and by a multiplicity of groups and persons with very often divergent, indeed contradictory conceptions and interests.

Sheila seems to be telling the Japanese: ''Democracy is not a gadget. It is not something you copy; it is not just a matter of a few procedures. It is something deeper that must seize hold of the social body at its very core.''

As for the procedure itself, and independently of the conditions of its application, which, it is understood, do not convince the speaker, in her eyes it suffers from serious defects:

What is at stake in these procedures is that the professionals learn something from laypersons. Is this really the case here? I am not sure. And then, above all and first of all the procedure must result in some political decisions. Now permit me to be skeptical on this point, for your initiative was taken, as you have just said, outside of any governmental demand. It was supported by a private foundation. It is difficult to see it giving rise to any decision making. It is therefore a complete waste of time, a parody of democracy.

It is a harsh judgment. But why should the social sciences be soft? When Sheila finishes her talk, silence fills the hall and its monumental architecture suddenly seems glacial. However, the symposium's procedure quickly moves things along. It is the turn of the panelists, and then the experts, to give their views. The latter are still suffering from the shock of their experience. One of them summarizes the general opinion: ''I was skeptical. I now think it is necessary to accompany research and to organize this kind of discussion.''

The ordinary citizens are no less satisfied. They avow that their position with regard to gene therapy is much more reserved than it was before the conference. But debate becomes possible, as one of them summarizes magnificently: ''Thanks to the conference I have become an amateur of gene therapy. And as an amateur, there are things that I like, and others that I am less keen on.''

We are familiar with the strange movements between the West and the Far East, and the game of well-oiled roles to which they give rise. The West shows the way, like the Statue of Liberty holding out the flame of liberty to the rest of the world, and Japan, needy and assiduous, is supposed

to follow. The Japanese are past masters in the art of playing this role, which allows them both to preserve their identity (they are different) and to readily share in a common history (they copy). The role playing requires that the Japanese, having imitated the model, hasten to surpass it and give lessons to their old teachers.

San Diego. The annual colloquium of 4S. More than 500 researchers from all over the world. The Japanese are there. Some have suggested organizing a session on consensus conferences. The theme has never previously been taken up at our gatherings. No doubt it was considered to be too applied, too close to the daily concerns of decision makers! Our Japanese colleagues are not paralyzed by these misgivings. They give a detailed presentation of the two Japanese experiments. (After the conference on gene therapy, another conference was organized on information technologies and on the Internet in particular.) They reveal what we had only briefly glimpsed at Nara: Five researchers from STS were behind the first conference. Reading the literature, they had come across the Danish experiments.

Kobayashi, one of the speakers, gives a detailed description of the two conferences. He demonstrates his absolute familiarity with experiments conducted throughout the world. A good professional, he explains critical points of the procedure, including the recruitment of members of the panel, the choice of experts, the duration of training, the format of the final proposals, and the right of expression for minority points of view. Then he comes to the lessons he thinks can be drawn from this experience:

> It has often been claimed, and what's more continues to be claimed, that scientific and technical questions are too complicated for laypersons to be able to make sensible judgments. And, once again, the miracle, which is no longer a miracle moreover, took place: all the specialists were surprised by the quality of the final documents.

Kobayashi wonders:

> What is it in the production of laypersons that surprises the specialists?

For him, what is surprising is that the laypersons, these amateurs of gene therapy, were perfectly capable of assimilating the technical details, but they also helped to enrich the experts' knowledge:

> One episode was particularly illuminating. A clinician participating in the conference as an expert provided the panel with copies of a document given to patients in order to get their informed consent. This document, he explained, was carefully worked out and tested and he was confident of its quality. However, much to the surprise of

the clinician, the panel found it of very mediocre quality. The ordinary citizens stressed the degree to which the document, peppered with technical terms, each more obscure than the other, was incomprehensible to a patient who had to decide whether or not to take part in an experiment. What is more, one of the panel members pointed out to the clinician that the phrase concluding a section of the document was, to say the least, shocking. In fact one could read: "If the therapy has an unfortunate outcome, we would be very grateful if you were to bequeath your body to medicine."

One of the qualities of a specialist is to think of everything! Kobayashi continues:

This anecdote illustrates the complementary relationship between knowledge produced in the laboratory and its conditions of utilization.

Fearing that we had not grasped the significance of his remarks, Kobayashi recounts the particularly illuminating comment of a Japanese chemist:

This great scientist said that from now on chemistry must be able to complete the list of the properties of molecules in the laboratory and to enrich this list with the characteristics of these same molecules, but taken outside the laboratory.

Spot on! Laboratory research and research outside the laboratory: we should have thought of this obvious symmetry ourselves. Molecules do not live only in the closed space of the laboratory or in places that reproduce the conditions of the laboratory. They also move around in the open! That is where ordinary citizens are waiting for them, observe them, and strive to control them. Hence consensus conferences, public hearings and inquiries, and focus groups.

The session is drawing to an end. Kobayashi continues, imperturbable:

Can we introduce procedures for not only consulting citizens but also for involving them in the production of knowledge on issues that provoke confrontations which, as in the case of nuclear power plants, have become more serious in recent years? How can we ensure that the proposals and conclusions produced by citizens' panels are taken into account in public decisions?

Kobayashi comes to the end of his presentation. He cleverly returns to its title: Who has most to learn, experts or laypersons? The answer follows logically from his remarks: "Obviously, the experts!"

On the flight back to Paris, I come across an article in a magazine written by a colleague. He draws some lessons from the citizen conference in June 1998 organized by the Parliamentary Office for the evaluation of scientific and technological options. He says rightly that after this experience

nothing will be the same. A landmark has been passed—one as symbolic as Cape Bojador, on which Portuguese sailors came to grief long ago, the way to the Indies being open to them once they had passed it. For some weeks the public space has been invaded. Genetically modified organisms have left the research centers where they were confined. They have had a good time marching with angry farmers, spreading through magazines, speaking to the evening television news programs through the ordinary citizen, and arousing controversy. As predicted for a long time, they were finally there in our midst. They were there, but not in hiding, and not invisible and discreet as some would have liked. No! They were showing themselves without false modesty, proudly riding high in the media. Whatever its obvious limits, this colleague added, the citizen conference, for a time at least, had made visible and debatable what had been hidden and excluded from public debate.

It is true that there was something euphoric about the chaos that was organized in this way. José Bové, a very popular leader of a leftist farmers' trade union, revived the social movement, dragging in his wake intellectuals, sociologist-journalists, and journalist-sociologists who no longer believed in it. Experts multiplied in front of the cameras to say that they were not as positive as some would like it to be thought and that these debates had their good points. One sententiously discoursed endlessly on the principle of precaution; all of them put in their warnings and interpretations. ''Let's decide!'' said some. ''Yes, that's it, let's settle it!'' said others. ''Above all let's not lose time!'' added anxious economists. ''Can't you see that the Americans are profiting from it to conquer the market?'' ''Let's take our time,'' murmured the calmest. ''Let's not be beguiled by powerful interest groups; let's consult and deliberate.''

The citizen conference helped bring it about that technological progress was once again debatable, and that the market ceased being that obscure force, or deliberately obscured force, which dispenses with all political deliberation. Even the French Academy of Sciences, in its ''great wisdom,'' heard the message. Without delay it got in line with current tastes, organizing forums on the health consequences of mobile phones, or on the effects of dioxins, though not long ago it had been happy to say ''Move along, there's nothing to see, all these rumors are the fruit of a sick collective imagination, of an unconscious fear that seizes hold of the people when new technologies appear.'' And not long ago the French Academy of Sciences would have been happy to recall the long list of irrational resistances that have marked the history of industrialized societies: Remember the

Luddites, the machine-wreckers! Remember the railway and the ridiculous fears it aroused! Remember! Remember! ■

Let us remember above all Kobayashi and his modest conclusions. Science and technology cannot be managed by the political institutions currently available to us. Obviously, it is not a question of dismantling them. They have given ample proof of their effectiveness. But their limitations are no less obvious. They must be enriched, expanded, extended, and improved so as to bring about what some call technical democracy, or more precisely in order to make our democracies more able to absorb the debates and controversies aroused by science and technology.

GMOs, BSE, nuclear waste, mobile phones, the treatment of household waste, asbestos, tobacco, gene therapy, genetic diagnosis—each day the list grows longer. It is no good treating each issue separately, as if it is always a case of exceptional events. The opposite is true. These debates are becoming the rule. Everywhere science and technology overflow the bounds of existing frameworks. The wave breaks. Unforeseen effects multiply. They cannot be prevented by markets, any more than by the scientific and political institutions. It was thought that genetic diagnosis kits had been perfected without a problem, and now some cry blue murder; the pursuit of profit, they maintain, leads straight to eugenics. We thought that geology would ensure a decent and definitive burial for nuclear waste that everyone would respect, and now wine growers, whose voice had not been heard, are worried, not about the effects of radioactivity, but about far more worrying commercial effects, since they are in danger of losing foreign customers who could take fright on learning that the grapes ripen some hundreds of meters above containers filled with nuclear substances!

It would be pointless to erect barriers to contain these overflows; they would quickly give way one after the other. First of all we should recognize that these overflows are destructive only if we stubbornly seek to prevent them. When given the space they need, they reveal their fecundity, their fertilizing power. In chapter 1 we endeavor to demonstrate what this power to enrich political debate consists in by emphasizing the importance of collective experimentation and learning. In *hybrid forums*, in which the direction given to research and the modes of application of its results are discussed, uncertainties predominate, and everyone contributes information and knowledge that enrich the discussion.

These overflows make it clear that the great divisions are outmoded. As Kobayashi rightly said, to start with we should accept the fact that the

knowledge of specialists is not the only knowledge possible, and consequently we should recognize the richness and relevance of knowledge developed by laypersons, and in particular by the groups that these overflows directly or indirectly concern. The conviction (both in minds and in institutions) that there is a difference in kind between the knowledge developed by professionals and that developed by laypersons is so strongly rooted that we will need at least two chapters to establish a new parity! Chapter 2 shows what *secluded research* consists in, that is, laboratory research which is not ruled out, but overflowed, when the molecules and genes it studies are let out in the open. Secluded research risks paralysis if it refuses to cooperate with *research in the wild*. In chapter 3 we present the characteristics of research in the wild and the modes in which it collaborates with laboratory research with the aim of getting the measure of overflows.

The *raison d'être* of the many procedures that have been invented and tried out over the last 30 years in all the so-called developed countries is that of organizing and controlling overflows, but without seeking to contain, prevent, or eliminate them. The consensus conference is only one of the apparatuses that have been devised to come to the aid of existing institutions. There is now a whole battery of procedures available for organizing hybrid forums. Chapter 4 shows that, in their diversity, they can be analyzed according to two dimensions. The first is the intensity of cooperation they establish between secluded research and research in the wild. The second is the amount of space they leave open for the emergence and consideration of new groups and new identities, whether it is those living near a nuclear power plant, parents affected by the death of their children, or patients who seek to participate in drug trials.

Chapter 5 presents some of the different existing procedures, showing how each enriches the scientific and political institutions in its own way. A democracy comes into play that can be described as *dialogic*. By absorbing the uncertainties that it puts at the center of debate, dialogic democracy enriches traditional representative democracy, which we propose to call *delegative* democracy.

Chapter 6 pursues the work of investigation of experiments underway by showing the consequences they entail for the notion of political decision making. In the space of organized hybrid forums, collective learning, which simultaneously produces new knowledge and new social configurations, ends up fabricating a close weave of micro-decisions, each of which is subject to discussion and linked to those that precede it as well as those that follow. This favors options being kept open instead of being quickly,

and often irrevocably, closed down. The model of the clear-cut decision disappears along with the oft-repeated myth of Alexander drawing his two-edged sword to cut the Gordian knot that no expert managed to untie. Sheathe your swords! This is the slogan that could sum up the now-famous principle of precaution. No more clear-cut, bloody decisions. Manly warrior assurance is not replaced by inaction, but by *measured action*, the only possible action in situations of high uncertainty.

Measured action gives notice to a whole series of notions and oppositions of which the reader will find no trace in this book: nothing on risks, nothing recalling the distinction between fact and value, or between nature and culture, and nothing that reinforces the idea of omnipotent laws of the market. In chapter 7 we show that the effect of all these notions is to divert our attention and dissuade us from taking seriously all the endeavors to go further than the habitual procedures of consultation and representation. This suggests to us, in conclusion, that, by inventing the concrete modalities of a democracy that can pick up the challenge of the sciences and technologies, all the anonymous actors who have modestly devoted themselves to opening up new sites and experimenting with new procedures have contributed to the more general, never-completed enterprise of the *democratization of democracy*—that is to say, of the people's control of their destiny. There is a paradox in this: the philosophy in the wild practiced by the Danes or the Dutch is every bit as valid as all the confined moral and political philosophies that we find surfeit of on campuses and in other closed spaces.