Mathieu Triclot*

Norbert Wiener's politics and the history of cybernetics

ON JANUARY 1947, the *Atlantic Monthly Magazine* publishes a letter, from the American mathematician Norbert Wiener, under the title: "A scientist rebels!".[1] Wiener is the founder of this discipline known as Cybernetics, which defines itself as the science of control and communication in the animal and the machine. Cybernetics is a by-product of the Second World War, a discipline that tries to unify different fields of research and different engineering cultures under the universal term of information processing. From this position, it extends towards the life and social sciences. Cybernetics describes a kind of alliance between some applied mathematicians, some engineers and biologists during and after the war.

In the 1947 letter, "A Scientist rebels!", Wiener replies to an engineer from Boeing, the aircraft company involved in the guided missiles programs. Wiener refuses to communicate him his own work, and he makes a heavy commitment: he swears

> not to publish any future work […] which may do damage in the hands of irresponsible militarists.[2]

The letter's style is tough and carries a sense of urgency and indignation.

The letter is the first act of a set of political commitments, taken by Wiener in the late forties and in fifties. Wiener involves politically on three post-war major issues: the nuclear arms race, the new politics of science and the danger of factory-work automation. Those commitments played a decisive role in the history of cybernetics.

What interests me in this story of the cybernetics founder's political commitment, is the interaction between science and politics. *The Atlantic Monthly* letter is published in 1947, the same year Wiener writes his most famous book, *Cybernetics*.[3] The history of cybernetics gives us a remarkable opportunity to isolate the different levels of interaction between political commitment and constitution of a scientific discipline.

I think we can break up Wiener's political commitment into 4 levels, characterised by different postures, and different relations between commitment, scientific content and political arguments. I will outline those different levels; beginning with what seems to me the most simple in order to reach the more complex level of interaction. Let's process within this typology.

First, one can find in Wiener's work some commitments he may call "external". I think especially about the anti arm's race commitment after the war. I call this "external commitment", because Wiener is committed here as a scientist, to questions that bear a special interest for scientists, but that don't have any special links to Wiener individual situation and scientific practice. Wiener is not an expert in those fields. He acts first as a respected scientist, one who knows lots about the process of technological developments. His authority in that case stems only from this position as a well-known scientist.

Until the breaking of the Korean War, Wiener writes numerous articles pleading against the H-Bomb program, the arms' race, or for an international agreement on the atom question.[4] This is not a

* Université Jean Moulin – Lyon 3, Lyon, France; email: mathieu.triclot@free.fr.

[1] Norbert Wiener, "A scientist rebels", *The Atlantic Monthly*, Jan. 1947, Vol. 179, p. 46; reproduced in: Pesi Masani (ed.), *Norbert Wiener, Collected works with commentaries, Volume IV*, Cambridge, MIT Press, 1985, p. 748.

[2] *Ibid.*

[3] Norbert Wiener, *Cybernetics, or control and communication in the animal and the machine* (Cambridge: MIT Press, 2000; first ed. 1948).

[4] See for example: Norbert Wiener, "The Armed Service are not fit almoners for education and science", *Bulletin of the Atomic Scientists*, vol. 3, 8, Aug. 1947; Norbert Wiener, "A rebellious scientist after two years", *Bulletin*

very original position, and it matches the political line followed by the Federation of American Scientists, the atomic scientists' movement which comes from the scientists' within the Manhattan Project. We have here a first model of commitment, in a pre-existent movement inside the scientific community. Wiener doesn't share all the Federation of American Scientists' positions, but he shares its core, and he doesn't play a very specific role in the movement.

The second level, more specific in Wiener's commitment, relates to the social impact of cybernetic machines, mainly the new digital computer. Very early, even before the end of the war, when the digital computer is still a concept Wiener advocates the idea that computers are not only made to compute, but rather that they are universal information processors. This is a remarkable stand, heavily tied to the whole history of cybernetics.

One of the implications it has is the idea that the computer wont be used only for scientific calculations, but that it would eventually lead up to a revolution in the production process. Wiener thinks the computer's advent allows a new industrial revolution, an information and communication revolution opposed to the previous revolution, which was the revolution of energy. This new industrial revolution of information rests upon the possibility of automated factories. In the post-war years, Wiener can be seen trying to prevent the new technological dangers of automated factories. This matches with the majority of Wiener's political writings.[5]

But, on this issue, Wiener doesn't make do with writing or calling to public attention, but he meets several times trade-unionist leaders or managers. In particular, Wiener exchanges mails for a few years with UAW's leader, Walter Reuther. UAW is the automobile factory workers' trade-union, one of the most powerful trade-union in the United States. Wiener and Reuther consider for a time forming a permanent joint council with scientists and trade-unionists about technological change. This doesn't work, for different reasons, but that was in the plans.

In comparison to the first commitment defined as "external", we have here another type of commitment, resulting from what we may call the "inventor's social responsibility". The first commitment was essentially a collective commitment, whereas the second leaves Wiener mostly alone. If Wiener speaks, it is not as a scientist in general, but as the founder of cybernetics; and this time with an expert's position, considering computing, control technologies or automation.

This inventor's commitment towards his invention leads to a very difficult, if not contradictory position. Wiener well knows that, since long ago, inventions aren't the results of an isolated inventors' cleverness anymore, but that the inventions' conditions are now totally socialised. So, how the inventor's individual responsibility could operate if the invention became a collective or social affair? Wiener has to deal with this contradiction and the stance he adopts holds a fragile solution. At first, we know that Wiener thinks he can destroy or not share his work, but, after some time, he tells himself that with the current maturation of ideas, others would soon get to the same results, but with no assurance that they would show the same concern over their finding's social consequences. Consequently, it was better to play along and give the most publicity to the invention of the computer in particular. So, the Wiener's stance leads us to wonder whether there is a responsibility of the scientist towards his findings, as Wiener pretends, and which type is this responsibility, and how it can operate.

The originality of this responsibility of the inventor's discourse is that it requires articulating, at a first level, political elements with scientific or technological analyses. But this is only a first step in Wiener's mixing science and politics. We can find in Wiener's writings a lot of political arguments which are, as we can say, "encoded" in the information processing's vocabulary; arguments that takes the following form: "knowing what we know now about the nature of information, thanks to our new

of the Atomic Scientists, reproduced in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, pp. 749-750; Norbert Wiener, "Conspiracy of Conformists", reproduced in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, p. 752; Norbert Wiener, "H-Bomb: Too Damn Close", *The Atlantic Monthly*, 186, Jul. 1950, pp. 50-53.

[5] See for example: Norbert Wiener, "Thinking machine seen replacing man: MIT scientist sees day when unskilled labor will be obsolete", *Boston Traveler*, 17 april 1949; Norbert Wiener et Donald Campbell, "Automatization, Norbert Wiener's Concept of Fully Mechanized Industry", St. Louis Dispatch, December 5, 1954, reproduced in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, pp. 679-683; Norbert Wiener, "The Machine as Threat and Promise", St Louis Dispatch, 13 décembre 1953, in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, p. 673; Norbert Wiener, "The Electronic Brain and the Next Industrial Revolution", Western Reserve University, Cleveland, December 10, 1952, reproduced in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, pp. 666-672.

science, this political consequence must follow", for example, "knowing the nature of information, we have to change the intellectual property rights", or "we have to privilege social organisations maximizing information traffic", and so on.[6]

We are dealing, with this third type of commitment, with an extremely original binding of epistemological elements, often coming from the very heart of cybernetic science, and political elements. Here, we reach directly the scientific concepts' content, far behind the simple issue of assessing techno-logical impacts. Contingent on some scientific contents, we have political propositions.

On this particular question, Wiener's position is poorly understood by his contemporaries and commentators. Wiener has a very uncomfortable position, even thought, in my point of view, it isn't totally inconsistent. I have to clarify the general context in order to free up the questions related to this type of commitment.

Among the social sciences representatives in Cybernetic Group, there are a lot of members of a movement called the World Federation for Mental Health, a scientists' movement relying upon human sciences, particularly psychoanalysis, in order to solve tensions in the political and social world. The idea is to use the social sciences' contributions in a politically progressive way to transform the social world in the very same way an understanding of natural sciences helps transforming the physical world. Those people think they have found in cybernetics a precious ally.[7]

But, in the book, *Cybernetics*, Wiener's grand-oeuvre and one of the most unexpected best-sellers in scientific literature, we find a rather puzzling chapter, entitled "Information, language and society". This chapter is precisely about the relationship between mathematical tools and social science. During most of the chapter, Wiener develops several analogies between information processing machines and the functioning of society; he tries to assess the information quantity of social organizations, etc. And suddenly, around the end of the chapter, Wiener begins to explain that he doesn't believe at all in the application of mathematics in social sciences or political analysis, and that when we use mathematics for political analysis — Wiener is thinking here about the Von Neumann's theory of games —, then it is always scientifically simplistic and politically reactionary. Wiener introduces some epistemological argument in order to strengthen this thesis. He explains for example that in social sciences we can never isolate the observer from the observed system, or we can never dispose of statistical series long enough to use the results without interference from our background hypothesis. In brief, Wiener seems to consider that the social world's complexity exceeds the possibilities of a real formal approach. As Wiener says, in conclusion:

> we cannot afford to neglect [natural sciences] ; neither should we build exaggerated expectations of their possibilities. There is much which we must leave, whether we like it or not, to the un-"scientific", narrative method of the professional historian.[8]

What can we expect of cybernetics, the science of communication and control, in social matters? Precisely, what Wiener will give us in his political writings: orders of magnitude rather than precise calculations with only the appearance of rigor. Wiener is often criticized for the lack of rigor of his analyses, as if we should expect a mathematical treatment, which Wiener is the first to refuse on these matters. In social matters Cybernetics concepts can indicate directions for research or action, without providing a formal language appropriate to solve all problems.

This third type of commitment raises the question of the uses of concepts and methods drawn from natural sciences in social sciences, and eventually of the type of tools sciences can provide for social transformation. Wiener's answer to these questions is original and consistent, I think.

At least, remains a forth level of interaction between science and politics, in Wiener's works; a level that concerns the scientific content of cybernetics, in an even closer way, not from the point of view of scientific concepts taken one by one and applied to social sciences, but from the point of view of research programs. Cybernetics cannot be understood without this dimension. Cybernetics is a

[6] Norbert Wiener, *The Human Use of Human Beings, Cybernetics and Society* (London: Free Association Books, 1989 [1954]), p. 113.

[7] Steve Heims, *Constructing a Social Science for Postwar America, The Cybernetics Group, 1946-1953* (Cambridge: MIT Press, 1993 [1991]), pp. 164-179.

[8] Norbert Wiener, *Cybernetics, op. cit.*, p. 164.

rather strange discipline. It appears during the war, as the synthesis of various technical fields, thanks to the vocabulary of information processing. But cybernetics grows into an interdisciplinary program, interested in physiology, neurology or even, as we saw, social sciences. This explains both the extra-ordinary dissemination of the information concept in different major scientific fields, and the failure of cybernetics to turn into a real discipline or science in the USA. Cybernetics doesn't stand up long to the centrifugal forces of his different research agenda.

But we cannot understand this strange and philosophical alliance of cybernetics with life or social sciences if we forget the political context of this particular era. Cyberneticians work when the practice and the mode of production of science are experiencing a major transformation in the United States. In brief, we all know that the war entails a massive change in the financial structure of American science. During the war, Cybernetics is deeply linked to the military technologies' development. The alliance with social and life sciences, which is so distinctive of cybernetics, and which has been so criticized, is obviously, from the Wiener's point of view, a way to escape "the militarization of American science" and to promote another type of research. Remember the 1947 open letter with his rejection of research done under command of "irresponsible militarists".

This rejection has implications on two levels: the level of scientific content or agenda, and the level of practices. At the level of scientific contents or research programs, Wiener chose to leave the field of computer science, where financing depends mostly on military or military related agencies, and to work on a more humanistic program, designing intelligent prosthesis for disabled persons. At the level of practices, Wiener criticizes again and again the new organisations for scientific work, which he calls the "Megabuck Science". In particular, he blames the new "science factory" for the subordination of scientists workers to great administrators who split the work and maintain separation for the sake of military secrecy.[9]

In brief, Wiener saw cybernetics as a counter-model of science, a science with a democratic impulse, in its organisation as well as in its research agenda. We cannot understand for example the divorce between artificial intelligence and cybernetics in the mid-50's if we don't have this political background in mind. This is not all, but this is a part of the story.

In conclusion, it seems to me that Wiener's case is truly rich to free up and articulate the different levels of interaction between a political commitment and a scientific practice. We have probably all we can expect: First, a scientist's commitment in a broader scientist movement against arms' race; second, the commitment of an individual inventor about the consequences of his invention, in this case, computers and automatic control devices; third, a reflection on the possible use of scientific concepts drawn from natural or engineering sciences in social science and political action; forth and last but not least, a reflection about the very functioning of science after the War which influences the way Cyberneticians define their own scientific practice and objectives.

[9] Norbert Wiener, "Science: The Megabuck Era", *The New Republic*, 27 Jan. 1958, reproduced in: Pesi Masani (ed.), *Norbert Wiener, op. cit.*, pp. 710-711.