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Technical Deliberation
Quarrels among Ponts et Chaussées Engineers under the French Consulat
The Ourcq Canal Affair

I here want to give an outline of my PhD on Ponts et Chaussées quarrels at the beginning of the 19th century.¹ I will first present the general aims and the methodology, and then the 10 chapters. As we are limited in space, I have chosen to be very brief for most of them, and to develop the fourth more lengthily (and, in other chapters, the necessary elements for the understanding of this fourth chapter.) As I am presently rewriting this work into a book, I am interested in all kinds of discussions, and would be very glad, if you wish, to go into further detail on some of these issues.

This work studies technical deliberation (deliberation here meaning everything that takes place before going to action), in the Ponts et Chaussées of the Consulat, by examining some quarrels among the engineers and especially the one on the Ourcq-canal. It is a case-study on an exceptional situation, a controversial project, the Ourcq-canal, and at the same time, it aims to be a general study on the usual work of making, discussing and deciding about projects (and all that is involved in these activities, that is knowledge-handling, rhetorical skills, etc.) in the Ponts et Chaussées corps at the beginning of the 19th century. It tries to capture two dimensions of the engineers' activity, the ordinary and the exceptional (which are in the two meanings of the French word *affaire* – the ordinary business and a polemical disruption – I use to describe the Ourcq case.)

The first aim is to give a new description of the Ponts et Chaussées corps, its functioning, especially in its activity of project. I wanted a more concrete picture of the corps, giving access to the practices of engineering (what are these engineers actually doing, what does their activity consist in?): a "thicker" description of the corps. Such an examination of the concrete functioning required a particular case to provide the necessary details, and a polemical case was in this respect more interesting, because it provided more archival material, and because the engineers made their disagreement explicit in such a case, many things get discussed and shown which usually do not appear, conceptions of knowledge and social behavior and expectations, etc. The Ourcq-canal controversy here is a *tool*. It enables to rethink the project as a deliberative and complex activity, and not only as a result, a document.² It enables to reconsider the social beings involved in this activity (government, Ponts et Chaussées assembly, inspectors, chief-engineers, etc.), which roles have been described as very structured and stable by the historiography, and which I can present now in a more complex view, with changing borders, borders that are at stakes for the actors themselves. It also gives a privileged access to the engineers' knowledges and practices, which are tools for the deliberation and objects of discussion at the same time.

The second aim of this work is to describe and understand the Ourcq-affair itself, as an *object* of investigation. Most existing analyses have simplified the complexity of the affair to a static confrontation between two opposing extremes, incarnated by physical or moral actors. I wanted

¹ Frédéric Graber, *La délibération technique – Disputes d'ingénieurs des Ponts et Chaussées sous le Consulat – L'affaire du canal de l'Ourcq*, Thèse (EHESS), déc. 2004, sous la direction de Dominique Pestre.

² Nathalie Montel has shown in her work on the Suez-canal, that historians of technique often ignore what comes after the project, the yards, and assimilate the work with the written project. She wanted to show the yard as a space that could not be seen in the project as document. I argue that one should draw another inference from her remark: the activity of project is also unknown or oversimplified, sometimes discredited as useless verbiage (by Montel for example), or conceived as inscrutable. See Nathalie Montel, *Le chantier du canal de Suez (1859-1869) – Une histoire des pratiques techniques*, Paris, Editions In Forma et Presses de l'école nationale des Ponts et Chaussées, 1998.

to show that this affair does not have to be abridged in one radical antagonism, that necessary leads to the victory of the truth. This aim is the reverse of the first one, as each further understanding of the corps' functioning corresponds to a new explanation of the affair. These multiple explanations must not be understood as perspectives, or as causal forces that could be added up: there is not one affair but several ones, slightly different, at different moments, involving different people with different issues; to get an understanding of these issues one cannot consider the affair as a whole, one has to perform cuts.

These two aims explain the methodological approach, which can be described as a crossing of micro-history (as described by Jacques Revel³) and the science studies' controversy analysis. This study is an incursion into the details. What I am doing is nothing else than a usual form of analysis, a cross-reading and rereading of documents which informs themselves, so that the confrontation of these texts progressively brings light into them. The specificity of this analysis is, first, its limitation. My choice was to concentrate on a limited corpus (mainly by focusing the study on 3 or 4 years of debates), and thus be able to read these texts very closely, with attention to details I would not even have noticed in a faster reading, to make sense of "small" things (which I do not believe to be small), to be able to understand and follow nearly every single argument. Another specificity is that I want to "take the actors seriously"⁴, and consider their arguments as part of a rhetoric interplay: what I find interesting is what can (or not) be argued at a given time, what argument works (or not), what strategies are chosen and what tools are developed for these. That is why the analysis mainly stays inside a certain documentation, a world of arguments, and does not necessarily try to get the meaning of things through the introduction of an external context. (Unfortunately it will be difficult to show many details and to follow arguments in this presentation of my work, because it requires much space.)

Finally, there is also a reflexive aim. Adopting a micro-historical methodology brings up questions about what it is to write history. This kind of method leads to a very untangled perception of the object of study, that makes a linear presentation quite difficult. To clarify my choice of writing a series of stories about different "aspects" of the Ourcq-affair/project-activity, I propose to draw on Revel's presentation of micro-history:

1. What is important in micro-history is not so much the scale, the attention to small events, but the principle of variation itself: changing the conditions of observation make the constructive dimension of the historical object more visible. In each cut of the "field of events"⁵ emerges new objects, and by changing these cuts, one can emphasize the relation between the cut and the objects that emerge.
2. Therefore micro-history has an experimental dimension: it intends to create conditions of observation more suitable (or powerful) to the emergence of new historical objects (One could speak of new "aspects" of the same object but, because of this "new" aspect, it cannot be exactly the same object any more...)
3. Micro-history forces the historian to think about writing, to develop literary solutions to present his complex analysis in a readable manner. I think this question of writing is a very general problem in history. On this question I adopted Paul Veyne's conception of history⁶: a single event is meaningless and must be placed in relation to others to compose a plot (*une intrigue*). But all these relations cannot be made at the same time. Thus, an object that is captured in one plot cannot be in another with the same thickness. Veyne conceives the writing of history

³ Jacques Revel, "L'histoire au ras du sol", Preface to Giovanni Levi, *Le pouvoir au village – Histoire d'un exorciste dans le Piémont du 17^{ème} siècle*, Paris, Gallimard, 1989, pp.i-xxiii.

⁴ This methodological attitude is common to a great number of social studies today, especially these that are giving attention to rhetoric and theory of argumentation (as I am.) "Taking the actors seriously" is the formulation of Luc Boltanski (see below), who insists that there is no difference of nature between the critical activities of the analyst and of the actors. If one considers the actor's arguments as mere illusions, the whole activity of deliberation would be a illusion too, my object of investigation would not exist.

⁵ To use a term of Paul Veyne, "champ événementiel."

⁶ Paul Veyne, *Comment on écrit l'histoire*, Paris, Le Seuil, 1971.

as a multiplication of these plots. It will not be possible to sum up all these histories in one big history, without simplifying each of these plots (and therefore its meaning.) In choosing to tell different stories, shifted, where objects are seen in a particular cut, I intended to bring the reader to a point where he does not expect a unique definitive story, and feel the multiplicity and irreducibility of these historical paths.

1. There is no doubt about the existence of an Ourcq canal affair. The incredible accumulation of reports, *Mémoires*, *Opinions*, etc. points out the event: the Ponts et Chaussées engineers have been disputing for several years on the construction of the Ourcq canal, in the north-east of Paris (1803-05 in an optimistic evaluation, 1800-1824 in a more pessimistic one, depending on the actors one identifies as relevant, and on what one considers as a beginning and closing of the affair.) I could have started directly by examining what the Ourcq canal affair was about, but I found it interesting to first get a more general understanding of what an affair could be. The Ourcq canal is not the only occasion of quarrel among the Pont et Chaussées engineers: it belongs to a series of affairs taking place during the French Consulat, after a comparatively quiet Old Regime, and before a very disciplined Empire (the Revolution being a quite desolate period for public works.) The Saint-Quentin canal, bridges in Paris, a bridge in Tours, and the Ourcq canal all have in common a very controversial and lasting development of the discussions in the assembly of the Ponts et Chaussées, the place where examination and decision of French public works projects took place. The Consulat can therefore be seen as a period of crisis of the deliberation system of the corps, a crisis of this particular assembly.

One can propose an explanation for this crisis: the French Revolution profoundly disturbed the functioning of this assembly. It did not really change the composition of the assembly: mainly the *inspecteurs généraux* who were the top of the hierarchy (10 to 15 persons), and some engineers (both chief-engineers and ordinary engineers); but the latter being usually assign to a province were supposed to be working there, and were seldom seen in the assembly, except those working in or around Paris. The main change introduced by the Revolution was a right to vote for the chief-engineers of the corps, making their opinions as important as the inspectors', which completely changed the social equilibrium of corps (in controversial cases, engineers came to Paris, increasing the members of the assembly.) But the main point is that the engineers did not previously use the vote as a means to take decisions, and that, when they did use it, it proved disastrous, unable to produce a strong decision. The Revolution also reduced the presence of an administrative authority within the assembly, leaving the engineer nearly alone to discuss and decide. The Revolution thus created a period of instability that ended with an important reform of the Ponts et Chaussées by Napoléon in 1804, that reintroduced an authority and abolished the right to vote of the chief-engineers.

As I analyzed the changes of the assembly during a broader period, I was able to describe very closely how the engineers actually took their decisions in the closed circle of the assembly. They disliked the vote. Even if some of them occasionally took advantage of it, when their opinion happens to be in the majority, they never defended the principle of majority in itself, and preferred to insist on the qualities of the engineers of each side, and to compare the advantages of the different solutions, rather than assuming the superiority of the number. The engineers preferred a more "rational" way of deciding, believing that there could only exist one true solution, and that it should be achieved by discussion: one should reply to every objection that arose; once one had used up all objections and took them into account, one had produced the "obvious" solution. This epistemology coincides with a more social assessment: the vote was seen as dangerous for the cohesion of the corps, because it could divide it into different parties (what actually happened when the engineers got to vote), which in a *société de corps* type society is disastrous.

Using sociological studies about decision making in assemblies⁷, I identified the usual decision-making process of the engineers, this "rational discussion", as a consensus: it is not a unanimous decision; it is achieved by the extinction of opposition in an unequal assembly, where a notable (in this case, an inspector) presents a report, if necessary including corrections proposed by objectors, a report that finally does not face opposition; the main point, in this way of deciding, is that one cannot go on opposing the decision for a long time, without presenting oneself as a threat for the whole community and its cohesion. In the affairs of the Consulat, the continuation of opposition leads to severe divisions among the engineers, making any decision impossible.

2. The Ourcq canal affair can be seen as a political one, in that the political power was deeply involved in it, and that Bonaparte personally intervened in it. Though Bonaparte took the idea of the Ourcq canal to a private company, his intention to carry out this project made it particularly interesting for all the engineers who wanted to get distinguished by him. But he did not let the corps decide by itself who should become the director of the project, he promoted a relatively young engineer to this post (a very prestigious one since the canal was one of the biggest constructions of the period), Pierre-Simon Girard, rewarding him for his particular loyalty during the Egypt-expedition. Girard thus got in a singularized position, having the support of the government and being less indebted to his colleagues. But this promotion was not the only intervention of Bonaparte. He conceived public works as political, not only in the obvious sense of their usefulness for his mostly military aims, but also because a canal or a bridge was an occasion to show the power in action, its strength, glory and dedication to public welfare. This publicity and propaganda dimension (there is a real staging of Bonaparte giving water to the Parisians) was very important to a man who wanted to gain his legitimacy through his action. This explains some of the visual choices made by Girard, the monumentality, the geometricity of his work (drawing the canal in straight lines), and its technical difficulty (suspending the canal on steep hillsides.) Girard also chose to privilege the governmental conception of time which interfered with the engineers' conception: the latter were concerned about discussing the proper solution, making the construction as secure as possible, and this time for discussion was very important to them, when the government was mainly interested in seeing results, actual building, people at work (the canal was also conceived by the government as a way of providing work for the destitutes), so that it sometimes, like in the case of the Ourcq canal, even ordered the day when the yard-work should begin; Girard chose to make the advance of the construction visible as demanded by Bonaparte himself, and so began with the concrete work before the project had been submitted and accepted by the Ponts et Chaussées assembly.

3. The Ourcq affair can be seen as political in another sense. It provided an occasion for the engineers of the Ponts et Chaussées to negotiate the respective roles of the corps and the government in the public works decisions.

One can first insert this question of the relationship between the corps and the political power in a larger history of the State and its administration, in the late 18th and 19th century.⁸

The political power was interested in having a stable, specialized and learned administration, in charge of precise tasks, because it provided a more effective instrument of government, but this same stability and lasting of an administration reinforced the functional dimension of the State and the administration could begin to incarnate the State itself, having a proper existence more or less independently of changing regimes; thus the political power feared such an autonomy of the administration, the confiscation of a part of power and initiative, and always tried to keep it in the role of an executant, a mere instrument. The various regimes of the late 18th and 19th century, all strongly limited the autonomy of their administrations, and often replaced the upper-staff of the

⁷ Especially the work of Philippe Urfalino, in his ongoing seminar at the EHESS (2003-04-05): "Sociologie de la décision."

⁸ See especially, Pierre Rosanvallon, *L'Etat en France de 1789 à nos jours*, Paris, Seuil, 1990.

previous regime. The technical administrations are an exception: the nature of their activities (dealing with facts) was often supposed to be less political, and the technicity of these activities required skilled engineers, which the government could rely on for deciding in matters which were not accessible to them, people that could defend the State against speculators. If the different regimes did keep technical corps (with strong identities and cohesion developed in the *écoles*) within the State, they sometimes developed more critical positions against them. In oversimplifying, one could say that Bonaparte in this respect relied on his technical administrations, giving them quite an autonomy, while Napoléon tried to confine as much as possible the corps in the role of an instrument.

The Ourcq-affair reveals a quite assertive position of the engineers in the rather "liberal" context of the Consulat. I examined the various reactions, between respect and open opposition of the governmental decisions, first in the very large discussions about the texts of law deciding about the canal (can the government decide anything without consulting the engineers? Are they not the only ones who can say what is possible, and even what is advantageous), and about the water needs in Paris (is it possible to make an evaluation of these needs without a political intention?) In these discussions, the engineers try to reaffirm their role and the order of intervention of each part in the project. If they show themselves as faithful executants (which is very important for their persistence), they nonetheless want to remain the conceptors of the projects; if they accept not to be the only decision-makers, the decision must nonetheless be theirs, it must be possible for them to make it theirs.

I will now show that this issue of conception-execution is also very important inside the corps, and also related to a problem of appropriation, of sharing property. I will develop a bit longer on this fourth point.

4. The Ourcq-canal affair also reveals a certain moral economy of the activity of project in the Ponts et Chaussées.

Girard decided to obey strictly the orders of the government, and put people to yard-works, though he did not have a complete project and had not submitted it to the assembly. When he first presented a partial account to the assembly, he tried to make the yards as acceptable as possible for his colleagues, describing them as experimental workshops for defining the cost of work and the composition of the soils. He insisted on the orders he had to obey, and asked the assembly to be comprehensive about the irregularity of the situation. The assembly first did not pay much attention to the works going on without any valid project and seemed to accept the governmental imperatives. But it pointed out another irregularity in Girard's behavior: he was the one who presented his project to the assembly, while the usual examination way passed through the nomination of a reporter, which analysed the projects, reported to the assembly, and proposed to accept it or to improve it by some modifications. This procedure usually took place in the absence of the engineer in charge of the project (who was most of the time in the provinces), who therefore did not have the opportunity to interfere in the examination. In presenting his project himself, Girard was again obeying orders; the orders of the *directeur général*, this time, Crétet, who was a sort of minister of public works, and who wanted the yards to go on as quickly as possible (to please Bonaparte) but also wanted to regularize the administrative situation. Girard could not ignore that he was breaking a sort of rule, and the assembly soon made him responsible for that, as for not having informed them of the ongoing project for months. they declared that the rules had to be respected, and that the project would first have to be examined, and therefore it created a board, and asked Girard to submit all existing material on the project.

For Girard, the nomination of this board meant delay in his work: time passing, the "temporary" workshops would not be temporary anymore, and the delivering of his material (plans, maps, levelings, etc.) would make the continuation of his work very difficult. He preferred to answer the

pressing demand of Bonaparte (who wanted a report every second week on the number of workers employed and of the advancement of the yards.) He tried to ignore the assembly and the board for a while; he tried to present himself as a faithful executant of governmental orders, and the assembly as a disturber, that wanted to interrupt or delay the work. He notified the minister of the Interior that the assembly should have accepted his project, which was the only way to normalize the situation while following the orders. In several ways Girard showed rebelliousness, every time more explicitly: he declared a kind of war on the assembly. He appeared very confident that he would be strong enough to impose his project in spite of the opposition of his colleagues. We cannot be sure that he adopted this rebellious behavior only because he wanted to take advantage of his potentially powerful position (his supposed closeness to Bonaparte); it is also possible that he thought the assembly was already against him, and that adopting the usual civilities would only lead to his ousting.

Be that as it may, in the following several months' confrontation between Girard and the board that was now in charge of his case, each party developed an opposite interpretation of the situation.

Let me first examine two particular criticisms of the engineers against Girard's behavior, which did not last. 1. He began the yard-work without any proper approved project. Girard would have great difficulty to fight against this criticism, because he would not be able to prove that he actually had pressing orders, without forcing the administrators and ministers to confirm their orders; as the situation had developed in a conflictual one, with several interpretations of the law, of Bonaparte intentions (which were seldom very explicit), these administrators were no longer sure that their decision to privilege the immediate execution of Bonaparte's orders against the established rules of the Ponts et Chaussées, was the best one; Girard could not be sure that they would confirm their orders and not abandon him, so he adopted a careful attitude, repeating he had orders without showing them. On the other side, the engineers could put the blame on him of having started the yard-work by himself, but it could get dangerous too for them to ignore Bonaparte's decision, if this was really it. So in spite of its effectiveness, this criticism did not last. 2. The decree of Bonaparte presented the task of the engineers as mere execution of existing plans (that's why he didn't left them time to prepare a project.) So several engineers would ask Girard for these plans, insinuating that he could have destroyed them in order to be able to present his own project. Bonaparte made his decision on the presentation of a private project, not knowing that this project was already under examination of the Ponts et Chaussées: the chief-engineer Louis Bruyère had been working for nearly a year on this private project, coming to the conclusion that it was impossible in its current form (the slope of the projected canal going uphill) and proposing instead the diversion of another river (the Beuvronne), smaller and nearer to Paris. When the discussion became serious at the assembly, nobody could actually prove which plan the government meant in its decree, but several engineers proposed different narratives in order to resolve that question. An important part of the engineers' activity (not only in controversial cases) is to make history: telling the story of the project, specifying who did what and when, not only to assign responsibilities, but mainly to define what the project is, what is in and out of it. In the case of the Ourcq canal one can identify three major types of stories. E.-M. Gauthey, an important inspector, convinced that the project should have been his, elaborated a story completely internal to the corps, with no place for the private company which first proposed the idea: the examination of this project by Bruyère was redefined as an investigation proper to the corps, and Gauthey used his hierarchical position to reappropriate Bruyère's work. Bruyère proposed a different story, in order to present himself as a real conceiver. He presented different projects of Ourcq-canals in a simultaneous examination, in which his solution emerges as the good one. In this story, projects exterior to the Ponts et Chaussées were taken into account, but they were evaluated with inside criteria, so that they barely had a chance. Girard enlarged the temporality, including every known projects of diverting the Ourcq, or even other

rivers around Paris, and organized these projects as a progression of knowledge of a virtual community of builders who are looking for the best solution: every project revealed a problem or an impossibility leading to a new one, and finally to Girard's proposal, which appeared as the only logical one. These stories are very important: this is the kind of process by which the engineers defined the limits of the project, and especially two kinds of origins: as I will show, it was important to establish who was the first Pont et Chaussées engineer in charge of the project (were Bruyère or Gauthey in charge of that project?), when the internal process began; and it was no less important to decide who had the first intention of the project (the government or the private company) and what this intention was (divert such or such river for different purposes), because the actual project had to reply to a given intention. One knew that one had the good project because one replied to the good origin, following the proper administrative path, considering the relevant past errors, etc.

I will now describe the more radical and lasting confrontation between Girard and the board. Both parties developed to the extreme a different aspect of the corps, separating two particular aspects that usually hold together. I will first present these two conceptions of what the examination of a project and the relationship between the engineer and the assembly should be, and later come back to the usual functioning that in this case broke apart.

From the first meetings on, the board (and some engineers in the assembly too) openly showed its hostility to Girard's project. The engineers mainly criticized the direction of the new canal (they rejected the principle of Girard, to draw the canal in long straight lines) but their disapproval was obviously more general. They did not propose little transformations to the project, they tried to have it rejected as a whole. In wishing the complete replacement of Girard's project, the board exceeded its functions, which Girard would remind it: the engineer in charge must keep the initiative of the project, he has the right to first propose what he thinks the project should be. He was not the only one to remind the assembly that it did not have the right to propose a project, but only to examine it and to make the necessary corrections on it.

Girard built his conception of what the judgment of the assembly should be on this right to initiative: to be unbiased, the assembly (the board) should strictly separate the activity of conception (left to the engineer in charge) and the examination; the judges only had the right to discuss the existing project submitted by the engineer; they could (and they had to) criticize it, but then the engineer should be asked to reply to their objections. Girard upheld that if he could provide satisfying answers to these objections, his project would be validated and his judges would have no further reasons to reject it. This separation of proposing and examining was not always easy to make: at what point did the modifications, the improvements of a given project, become another project? Judgment over projects often required comparisons: if one wanted to show that a direction was too expensive, one had to provide a better alternative, which could be denounced as an initiative, a competitive project. Every criticism was a potential modification that could be interpreted as an initiative.

The engineers of course denounced this conception of Girard, because in a radical form it made all examination impossible. If they accepted a right to initiative, this right should be kept in certain limits, which they would try to make as tight as possible. If the assembly would have accepted Girard view, the decision would have appeared to be his (especially if, as it was the case, he defended his project so strongly that he did not have to make any change to it.) If the project had been accepted without modification, the assembly would have appeared as a mere registration institution, which, after few discussions, had allowed the engineer in charge to do what he wanted. The engineers wanted to keep a part in the decision, in the project itself. They mainly reproached Girard that "he did not admit his errors", and especially that "he never yielded to the assembly." They expected Girard to do something that he was constantly denying.

To understand this expectation let me go back to the ordinary functioning of the assembly. Usually a project was submitted to the inspector in charge of the district in which it had to be constructed (or in particular cases, to a board of engineers.) The reporter usually defended the project and emphasized some points that should be improved, thus defining the weaknesses of the project the assembly should discuss, and limiting the discussion to these points. It was rare that the engineer in charge appeared at the assembly while his project was discussed: it could happen that he was called to clear some uncertainties, and would be allowed to answer on particular criticisms, but he did not usually go on arguing, and left the discussion to the assembly. The Ourcq affair is original in this respect, because Girard was constantly at the assembly, and especially he did not stop arguing, defending his project. Doing so he made it impossible for his colleagues to impose corrections on the project. Now corrections were a major stage of every examination: if, in ordinary cases, the assembly simply accepted the report that was presented, this report most of the time proposed changes to the project, mostly minor changes, but a project never went to execution without such an intervention of the assembly. In the Ourcq affair, the engineers expected Girard to accept transformations of his project, but they made them impossible to accept, because there were considerable corrections, which completely changed the project into another one (divert another river for different uses.)

The two conceptions of examination, developed by Girard and the board, supported two different visions of the relationship between the individual and the collective. If one accepted that the activity of conception was an individual one, that it was a single engineer who produced the project, it was not conceivable that he could be solely responsible for the construction, for in the eyes of the world, of the government, of the public, only the corps was responsible for everything that was constructed. So there had to be some kind of *collectivization* of the project, and this was precisely what the examination was for. Girard and the board had two different conceptions of what this collectivization should be. For Girard, the project of a Ponts et Chaussées engineer was good *a priori*, precisely because he was an engineer of the corps, because he had been educated in it, because he was part of its body, and had learned to produce acceptable projects. His skills were the corps' skills, and they guaranteed the quality of the project. In this view, the judges were only controllers; they had to look for errors that he could have missed. Here the engineer incarnated the corps, and the project belonged to the corps from the beginning, as he did. His colleagues opposed to this conception a quite different one: they did not deny that the engineer had certain skills, but a project simply could not be good without the assembly's examination. Here, the engineer was not an incarnation of the corps, but a sort of delegation: when he had proposed his project, it was not finished yet; he had only submitted a kind of advanced outline, which his colleagues would have to work on in the assembly. The final project would be a collective one, because it had been elaborated and certified collectively, the whole corps (even though only symbolically through the person of the reporter) had worked on it.

Both parties denounced the failure of the collectivization, describing it as an excessive *personalization*. In the conception of the engineers, Girard was trying to avoid the collective examination and to impose a project, which was an individual one (he did not give the opportunity to transform the project into a collective one.) But for Girard, there was also a kind of personalization. Several times, Girard was able to prove that the criticisms on his project were unjustified (for example, the board tried to show that Girard's direction was too expensive, but failed to provide a satisfying comparison to prove this claim.) The engineers should have admitted their failures, and accepted that the project was good because one could not prove it was not. In continuing their attacks against Girard they demonstrated that they were not judging the project but the man, that they did not really want to improve the project, but to get rid of the engineer in charge. In Girard's conception, as the engineer incarnated the corps' values and skills, errors had to be rare; it was not plausible that a Ponts et Chaussées engineer could make large

and numerous mistakes. If he was accused repeatedly, his skills and therefore his very belonging to the corps were questioned.

The aspect of the corps developed by the engineers in their conception of examination is most familiar to the historiography of French state corps: *integration*. The engineers always insisted on a holist dimension of the corps: it was a big family, where all the engineers were inseparable parts of a whole, and the main question was preserving its unity. The means of this program are well known⁹: the corps was built on a school, which provided the collective culture and *esprit*; but after the school the efforts to maintain it a strong united body were no less, and the engineers were submitted to strong discipline, in a military-like organized institution. In the Ourcq affair, the board particularly stressed the undisciplined behavior of Girard as a threat to the whole corps: the autonomization of a single engineer would be a bad example for the community, every engineer would soon contest the examination, leading to a complete disorganization; Girard menaced the cohesion of the corps, its unity against a world badly disposed towards it.

But Girard's conception of examination focused on another aspect of the corps: the ambiguous nature of the work of the engineers, the problem of the *property* of this work. The engineer was not building alone, his work was always collective in two senses: it was always the corps that was building and responsible for it; and ultimately it was the State (or even Bonaparte himself) that was acting. Therefore the engineer's work was and was not "his", a conflict that was potentially painful to him. In defending his right to initiative, Girard was defending a bond to his project, that allowed him to call it his.

To be a Ponts et Chaussées engineer meant to be devoted to the corps; quite completely as there was no real separation between private and public life. Engineers always described this sacrifice of their whole life to the corps enthusiastically (unless they were pensioned off, or dismissed), but this devotion had to be paid back with gratitude: rewards, promotions, and celebrity. The engineers took much care of their *names*, and they constantly tried to attach this name to something, that could stand for a concrete and permanent proof of their qualities: they wanted the authorship of their work. Girard would spend an important part of his life defending his authorship on the Ourcq-canal (especially under the Restauration, when he was discharged of his canal) against people in- and outside the corps who tried to delete or rewrite this authorship (many books on the canal, for example, in the 19th century barely spoke of Girard and the 15 years he spent on the Ourcq-project.) The corps was very ambiguous about the common ambition of the engineer to attach their names to their work: one usually spoke of past projects by naming and praising their authors, but projects more usually got named and famous after the death of their authors, when the corps could explicitly present an engineer as a model without fearing that his work would only be his, and not also, through him, the corps'. The question of the property of the work was made more complicated by the hierarchical structure of the corps: the superiors were usually making their own the work of their collaborators; most of whom seldom tried to get it back. Pride and glory were suspicious values in the corps, constantly suspected of being in conflict with the welfare (of the corps, and of the State.) The rules for the wages were quite significant in this respect: the engineers never got a proportional part of the costs when working on public works, as they did when they occasionally worked on architectural projects.

In the confrontation between Girard and his colleagues, both conceptions relied on admissible principles (the principles were accepted by the other party, it was the extension, the limits which were contested.) These two opposing logics of argumentation were usually not separated, and they can be seen as the split of something that in usual situations was held together: the

⁹ See Antoine Picon, *L'invention de l'ingénieur moderne – l'École des Ponts et Chaussées, 1747-1851*, Paris, Presses de l'école nationale des Ponts et Chaussées, 1992 ; Jean Petot, *Histoire de l'administration des Ponts et Chaussées, 1599-1815*, Paris, Marcel Rivière, 1958.

breakdown of an equilibrium. The Ourcq-affair gives an opportunity to describe this moral economy, by tying up the two conceptions.

The engineer had to be regarded by his colleagues as an incarnation of the corps' values, so that his skills and his belonging to the corps could not seriously be questioned. The examination was in most cases a mere controlling, errors were rare and assigned to the general imperfection of human being. But, the same examination also enabled to put a collective mark on the project: the engineer in charge had to be corrected to collectivize a work which conception would remain widely individual; the engineer should let himself be amended, accept this collective mark (in most cases he did not have much choice, because he greatly depended on the assembly, was far away from it, with little means of influence on it.)

It was a kind of exchange: the engineer formally kept the initiative on his project; he remained the author, the conceptor, by an act of obedience to the assembly. This act reaffirmed his belonging in the corps, so that his project could become, through him, a project of the corps, which the corps could assume the responsibility for. The collective appropriation that took place in the examination produced a hybrid, a project that was strongly individual and strongly collective at the same time. By this procedure, the engineer's pride coincided with the public welfare, his success and celebrity coincided with that of the corps. The collectivization enabled the acknowledgment of the engineer's own qualities and greatness while strongly integrating him into the corps.

The examination procedure in the Ponts et Chaussées was therefore a form of civility: the engineers on both sides had to adopt certain behaviors to make this subtle equilibrium possible. In the Ourcq-affair, Girard refused these usual civilities leading to a symmetrical attitude of his colleagues.

I will now very shortly present the rest of my work: a second part in three chapters (5-7), concentrates on three important technical themes discussed by the engineers in the Ourcq-affair, and a third part (chapters 8-10) tries to give a more global perception of the affair and more generally of the activity of project.

5. The Ourcq-canal was not an ordinary construction: it intended to bring drinking water to Paris, and the water quality was therefore one of the most discussed questions. To understand the very specific approach of the Ponts et Chaussées engineers on this issue of water-quality, I first proposed a general picture of the various practices and discourses on this subject in the second half of the 18th century, chemical, physical and medical analysis, or analysis in terms of uses, of sight (and smell), and of soils. In the case of the Ourcq-canal, the engineers approached the water-quality in a completely different way; they made no use of the existing methods of analysis, and privileged one criteria, the movement (which was actually an established criteria of quality, but only a qualitative one, and not as they would make it, a quantitative one), that enabled them to formulate this problem in terms of construction, in the (geometrical) parameters of the canal.

6. But Girard did not want the canal to be a simple aqueduct, he also wanted it to be a navigation canal: he imagined a hybrid of two existing categories of constructions with completely different rules, a nonsense for his colleagues. In order to defend this "new" object, Girard inserted in his project a theory (of rational mechanics), which was very uncommon in the Pont et Chaussées at that period. He affirmed that new questions required new answers, and that theory was able to provide technical solutions, and should replace the ordinary traditional tools of his colleagues, their inappropriate *règles de l'art*, rules of the art (an operative knowledge the engineer had to follow to produce a given category of objects), which forced them to choose between the different categories of canals. It was quite impossible for the engineers to judge a project not formulated in respect to these common rules, the theory was therefore received very critically.

The engineers' reactions reveal a more general skepticism about the applications of science to the arts, their particular idea of nature (it could not be regular and would never follow a general law of nature, it could be regularized and therefore follow a particular law of engineering), and the articulation of nature and artifact.

Thanks to the intervention of Prony (who was the most "scientific" of these engineers, especially member of the *Institut de France*) who would find Girard's problem interesting (how to make the water flow fast enough in the canal to be drinkable, while maintaining an adequate height for navigation) the theory would finally be adopted as a way to decide about the project, but in a completely rewritten and rethought form (Prony actually developing his well used formula in correcting and reappropriating Girard's theory.) The theory finally won as a tool to make decisions, though a majority of engineers first rejected it, because it made it possible to link the different parameters of the canal in a constraining manner, by which they expected to prove Girard solution to be impossible.

7. If all the characteristic parameters of the canal were linked by a certain formula, which had finally become consensual (though not for long), then the engineers had also to agree on the measurements of these quantities. There were two main problems of measurements in the Ourcq-affair: first, the levelings, which should decide if the direction of the canal chosen by Girard (his long straight lines) was acceptable in economic terms; on the other hand, the gauges, the measures of the flow of the rivers which should be diverted, in order to establish the possibility (or not) of navigation, the main question which was dividing the engineers. These two very different measurements – the first very standardized and of frequent use, the other not – reveal the same problem: there were unable to solve the disagreement and to decide. Beyond contextual differences, these measurements reveal the difficulty that the engineers had to face: in a context of action, does the measurement aim to fix the size of a given thing or to determine the right thing? It appears that the significance of a measurement depends on what one wants to do with it (there is a strong interference between *what is* and *what should be*.)

8. The Ourcq affair is made of endless exchanges of criticisms and defenses, both sides denouncing the other in the name of general principles. I have therefore analyzed the affair from the angle of the *sociologie de la critique*, developed in the 1990s by Luc Boltanski and Laurent Thévenot¹⁰, a sociology that is concerned precisely with the question of denunciation, of competitive principles of justice, of justification. I did not apply this complex (and very decontextualized) model, but tried to see how it could bring a new understanding of the affair, and of the general activity of the engineers as a justificatory one.

I first wanted to understand how Girard, whose institutional position was not so strong, could maintain himself so long in an assembly that did not usually hesitate to decide authoritatively. The assembly was not a "space of justification", where the accused Girard could defend himself, reply to criticisms: it became so under certain conditions, with some backings, commitments, resources and character. This explains why such lasting affairs were quite rare, even under the Consulat.

The idea of justification can also provide an understanding of the activity of project as an argumentative one: the deliberation of the engineers appears also as a justification of a project, on which they had first to agree, before they could allow its execution. They had to come to an agreement about what was the good project, in two senses: it had to be advantageous and it had to work. This argumentative activity consisted in balancing heterogeneous general principles (different dimensions of public welfare) like economy, commodity, esthetics, prestige, individual prejudice, etc.

¹⁰ Luc Boltanski and Laurent Thévenot, *De la justification – les économies de la grandeur*, Paris, Gallimard, 1991.

9. It is also important to understand why the Ourcq-affair did not stay in the closed circle of the assembly, how the affair left the assembly, in what new spaces it went, and how these spaces changed the shape of the deliberative process. In this later part of the affair, the engineers and administrators tried (in various ways) to remove the different means by which Girard was able to assert his justifications and criticisms in the assembly. The new places of deliberation appear mainly as means to put a stop to the debates, to finally reach a decision, by silencing those who would like the discussion to go on

10. Finally I come back to the general activity of producing and examining projects, and try to specify what is meant when a project is proclaimed "good." Were the engineers, like H  l  ne V  rin has suggested for the modern period, aiming at the production of the "best" project? I argue, that the Ponts et Chauss  es engineers at this very beginning of the 19th century were certainly concerned with optimization, but that does not mean that they conceived this question in terms of choice. Above all, the engineers wanted to achieve a unique project (which was important for their social equilibrium between conceiving and examining), and to make sure that it was the only possible one.