"Assembling Ethics in an Ecology of Ignorance"

Paul Rabinow
UC Berkeley Anthropology

[Presented as the closing plenary lecture of the First Conference on Synthetic Biology, held 10-12 June 2004 at MIT; the transcription below was provided by the speaker. The text was quickly reformatted in order to reduce encoded file size – DE]

♦An Ecology of Ignorance.

The German sociologist Niklas Luhmann, in a book of essays entitled Observations on Modernity, provides acute reflections on: **how** does the future appear? What is its' modality? And **how** should a social analyst observe this process? The quick answers are: The future appears as a contingent set of possibilities about which decisions are demanded. Decisions are demanded because the future appears as something about which we must **do** something (remembering that non-action is an action, not choosing is a choice).

Social analysis consists in observing observers observing. What is observed in the genomics world are trend-spotters, spin-specialists, advisers, facilitators, counselors, ethicists, cultural critics of science and technology and an occasional anthropologist. This manner of posing things foregrounds the legitimacy of expertise as both necessary and dubious. That is to say, as problematic. However, if we can't depend on experts, then what should we do? Or, said another way, in addition to experts, whom?

I. Mode.

In an essay entitled "Describing the Future," Luhmann addresses the issue of what form the future is being given today as well as what forms predictions about it take, in a society that understands itself to be ever-accelerating. Although our times abound in futurologists, prophets, and prognosticators, it is hard to take them seriously as we actually have very little sense of what a future not yet visible in the present would look like in any detail. Two of my favorite confirmatory examples are: the world-historical failure of the experts to predict how the Soviet Empire would end (although a multitude of volumes now purport to show how that end was inevitable); and the fact that during several years Bill Gates missed the import of the internet. Perhaps posing the question of the future in terms of **form** rather than content will produce sociologically more powerful insights. [i] Luhmann argues that the only **genre** of answer to this question that should be taken seriously is one that turns on the future appearing as contingent; one that (for that very reason) compels incessant decisions and reformulations.

As never before, the continuity from past to future is broken in our time. However, the one thing we do know is that much of what will be true in future presents will depend on current decisions. Decide now! To further complicate the picture, we don't have anyone who really **can** decide. It so happens that we live at a time in which the social authority of

experts has been undermined by their oft-proven inability either to forecast the future or to make it happen as envisioned.

Luhmann calls that which has taken the place of authority "the politics of understanding." Understandings are negotiated provisos that can be relied upon for a given time. Such understandings do not imply consensus, nor do they represent reasonable or even correct solutions to problems. What they do do is attempt to fix **reference points**. Reference points are those things that are removed from the argument for further controversies in which coalitions and oppositions can form anew. One might call this the politics of commonplaces understood in the old tradition of rhetoric as the starting point for arguments.

Understandings have one big advantage over the claims of authority: they cannot be discredited but can only be constantly renegotiated. Finally, their value does not increase but only decreases with age. This helps to explain why we continue to turn to experts whose predictions of twenty years ago now look ridiculous; they may have been wrong but at least they are helpful in framing a discussion. [ii] Of course , following the media whirlwind, everyone agrees that cloning is vitally important – the President wants a position soon – hurry, let's have a weighty discussion about its future impact, round up the usual value spokespeople, and be sure a broad spectrum of views is represented. Express concern. Issue a report.

For us, the present refers to a future that only exists as what is probable or improbable. Said another way, the form of the future is the form of probability that directs a two-sided observation as something more or less probable or more or less improbable, with a distribution of these modalities across everything that is possible. The present can calculate a future that can always turn out otherwise. The present can in this way always assure itself that it calculated correctly, even if things turn out differently. Such a situation does not rule out prognoses. In fact it incessantly demands it. But its only worth lies in the quickness with which it can be corrected and or more commonly simply forgotten. There exists, therefore, only a provisional foresight, whose function is found in the form it provides for a quick adjustment to a reality that comes to be other than what was (then) expected.

It is in such a situation that one finds the **modern type of expert,** that is someone who, when asked questions he cannot answer, responds but in a mode that can be led back to a mode of respectable uncertainty. With a little distance, experts and counter-experts as types appear to be equally convincing and equally plausible, their assertions about the future equally unconvincing and equally implausible. It is desired that they have transparent interests and values. Their opinions count because we know what they represent. Negotiations can then be defined as an attempt to increase uncertainty to the point that the only remaining reasonable option is communicating with one another. However, as we do not have the unlimited time that would be required to reach non-distorted agreement, we find ourselves in a quandary.

Responsibility to Ignorance.

In an another essay entitled "The Ecology of Ignorance," Luhmann further specifies the place we reflexive moderns find ourselves in. We move in a situation of **systemic ignorance**. Some of this ignorance is produced knowingly but some is not. Precisely because of the form we have given to the future, we are by necessity within an ecology of ignorance. This point does **not** imply that we need a better map of what we don't know so that we can go about acquiring the requisite knowledge in an ever-more comprehensive manner. Rather, it means that there are inherently volatile, temporally unfolding spaces of ignorance that do not require filling in (as they were not always there and there will always be more of them). These spaces are differentially distributed and are, of course, saturated by partially volatile and partially frozen sets of power relations.

What is appropriate is a reflexive acknowledgement that an ecology of (partial and permanent) ignorance is the social and political ecology in which we live, labor and discourse. Such an acknowledgement would have important consequences. First, it would further deflate the authority of those making futuristic pronouncements – can you remember back less than a decade when debate around mapping the genome turned on the alternatives of: the Genome as Holy Grail leading to ever-lasting health versus genomic mapping as leading to an inevitable Back Door to Eugenics? One can simply observe that those making such assertions had no possible knowledge on which to base such claims. Such claims fluctuate between tautologies – the rich will profit from this (whatever the "this" is) – to hype – a new age of medicine is dawning "within a decade." But why is there so much debate about things we can not know about -- now? To pose the question is to answer it. These platitudes and clichés should be seen as attempts to fix reference points for debate and communication. They are part of a sociologically essential hype that prognosticative observers of science and society can now not operate without. Luhmann puts this insight bluntly: "[t]he intensity of ecological communication is based on ignorance. That the future is unknowable is expressed in the present as communication. Society is irritated but has only one way to react to its irritation, in its own manner of operation: communication." [iii] Let's hold a conference, set up a commission, have a lively debate, write editorials, take a stance, position ourselves. These activities are often referred to as political, or, at times, ethical.

We have a responsibility to our ignorance. iv Given the expansive normativity of communication and given the imperative to make decisions in the face of a contingent but on-rushing future, it is not surprising that we live in a time in which the term **ethics** appears promiscuously in the most surprising couplings – business ethics, baseball ethics, bio-ethics. Although at first blush these pairings would seem to be oxymoronic, Luhmann's conceptual apparatus provides insights into the form these ethical discourses take.

It is no surprise that our bureaucratically driven welfare states are permeated with and regulated by **procedures**. "If we do not know what good reasons are, then we at least want to be able to say how we can test whether good reasons are good reasons, namely in communication itself." [v] That communication is about **values**. "A normative

understanding of values serves to allow an ethics to formulate moral demands for the behavior of others, demands *that can be maintained despite constant disappointments*." This claim means that there are stable reference points established that are impervious to the fact that they are not lived up to. No one can instantiate the value of autonomy. It is a regulative idea. We have ethical experts whose work is to constantly re-assert the importance of autonomy or dignity. Empirical failure in no way deflects or deflates their position. However, such value experts can only explain themselves in value terms. The power relations upon which and through which their positions are constructed, maintained and expanded fall outside of this discourse. When one group of ethicists ousts another the only language available to explain their victory is one of better ethics. Luhmann points to the philosophy of Hans Jonas as the most sustained attempt to develop an ethics (of procedure and value) in a technological age. Jonas argued that the heart of ethics lies in taking **responsibility** for the (future) consequences of our actions. This position has two major inherent limitations. First, as we live in a modernity in which the future appears as contingent, the ethical actor can not know the future chain of consequences of his actions. This situation leads to a dilemma: Either we do not act (but then who takes responsibility for the consequences of inaction?) or we act responsibly knowing that we can not know what our actions will stochastically lead to. We find ourselves in the world of being conscious of accepting risk, and ethics, at least until now, has not been able to provide any criteria for this. Only procedures and values. Hence the cost of a responsibility-based ethics may be its impossibility. If we were to be responsible to our ignorance then we would have to think differently. If we did so, there would be problems translating such structural ignorance and a principled responsibility to it into the kind of technical rationality that our bureaucracies demand. But those problems would be worth struggling over.

II. Nature.

Georges Canguilhem, in an acerbic article entitled «*Nature dénaturée et Nature naturante*» ["Nature denatured and naturalizing nature"] provides a stern pedagogical lesson to those who hold sentimental views of nature's purity. Canguilhem's article was written at a time (1976) when ecology was gaining a momentary prominence on the French political scene. Canguilhem observes Western history has seen sporadic waves of protest against the putative "de-naturation of human life in both its means and its ends" putatively caused by technico-economic practices. The common denominator of all such protests is an affect of regret, a deploring of the loss of an imagined, unmediated contact with "that originary absolute, essential reference, about which people dream under the name of nature." [vi] For Canguilhem such a position is scientifically absurd although he admits, not without a certain self-satisfaction dear to secular French thinkers, that the position as well as its associated emotion, could well be theologically coherent.

All techniques are artificial; this banality, however, does not imply that techniques are metaphysically distinct from or opposed to nature in any ontological way. For example, if agricultural techniques are to succeed they must be "rigorously conditioned by the very nature of animal and vegetable functions of growth and multiplication." [vii] This stricture applies to whatever form of technology is at issue be it that of peasants, industrial

agriculturalists, or organic farmers. “For a long time, man has harvested that which he has sown without having made it grow.” [viii] One can intervene in multiple ways with organic things but the things themselves must have the potential to integrate those changes if the results are to be anything approaching what those applying the technology had sought to bring forth. Certain interventions will do nothing or produce loss; others will increase yield or produce unexpected results. Technology can be seen as a mode of revealing potentials, not essences.

Canguilhem draws two major conclusions from this principle. First: “Scientifically speaking, denaturation is meaningless. Technically speaking, denaturation means a change in use. No use is inscribed in the nature of things. The very first use of a thing is its denaturation.” [ix] Or said another way: “It is certain that one does not denature nature in orienting its powers towards effects that are not the usual ones.” [x] We are only just beginning to learn again how polyvalent and over-determined organic systems already are; we know very little about their limits. Biotechnological interventions will surely teach us more. Such knowledge, like all knowledge, carries with it risks. [xi]

III. Security, Danger, Risk.

Any discussion of risk must confront a definitional question as there are so many different ways to approach the topic. Here I adopt the distinctions proposed by Niklas Luhmann, in his book, Risk: A Sociological Analysis. Luhmann asserts that the world “knows no risks, for it knows neither distinctions, nor expectations, nor evaluations, nor probabilities –*unless self-produced by observer systems in the environment of other systems*.” [xii] This claim means that any discussion of risk-taking or risk-making entails a reflective state of affairs and a decision about significance.

Risk has been frequently coupled with “security.” This coupling is polemically useful but analytically weak. If one opposes something and wants to discredit it then it is smart to contrast risk with security (or safety). By so doing one implies that there exists a clear choice between a secure state of affairs and one that is not. Of course, the problem is that it is hard to see how anyone could choose the undesirable conditions rather than the desirable ones. If choosing security is a fool’s paradise, then another way forward is to make the primary distinction **risk/danger** instead of risk/security. By so doing one shifts the focus from a quest for security to an attention to possible future loss. In this mode one can make a link between a potential loss and a string of decisions that might lead to it: at that point one is speaking of risk, or as Luhmann says “the risk of decision.” Once one begins to operate within the logic of risk and danger, the horizon of safety by no means disappears; rather it remains unmarked in the linguistic sense. Within the pair of risk/danger one can emphasize either side: If one downplays the side of decision making than “the possible loss is considered to have been caused externally; that is to say, it is attributed to the environment. In this case we speak of danger.” [xiii] Those who mark risk, downplay dangers; “whereas marking dangers allows the profits to be forgotten that could be earned if risky decisions are made.” [xiv] A reflective observer sees that there can be no risk free behavior. Deciding to act poses risks of loss in the future but the observer notes that it is equally true that not acting carries with it its own consequences.

Luhmann draws two further consequences relevant here. He calls the first, “the contingency schema.” If one is concerned with the issue of future loss and of decision making, then we are faced with “two temporal contingencies, event and loss are firmly coupled as contingencies (not as facts!), this makes it possible for observers to differ in the way they see things. Temporal contingencies provoke social contingencies, and this plurality, cannot be cancelled out by an ontological formula. [xv] For Luhmann accepting contingency means taking up a modern ethos toward the modern world.

Luhmann’s second insight rejoins Canguilhem: “Modern risk oriented society is a product not only of the perception of the consequences of technological achievement. Its seed is contained in the expansion of research possibilities and of knowledge itself.” [xvi] The more science we do, the more knowledge we make, the more technological intervention becomes possible, the more choices are posed, the more risk there is, the more the imperative to act or not to act imposes itself. And that point must be the beginning of seeing what difference today makes with respect to yesterday: vigilance and intervention *même combat*.

IV. Problematize.

In 1912, Marcel Duchamp left Paris for Munich. In Paris the art world was battling over Cezanne and Cubism. In Munich Duchamp encountered a different way of taking up painting, its questions, practices, its history and its future. Famously, upon his return to Paris, Duchamp called his time in Munich "the occasion of my complete liberation." [xvii] He abandoned painting as an "artisanal pleasure," so as to turn it into something else. He did not seek to eliminate painting, rather he sought to up the practice in a new manner, one that was "utilitarian as opposed to contemplative, and ready-made, as opposed to artisanal." [xviii] One might say he abandoned the traditional practices of painting out of loyalty. In a letter he wrote to himself, Duchamp said “Marcel, no more painting; go get a job.” [xix]

The emergence of modernism in painting -- understood as composed of objects, materials, way of making things, forms of subjectivity -- can be understood as an on-going questioning of pictorial practice through successive and overlapping abandoning of each of the traditional modes of taking up these elements. A primary site of the problematization of pictorial practice characteristic of the avant-garde is found in the complex exchanges with industrialization: division of labor, new materials, new means of pictorial production and reproduction.

Duchamp picked out the paint tube as a paradigmatic locus of such elemental transformations. The first commercially produced tubes of paint appeared during the decade 1830-1840, contemporary with the other specific point of "industrialization's penetration into the painter's practice. Like photography, it was thus threatening painters most directly in their artisanal traditions; certainly the tube of paint freed them from a tedious and mechanical task, but it also introduced the division of labor into a professional activity that had always sought to maintain as much control as possible over the whole production process." [xx]

At the time of Duchamp's visit, there existed in Munich a *Deutsche Gesellschaft zur Forderung rationneller Malverfahren* (German Society for the Promotion of Rational Pictorial Procedures) devoted to the preservation of traditional crafts. Industrialization's perceived threat to the status of traditional crafts was articulated as the basic reason for the Society's existence. The specific threat at issue concerned the control of the manufacture of pigments. This control was passing from the artist to industry, from the studio to the factory. This shift carried with it a number of unexpected challenges and consequences. Artists were losing out to chemists and engineers for the control of a technical knowledge they formerly had considered integral to their art. "The workshop recipes that painters, since the Van Eyck brothers, had protected jealously from the curiosity of their colleagues and passed on only to their best pupils were now on the public market, object of a competition that no longer involved artists on the aesthetic plane, but rather paint manufacturers on the economic plane. Pictorial technique...had been itself a bearer of tradition, lost its esoteric character and become know-how that was part science, part merchandise, and whose success was connected to technological progress and profit." [xxi]

This transformation is fully in line with the more general process of "rationalization" identified by Max Weber (in Munich) during the same period. The banalization of the tube of paint was surely a moment of "de-magification." De-magification," is a fundamental principle of modernity. Simply enough, it means that there are no mysterious forces at play in the world, that -- in principle -- everything could be known and mastered by calculation. Paint was becoming controllable material. The efforts of Kandinsky and others to "spiritualize" pure color were, in this perspective, a swan song rather than a prelude. [xxii]

The commercialization of the tube of paint also brought with it what is taken to be another ineluctable aspect of modernity, standardization. The tube of paint had a price, it had a reliable consistency, it could pass from place to place while remaining the same. Colors were becoming modern. Industry was now an obligatory site of production for the manufacture and distribution of the artist's primary materials. What artists did with those primary materials, of course, was not dictated by the materials. Nonetheless, as Duchamp grasped so strongly, the tube of paint was exemplary of the mode in which industrialization contributed to the suspension of what had been painting's "common sense" as well as its art. That contribution, however, should not be understood as a determining one or as a univocal force. The rupture occasioned by XIXth century industrialization in the field of artistic practice was a singular historical event, which not only survived the conjuncture in which it emerged but which helped to provide the materials and practices used to retroactively reinterpret what that conjuncture had been. The assimilation of industrial partners and industrial materials into artistic practice was an historical event of extended duration. Rembrandt was engaged in commerce and in the division of labor in his studio; the impressionists included smokestacks in their paintings; Andy Warhol called his studio "the factory." There is no single point that defines the moment of transmogrification of tradition into modernity. However, there certainly have been -- and will be -- moments punctuated by a heightened awareness of change and challenge. Industry did not destroy painting (or crafts for that matter) only made them

appear problematic in a new way for a certain time. Furthermore, industry itself is only a general name for a very diverse set of processes, entities and practices. As Marx underlined modern industry is characterized above all by relentless change. One certainly can lump together German chemical factories on the eve of the First World War and Genentech at the end of the XXth century but they can be distinguished with equal plausibility and conviction. It all depends on what you are seeking to elucidate.

Deduction: Paul Klee.

The composer Pierre Boulez in a book on the painter Paul Klee insists that composition and experimentation are inseparably linked although they are not identical. They are joined through a motion of stopping and starting, of moving toward and standing back. Boulez observes with admiration that Klee possessed an extraordinary power of deduction. [xxiii] Deduction and distillation is both a sign and a goal of mature art (and thinking). The experienced artist knows that creativity is more than creative impulses. He knows this not just cognitively but in an embodied mode. Ideas or impulses, one discovers (and there is no other way to know it) may well be too rich. That richness can constitute an unexpected encumbrance to creation. Handling this energy may pose unsuspected problems. Through practice, at least for certain artists and certain thinkers, the challenge becomes one of how to divide things into smaller units: ones that can be handled better. The painter must be able derive these units and imagine their development into a larger structure but equally, to have sufficient imagination to maintain their "impulsion to movement." [xxiv] Achieving this motion, for Boulez, is precisely the essence of composition. Finding the means to do this, the balance of structure and motion -- the issue of form -- varies from practice to practice; fortunately there seem to be a large, if indeterminable, number of possibilities within each practice.

In his 1912 '*Approches de l'art moderne*,' Klee juxtaposes "impressionism" and "expressionism." Impressionism, he writes, seeks to receive nature and its existing forms, to let those forms and the sensations of the world press themselves in upon us. The danger and limit of such naturalism, however, is that it privileges observation of form (or sensation) as if they existed by themselves and that the artist's challenge consisted in observing and allowing the capture of that auto-sufficiency. It is the latter claim that Klee completely disavows. Rather, he maintains, that one must approach form (and nature) in an active mode; art (but also science) is inseparable from an interventionist relationship to the material. Forms are not merely received, although they are received, they are also, and with equal importance, made. Klee formulated this insight in a 1920 lecture as his 'credo,' – "Art does not reproduce the visible; it makes it visible." [xxv] It is this operational dimension, the rendering, this insistence on activity, that is decisive.

In 1924, Klee delivered a lecture entitled '*De l'art moderne,'* where he asserted that the artist does not accord to nature the same constraining importance and self-evidence that self-proclaimed realists attribute to it. "Fixed forms,' Klee writes, "are not the height of nature's creation. It is nature in process that the artist seeks to make visible." [xxvi] The artist need not, must not, feel subjected by what exists. That freedom is the artist's right and his duty. Furthermore, it is precisely this mode of relating to things that surprisingly

provides access to forms. The reason for this unexpected bonus is that nature itself is movement and change. The modern artist attempts to see what is, while knowing that it could be otherwise and indeed probably has been otherwise.

Klee's "cool romanticism" practiced an extreme attention to things. He practiced a mode of approaching things taken up as if they were already always themselves in the process of transformation. The job of the artist then was not to violate the real any more that he needed to adopt an avant-guardist opposition to it. Rather, as thing themselves were in a process of transformation – *nature naturante*-- it was perfectly consistent to find their motion there where it lay. And to work with it.

In his Bauhaus lessons Klee provides a highly distilled exposition and demonstration of the means for achieving motion in painting. [xxvii] Klee, through his teaching and interchanges with his colleagues and students, moved toward a kind of purification, one that led back to geometry and its abstractions. Working systematically on elaborating the multiple uses of the simplest elements – the square, the circle, the straight line, etc., -- Klee laid out all the logical variations, combinations, connections, mutual reciprocities. Klee's geometry, however, was not Euclid's. '*Klee*,' Boulez writes, preserves *'une zone d'insoumission.'* [xxviii] Klee's 'dissidence' allowed him even greater access to a nature, and hence, to a new art.

Conclusion.

The issue of what gets to be named ethics is a question of power and rhetorical skills. So members of your community will need to learn from the recent past. And to develop skills and networks. Exemplars that spring to mind: Asilomar and Monsanto but also DeCode.

There needs to be a much better defense of scientific and technical understanding. Everything is now cast as "good for something else." The highest value today is health. We need a better statement of "Science as a vocation," for the twentieth-first century. This too is ethics.

Secession not revolution. "The Munich or secession model supposed neither a total or radical break with tradition nor the monolithic character of academism. In this model the avant-garde assumes the right to say what a painting is when it judge the academic too rigid or limiting. The novelties of the avant-garde were not seen as a radical refusal, but as"secession," that expanded the territory by resituating the place of the old and now merely academic tradition within it." (x)

Make the shift from risk/security to risk/danger. The rhetoric of danger is everywhere. This is based on fear. Replace fear with prudence, pleasure and wonder.

Talk more about how natural it is to be transformative.

[i] Niklas Luhmann, Observations of Modernity, Stanford: Stanford University Press, 1998 (orig. 1992), p.63.
[ii] Gregory Pence, Who is Afraid of Human Cloning?,
[iii] "ecology" (check)
[iv] Thanks to James Faubion for this phrase.
[v] Ecology, p.93. See Edward Andrew on value as subjectivation.
[vi] Georges Canguilhem, "Nature dénaturée et Nature naturante," published in Savoir, faire, espérer: les limites de la raison, Publications des Facultés Universitaires Saint-Louis, Bruxelles, 1976, p. 71. *cette sorte d'absolue originaire, de référence indépassable, dont il est rêvé sous le nom de Nature.*
[vii] "Nature," p. 78.
[viii] "Nature," p. 79. *L'homme a longtemps semé ce qu'il avait récolté sans l'avoir fait pousser.*
[ix] "Nature," p. 84. «Tels qui croient tenir un langage humaniste usent en fait d'un vocabulaire théologique. Scientifiquement parlant, dénaturation n'a pas de sens. Techniquement parlant, dénaturation signifie changement d'usage. Or, aucun usage d'une chose n'est inscrit dans la nature des choses. Le premier usage d'une chose est sa dénaturation.»
[x] "Nature," p. 85. «Il est certain qu'on ne dénature pas la nature en orientant ses pouvoirs d'effets qui ne lui sont pas ordinaires.»
[xi] "Nature," p. 87. «Parce que la nature ne peut qu'être naturante, une nature dénaturée, à la fois fille et mère de la culture, est possible. Parce que cette dénaturation a du emprunter progressivement les voies de l'abstraction et de la représentation non-figurative qui sont celles de la science, et que de ce fait on n'a pas su reconnaître dans la nature dénaturée la nature naturante, une plainte et une colère sont nées, auxquelles la littérature et l'idéologie s'efforcent en vain de donner un poids philosophique.»
[xii] Niklas Luhmann, Risk a Sociological Analysis, p. 6.
[xiii] "Risk," p. 21.
[xiv] "Risk," p. 24.
[xv] "Risk," p. 17.
[xvi] "Risk," p. 28.
[xvii] Nominalism, p.104.
[xviii] Nominalism, p.98.
[xix] Rajchman, p.xxi.
[xx] Thierry de Duve, Kant After Duchamp, Cambridge, Mass: MIT Press, 1996, p.177.
[xxi] Nominalism, pp.179-180.
[xxii] Max Weber, "Science as a vocation," in C. Wright Mills and Hans Gerth, eds., From Max Weber, Essays in Sociology, New York: Oxford, 1946, p.139.
[xxiii] Ibid., p. 130.
[xxiv] Ibid., pp. 130-131.
[xxv] Paul Klee, "*Credo du Créateur*, " in Théorie de l'art moderne. Paris: Editions Denöel, 1985, p.34. *L'art ne reproduit pas le visible; il rend visible.*
[xxvi] Ibid., p. 28. "*Les formes arrêtées, ne représentant pas à ses yeux l'essence du processus créateur dans la nature. La nature naturante lui importe davantage que la nature naturée.* "
[xxvii] Boulez, p. 131.
[xxviii] Boulez, p. 127.