



GARY WOLFE, SERIES EDITOR

- 10 *Cosmopolitics II*
Isabelle Stengers
- 9 *Cosmopolitics I*
Isabelle Stengers
- 8 *What Is Posthumanism?*
Gary Wolfe
- 7 *Political Affect: Connecting the Social and the Somatic*
John Protevi
- 6 *Animal Capital: Rendering Life in Biopolitical Times*
Nicole Shukin
- 5 *Dorsality: Thinking Back through Technology and Politics*
David Wills
- 4 *Bios: Biopolitics and Philosophy*
Roberto Esposito
- 3 *When Species Meet*
Donna J. Haraway
- 2 *The Poetics of DNA*
Judith Roof
- 1 *The Parasite*
Michel Serres

ISABELLE STENGERS

Cosmopolitics I

I. The Science Wars

II. The Invention of Mechanics

III. Thermodynamics

posthumanities 9

TRANSLATED BY ROBERT BONONNO



UNIVERSITY OF MINNESOTA PRESS

MINNEAPOLIS

LONDON

The University of Minnesota Press gratefully acknowledges the generous assistance provided for the publication of this book by the Hamilton P. Traub Press Fund.

Published in French as *Cosmopolitiques I*; copyright Éditions La Découverte, 2003. The contents of this book originally appeared as part of a seven-volume edition of *Cosmopolitiques*, also published by Éditions La Découverte in 1997. *Cosmopolitiques I* includes volumes I, II, and III of the original edition; *Cosmopolitiques II* includes volumes IV, V, VI, and VII of the original edition.

English translation copyright 2010 by Robert Bononno

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of the publisher.

Published by the University of Minnesota Press
111 Third Avenue South, Suite 290
Minneapolis, MN 55401-2520
<http://www.upress.umn.edu>

Library of Congress Cataloging-in-Publication Data

Stengers, Isabelle.

[*Cosmopolitiques*. English]

Cosmopolitics / Isabelle Stengers ; translated by Robert Bononno.

v. cm. — (Posthumanities ; 9-)

Includes bibliographical references and index.

Contents: I. The science wars, II. the invention of mechanics, III. thermodynamics

ISBN 978-0-8166-5686-8 (v. 1 : hc : alk. paper) — ISBN 978-0-8166-5687-5 (v. 1 : pb : alk. paper)

1. Science—History. 2. Science—Philosophy. 3. Science—Social aspects. I. Title.

Q125.S742613 2010

501—dc22

2010010387

Printed in the United States of America on acid-free paper

The University of Minnesota is an equal-opportunity educator and employer.

17 16 15 14 13 12 11 10 10 9 8 7 6 5 4 3 2 1

CONTENTS

Preface / vii

BOOK I. THE SCIENCE WARS

1. Scientific Passions / 1
2. The Neutrino's Paradoxical Mode of Existence / 14
3. Culturing the *Pharmakon*? / 28
4. Constraints / 42
5. Introductions / 56
6. The Question of Unknowns / 71

BOOK II. THE INVENTION OF MECHANICS: POWER AND REASON

7. The Power of Physical Laws / 87
8. The Singularity of Falling Bodies / 98
9. The Lagrangian Event / 112
10. Abstract Measurement: Putting Things to Work / 129
11. Heat at Work / 139
12. The Stars, like Blessed Gods / 150
13. If We Could . . . / 162

BOOK III. THERMODYNAMICS: THE CRISIS OF PHYSICAL REALITY

14. The Threefold Power of the Queen of Heaven / 173
15. Anamnesis / 180
16. Energy Is Conserved! / 189
17. The Not So Profound Mystery of Entropy / 202
18. The Obligations of the Physicist / 221
19. Percolation / 236
20. In Place of an Epilogue / 254

Notes / 262

Index / 285

PREFACE

How can we examine the discordant landscape of knowledge derived from modern science? Is there any consistency to be found among contradictory or mutually exclusive visions, ambitions, and methods? Is the hope of a "new alliance" that was expressed more than twenty years ago destined to remain a hollow dream?

I would like to respond to these questions by arguing for an "ecology of practices." I have constructed my argument in seven steps or parts, covering two separate volumes (this is the first).¹ Each of these seven books is self-contained and can be read on its own, but I hope that readers view individual books as an invitation to read the others, for the collection forms a unified whole. Step by step, I have attempted to bring into existence seven problematic landscapes, seven attempts at creating the possibility of consistency where there is currently only confrontation. Whether the topic is the nature of physics and physical law, the debate over self-organization and emergence, or the challenges posed by ethnopsychiatry to the division between modern and archaic knowledge, in each case I tried to address the practices from which such knowledge evolves, based on the constraints imposed by the uncertainties they introduce and their corresponding obligations. No unifying body of knowledge will ever demonstrate that the neutrino of physics can coexist with the multiple worlds mobilized by ethnopsychiatry. Nonetheless, such coexistence has a meaning, and it has nothing to do with tolerance or disenchanting skepticism. Such beings can

be collectively affirmed in a "cosmopolitical" space where the hopes and doubts and fears and dreams they engender collide and cause them to exist. That is why, through the exploration of knowledge, what I would like to convey to the reader is also a form of ethical experimentation.

BOOK I

The Science Wars

Scientific Passions

How do the sciences force us to conceive of the world? What do they teach us about the possibilities of understanding it? According to Stephen Hawking, speaking with all the apparent authority of cosmological theory and as a descendant of Galileo, Newton, and Einstein, we will soon know the mind of god. John Wheeler, using quantum mechanics, claims that the universe itself, like everything that exists in space-time, owes its actual existence to the observer. Believers in the (strong) anthropic theory claim that science is leading us toward a different, but equally unsettling, conclusion: the end point of the universe is the production of those who describe it. This gives rise to the question of the durability of our cosmic vocation: what will become of mankind in a few billion years when the sun's resources are exhausted and the universe itself winds down? For the moment, however, we still don't know if quantum mechanics will allow Schrödinger's cat, enclosed in its infernal box, to die before the physicist condescends to open it, or if the entire universe will spin off multiple realities each time a measuring device produces one result rather than another. There is still ongoing debate concerning the possibility of the "stardust" we consist of achieving conscious experience: is

consciousness an irreducible property, like space or time? Can it be fully explained in terms of the multiple cross-processing of information residing in the brain? Or, rather, is it based on quantum effects that have been amplified and stabilized in the brain's microtubules? Whatever the case may be, if thought can be reduced to the properties of circuits and neuronal systems, shouldn't we begin to treat our ideas about knowledge, the ego, consciousness, perception, and so on as fated to join the crystal spheres of astronomers, the phlogiston of chemists, or the animal spirits of physicians in the cemetery of prescientific theories?

It is said that the first step in the history of science was the break with myth, but equally important was the break with sophism. Rational discourse would, therefore, from its inception, designate its "others" polemically: the fictions that evade verification and defy argument, on the one hand, and the arguments that exploit the freedom—for those who have escaped myth—to prove a thesis (or its opposite), on the other. What of the historical sophists, apart from their role as outcasts, as the other of the philosopher, the friend of truth? How do myths function within the cultures in which they are an integral part? There is no need to raise such questions here, for terms like "myth" or "sophist," insofar as the sciences are concerned, serve as code words, always addressed to others, reminding them of the always renewable rupture. From this perspective it could be said that the sciences follow a narrow path, ever on the defensive against the powers of the imagination, which are satisfied with explanations and significations forged without constraint, and against the powers of rhetoric, which are satisfied with the ambiguity of language and the pretenses of proof.

In following this narrow path, are scientists really capable of balancing and theorizing the "larger questions" concerning the universe, its origin or finality, human thought, or humanity's role? If not, is it by again promoting the abstinence and

proud humility that science must maintain in the face of the delicious temptations of ideology that we will be able to promote a harmonious and pacific collaboration among the hardworking "seekers of proof" extolled by epistemology?

In fact, the past and present of so-called scientific practices, as inventive as they may be, force those who study them to acknowledge that those qualities are always susceptible of turning into their opposite—narrow-mindedness and arrogance—as soon as those who are responsible for cultivating them are forced to position themselves against one another. If the landscape of practice currently provides the impression of coherence, it is one of generalized polemic. Cold or hot, depending on circumstances, it is expressed as contemptuous disinterest, attempts at annexation (for example, that long-awaited moment when a "rational pharmacology" will finally enable us to design "scientific" drugs), even dramatic proclamations, where a contested practice links its fate to that of humanity as a whole (the criticisms of psychoanalysts who warn of the threat presented by the rise of pharmacological psychiatry). This polemic is embodied statically in our universities, where every discipline has its own territory, its experts, its criteria, and where the reassuring fiction of collegiality prevails, one whose only point of agreement is the disqualification of the "nonscientific." A polemic embodied much more dynamically by the "large-scale operations" of mobilization, conquest, and hierarchization that structure the landscape of the scientific disciplines.

Thirty years ago, the person who wrote those lines, then a novice philosopher, still believed in the exemplary role physics could play once it affirmed the possibility of transforming the scope and significance of its function as a model for other forms of knowledge—a function it has served ever since the origin of the modern sciences. *Order out of Chaos: Man's New Dialogue with Nature*, which I coauthored with Ilya Prigogine in 1979, showed how some of the most fascinating statements made by

physics, particularly the reduction of the distinction between past and future—"time's arrow"—to a mere question of probability, far from conferring upon physics a quasi-prophetic function, disclosed its fragility, the impassioned adventurousness of its character. At that time Ilya Prigogine and I wrote: "In any event, as far as physicists are concerned, they have lost any *theoretical* argument for claiming any privilege, whether of extra-territoriality or of precedence. As scientists, they belong to a culture to which they in their turn contribute."² In *Entre le temps et l'éternité*, we again stated that "the search for coherence among forms of knowledge has been the connecting thread in this essay. . . . We cannot discover such coherence as if it were a truth that transcends our history, whether that history leads us to truth or has lost its original connection to it. We can only construct it within this history, from the constraints that situate us but which also enable us to create new possibles."³ However, it is much easier to announce the good news that the prophetic utterances of physics have changed and now reflect a world that is temporally asymmetric rather than symmetric, chaotic or bifurcating rather than deterministic, capable of self-organization and not inert and static, than to face the bemused smile of readers confronted with the idea that physicists are capable of telling them what kind of world they live in. That is the lesson I needed to learn. In a sense, for the third time, I intend to rework this notion of coherence and to do so by confronting the question of the relationship between the "passion for truth" characteristic of the scientist, and which marked both *Order out of Chaos* and *Entre le temps et l'éternité*, and the question of a possible peace, a humor of truth.

One possible objection is that the lesson was obvious and should have been evident to any philosopher worthy of the name. The very title of the book, *Order out of Chaos*, didn't exactly serve as an example of a denial of prophetic emphasis. And whenever it attempted to turn physics into a "poetic

attentiveness" to nature, didn't it already—even though we had specified that poetics was to be understood in the etymological sense of "maker"—encourage scientists to range outside the narrow and austere pathways that defined them, with respect to myth as well as the precariousness of discursive proof? And am I not once more in the process of making the same mistake? Why speak of the humor of truth when the association between "science" and "truth" is now suspect? Shouldn't I acknowledge that it is the responsibility of critical thought, which teaches each of us the limitations of our respective approaches, to promote methodological peace?

I have to acknowledge that the ideal of peace through a rejection of the ambitions and passions that the critic condemns is not my goal. What's more, it seems to me that this ideal is one whose history leads us to doubt its relevance. After all, if there is a turning point in what is referred to as modern science, wasn't it Galileo's rejection of the eminently rational compromise offered by Cardinal Bellarmine? If the astronomers had been in agreement, the heliocentric doctrine would have been recognized as "true," but it would only be so relative to the questions and calculations of the profession. Indeed, one could also claim that the great narrative of the Copernican revolution, which celebrates the destruction of the ancient cosmos, with the Earth at its center, and its substitution by an acentric universe in which the Earth is merely a planet, was by no means necessary. For the Earth-as-planet is less a substitute for the Earth-as-center than a supplement; it is a reference point for new questions, new practices, and new values, but does not produce genuinely scientific answers to age-old questions. But Galileo's rejection of the Jesuit proposal must be heard. The Earth-as-planet is not a simple professional hypothesis, it asserts a truth that no methodological ban will be able to limit. Can we ask that Galileo's heirs endorse the ascetic rejection he himself refused to make?

One might reply that this backward movement is illegitimate, as the period in question was one of conflict, a time when more than just the relative positions of the Earth and the Sun were at stake. Galileo was defending freedom of thought in the face of clerical dogma, that is, the possibility of genuine critical thought. Methodological criticism can only take place in a pacified world, a world where the right to conduct research and the absence of revealed knowledge are recognized. Galileo's heirs no longer need, or should no longer need, weapons of questionable merit to conquer a territory that is recognized as their own.

Let's look at another example. In 1908, a time when religious dogma was no longer a threat to physics, the physicist Max Planck initiated the excommunication of his colleague Ernst Mach, whom he proclaimed guilty, through his historical-pragmatic conception of physics, of weakening the faith in the intelligible unity of the world. For Mach, physical references that appeared to refer to a world that existed independently—absolute space and time, atoms, and so on—had to be eliminated and replaced by formulations that tied physical laws to the human practices with which they were indissolubly connected. In contrast to this critical approach, Planck would affirm the necessity of the “physicist’s faith” in the possibility of achieving a unified concept of the physical world. Without that faith the source of inspiration that had enabled minds such as Copernicus, Kepler, Newton, and Faraday to carry out their work would dry up.⁴

Planck was the first to explicitly position physics within the context of *faith* rather than austere rationality, a faith that had now become an essential component of the physicist’s *vocation*, and to correlatively affirm that the practice of physics was not just another kind of science. Planck did not actually deny the general plausibility of Mach’s description, he rejected it *for physics*. Physicists *must be able* to speak of the “world” or “nature” independently of the operational and instrumental

relationships that, for Mach, were the only source of theory’s legitimacy. Without that, how could physicists have dared claim that energy is conserved and that it was already conserved before life on Earth even existed, that is, before a human was able to conceive of it? How could they have felt authorized to claim that the laws of gravity would continue to govern the movements of celestial bodies after the destruction of the Earth and all its inhabitants? In order to be able to produce such statements—the culmination of modern physics—Planck states that the physicist must be able to believe that even an “inhabitant of Mars,” or any other intelligence in the universe, can produce their equivalent. The differentiation established by Planck, based on which he defined the “physicist’s vocation,” does not juxtapose opinion and rational practice but affirms the privilege of physics. In doing so, he connected the inspirational needs of physicists with a twofold hierarchy: one for the “realities” with which we deal, with physical reality being the only “real” one, and that of our rational knowledge, with physics at the summit.

Here, Planck created what Gilles Deleuze and Félix Guattari refer to as a “psychosocial type.”⁵ Planck’s physicist is not a portrait, one we might want to compare against the original. His role is to serve as a “marker,” to function as a reference whenever physicists discuss their work, its meaning, and the scope of their theories. And the faith that inhabits Planck’s physicist cannot be assimilated to a type of ideological overload indifferent to what one might recognize as strictly scientific challenges. While the theme of the physicist’s vocation may reflect a strategy of hierarchization, it cannot be reduced to such a strategy in the sense that it could be understood in purely human, social, political, or cultural terms. Planck is not inventing a means of differentiating physics from the other sciences; he states, he literally “cries out” against Mach the *fact* of that difference. He celebrates the conservation of energy but he is himself the product of the event engendered by the statement of that conservation, the

victim of the power it seems to confer on the physicist: the power to talk about the world independently of the relationships of knowledge that humans create.

As such, the impassioned vocation of the physicist affirmed by Planck is part of the present, of the identity of physics transmitted to physicists, with which they identify in turn. And that vocation serves as a reference not only in "external" discourse on the rights and claims of physics but within strictly technical controversies that underlie concepts considered fundamental by physicists. It is in itself a vector and ingredient of history. The "physicist" whose commitment it heralds is, for better or worse, an integral part of the very construction of the theoretical claims of twentieth-century physics.

It seems to me that the impassioned commitment of physicists is bound to resist criticism precisely because it has been forged in opposition to critical thought, like that of Mach,⁶ and because an active component of the history physicists inherit and which they learn to extend can be found in its reference to the scandalous creativity of a physics that rejects the limits proposed by critical rationalism.

Yet, we may very well wonder whether this vocation, and with it the scientific faith that serves as an obstacle to methodological peace, are not part of a past only traces of which remain in the present, with those being mostly media related. Clearly, a certain type of "prophetic" physics exists today. But, if we must speak of physics, wouldn't it be preferable to approach it from the viewpoint of the new undertaking known as "big science"? International financing, the construction of large-scale instruments, management of an experiment over a period of several years, the organization of large numbers of colleagues, the division of labor: these are the kinds of practical questions that preoccupy "cutting-edge" physicists today far more than the "ideal" question of the physicist's vocation. Can't we take advantage of this situation, which clearly illustrates that, regardless of its

vocation, physics is confronted with the same kind of difficulty faced by every mega-enterprise threatened by bureaucratization and autism, and forget about this outdated mess of arrogant pretensions?

It is an objection we need to take very seriously. A plausible future is within sight in which there will obviously be scientists, but they, as more or less competent employees, will no longer be distinguished from anyone else who sells their labor power. That this perfectly plausible future already serves to disqualify interest in the impassioned singularity of scientific practices may appear to be an appropriate response to the arrogance of their claims. In *The Invention of Modern Science* I wrote of the connivance of the so-called modern sciences with the dynamics of redefinition that singularize this delocalized, rhizomatic power known as capitalism.⁷ We can see the genial hand of capitalism in this complicity, the source of its most formidable singularity: its parasitic nature. While capitalism has destroyed many practices, it also has the ability not to destroy those it feeds on but to redefine them. So-called modern practices are affected by this parasitism, which gives them an identity that weakens any ability to resist their subjugation, pits them against one another, and leads them to condone the destruction of practices whose time has come. Wouldn't it be fair if scientific practices, which have to a certain extent benefited from the dynamic of redefinition that destroyed so many others, were to experience the same fate?

However, this vindictive morality, no matter how appealing it may be, is not one I share. Its promulgators will always have good reasons for their verdict, but this verdict will be delivered repeatedly, without risk, and situates them in a monotonous landscape littered with similar reasons for disqualification. Where then can we situate, in our present, a "cause" capable of resisting the accusation of compromise and able to teach us to resist, along with it; a cause that we can acknowledge to be

free of complicity, having resisted not through some historical contingency predicated on “not yet,” but through its own resources, the dynamics of capitalist redefinition? If learning to think is learning to resist a future that presents itself as obvious, plausible, and normal, we cannot do so either by evoking an abstract future, from which everything subject to our disapproval has been swept aside, or by referring to a distant cause that we could and should imagine to be free of any compromise. To resist a likely future in the present is to gamble that the present still provides substance for resistance, that it is populated by practices that remain vital even if none of them has escaped the generalized parasitism that implicates them all.

Consequently, it is the “living” physicist I need to consider, not the one who will snicker at the romantic dream pursued by her science and which a harsh reality will have destroyed. I do not want to take advantage of the process that would replace the generalized polemic among practices with the creation of an instrumental network where each discipline would have no other identity but that of a data generator that marks its position in the network in question. I want to resist this process. This presupposes betting on the possibility of different dreams for physicists and other modern practitioners. Therefore, it is the anxiety that continues to occupy the physicist at CERN that I want to confirm and celebrate, and not the likelihood of the cynical laugh that ushers in the abandonment of the dream and the redefinition of the physicist as a cog in some more or less extravagant large-scale undertaking.

“The *diagnosis* of becomings in every passing present is what Nietzsche assigned to the philosopher as physician, ‘physician of civilization,’ or inventor of new immanent modes of existence,” wrote Deleuze and Guattari.⁸ The challenge they lay out could equally be my own: to diagnose the “new immanent modes of existence” our modern practices may be capable of. This also implies the possibility of “psychosocial” types activated by a desire for truth that would not require them to

claim—as it did in the case of Planck and Ernst M. truth that transcends all others.

The Invention of Modern Science culminated in the entirely paradoxical figure of “nonrelativist sophists,” of titillers capable of claiming that “man is the measure of things” and of understanding the statement “not all measurements are equivalent” as an imperative, to make sure we have made ourselves worthy of addressing what we claim to measure. Those sophists who are not satisfied with the mere acknowledgment of the relativity of truth but would affirm the truth of the relative⁹—what I refer to as the humor of truth—would then be equally capable of reworking the meaning of the relationship that identifies science and struggles against opinion and myth. For—and this is the central thesis of *The Invention of Modern Science*—while the “struggle against opinion” is vital to the so-called modern sciences, that struggle has nothing to do with matters of principle: the opinion against which a science is invented is not opinion in general. It is opinion created with reference to the invention itself, to the possibility of a new “measurement,” of the creation of a new way, always local and relative, of differentiating science from fiction. That is why I have tried to highlight the difference between the event constituted by the creation of a measurement and the directive embodied in the reduction of this event to an illustration of the right and general obligation to subject all things to measurement. This difference can be stated in political terms, and it would then correspond to the difference between the politics constitutive of the sciences and a general politics of power. Yes, scientific practices, and in particular theoretical-experimental practices, are vulnerable to power but, no, this vulnerability cannot be confused with fatality. This difference can also be stated in terms of a “mode of existence”: the sciences do not owe their existence to the disqualification, with which they are identified, of so-called “pre-scientific,” or nonrational, knowledge.

Yet the possibility of other identities for the sciences, as I

tried to bring out in *The Invention of Modern Science*, is not sufficient for the operation of "diagnosis." A true diagnosis, in the Nietzschean sense, must have the power of a performative. It cannot be commentary, exteriority, but must risk assuming an inventive position that brings into existence, and makes perceptible, the passions and actions associated with the becomings it evokes. What I want to make perceptible are the passions and actions associated with a peace that is not one of method, that does not demand that those it involves reject the specific passion for truth that allows them to think and create.

Naturally, the act of diagnosis must not be confused with a mere political project. It is not a question of constructing a strategy that hopes to inscribe itself as such in our history and which, in order to do so, must take into account the interests and effective relations of force without which no claim, no objective, no alternative proposal would have meaning. If it were a question of strategy, the undertaking would be part of a genre that has demonstrated its ability to survive its own absurdity: it would position me in line with those—and they are legion—who are convinced that everyone's future is governed by conditions that they themselves are responsible for establishing.

The diagnosis of becoming is not the starting point for a strategy but rather a *speculative* operation, a thought experiment. A thought experiment can never claim to be able to constitute a program that would simply need to be put into application. With respect to scientific practices—as elsewhere—such experiments have never had any role other than that of creating possibles, that is of making visible the directives, evidences, and rejections that those possibles must question before they themselves can become perceptible. And unlike the thought experiments that are part of scientific practices, these possibles are not determined, and what is at stake is not the creation of an experimental mechanism for actualizing and testing them. The diagnosis of becomings does not assume the identification

of possibles but their intrinsic link with a struggle against probabilities,¹⁰ a struggle wherein the actors must define themselves in terms of probabilities. In other words, it is a question of creating words that are meaningful only when they bring about their own reinvention, words whose greatest ambition would be to become elements of histories that, without them, might have been slightly different.

The Neutrino's Paradoxical Mode of Existence

I would like to return to the point where I approached the question of the "physicist's vocation." It is indeed in terms of mystification that Mach criticized the reference to atoms, and to absolute space and time. Seen from the perspective of the references accepted at the time concerning the opposition between an authentically scientific practice and one not subject to the exigencies of scientific rationality, Mach was "right" and Planck was well aware of this. He knew he was associating the "physicist's vocation" with what, following Marx, should be referred to as mystification: the transformation into "the properties of things themselves" of something that, according to Mach, should be subject to experimental practice and, Marx would have added, to its corresponding social relations. It is this that may have triggered the violence of Planck's reply, the accusation that Mach was a "false prophet": we recognize false prophets, he said, by the fruits of their prophecies, in this case the predictable death of physics.

But it is Émile Meyerson, the philosopher of science, who best understood the violence of the rejection by physicists of the "rational" translation of their quest that had been proposed by critical philosophy. For this emphasized a generalized *presentation* that contrasted the passion for comprehension with

the ascetic reading offered by epistemology. In the beginning of Meyerson's first great book, *Identity and Reality* (1907), he notes the difference between a "law" and a "cause." Although ordinary epistemology took pride in following Hume in its critique of causality, which should, rationally, be reduced to empirical regularity (where the law would define the rule), Meyerson showed that scientists are not satisfied with such regularity, even if it allows them to predict and control. On the other hand, every time a causal hypothesis has led us to assume a nature capable of explaining itself, it has, he claims, exercised its hold over physicists. The nature of this hypothesis—that atoms collide according to Cartesian laws, that they are attracted to one another in a Newtonian sense, that they are replaced by energy as understood by Ostwald, or by disturbances in the ether, or by a pure physical-mathematical formulation—is of little importance. What is important, for Meyerson, is the construction of an "ontological" reality that could explain what we observe and could do so, moreover, by reducing change to permanence, by demonstrating the *identity* of cause and effect. Reason anticipates and expects identity, that is, the discovery of some permanence beyond an observable change, and it does so even when the possible realization of its ambition for identification would have paradoxical consequences. "Let us suppose for a moment that science can really make the causal postulate prevail; antecedent and consequent, cause and effect, are confused and become indiscernible, simultaneous. And time itself, whose course no longer implies change, is indiscernible, unimaginable, non-existent. It is the confusion of past, present, and future—a universe eternally immutable. The progress of the world is stopped. . . . It is the universe immutable in space and time, the sphere of Parmenides, imperishable and without change."¹

From Meyerson's point of view, the idea of a stable separation between science and metaphysics is a vain pursuit: "Metaphysics penetrates all science, for the very simple reason that

it is contained in its point of departure. We cannot even isolate it in a precise region. *Primum vivere, deinde philosophari* seems to be a precept dictated by wisdom. It is really a chimerical rule almost as inapplicable as if we were advised to rid ourselves of the force of gravitation. *Vivere est philosophari.*"² Every time the possibility of understanding arises, no matter how bold and speculative, it benefits from a favorable a priori: scientists have a *propensity* for considering that possibility to be true; it seems "plausible" to them. For Meyerson, plausibility is neither aprioristic nor empirical. Unlike a Kantian aprioristic judgment, it may be refuted by experiment, but it nevertheless exerts a seductive power on the mind of the scientist, just as it does on "common sense" in general, that no empirical knowledge alone is capable of justifying.

Because it exists nature can bend to the requirements of the causal postulate only partially. It manifests itself, therefore, in its "irrationality," in the resistance the effort at identification always runs up against. This points to the great difference between the history of a science such as physics, where the general and invincible tendency of the human mind to identify is reflected in the risk and creativeness generated by resistance, and other undertakings that are satisfied with plausibility. To state that the physical brain must obviously explain thought, for example, is to embrace a "plausible" statement in the Meyersonian sense, and the difference between the static flatness of this statement and the beauty of Einstein's vision is explained by the poverty of the constraints the first will have to satisfy, as well as the consequences that will have to be verified. Neither aprioristic nor empirical, such a statement can indifferently associate itself with any aspect of neurophysiological research.

I have dwelt on Meyerson's thesis at some length because it quite accurately describes the challenge that lies before me. Had I accepted his claims, my problem would be solved. It would be pointless to investigate the meaning assumed by the "physicist's

faith" at the turn of the last century or the failure of the various criticisms leveled at physics. The prestige of the theories that lend to physics the allure of metaphysics, the hierarchy of the sciences, as well as the hierarchy that characterizes physics and divides it into "fundamental physics" and "phenomenological physics," limited to the study of observed behaviors, would be self-explanatory. And it would be robustly self-explanatory because no critical disclosure of any kind could modify what would then possess the allure of fatality. There would be nothing left to do but offer some slightly incantatory praise for the "risk" that characterizes the difference between the physicist's "faith" and the vacuity of common sense whenever it gets mistaken for science.

But being faced with a challenge does not mean that I have the means to refute a description like the one provided by Meyerson. On the contrary, I regard such a description as terrifyingly *plausible*, much more plausible than those that view physics as a project for domination or control. Learning to resist this very Meyersonian plausibility, learning not to "identify" physics, whatever the temptation, with a metaphysical common sense that would explain its successes and its excesses, is an attempt to implement a different idea of philosophy, one that I have already referred to specifically as "speculative" in the sense of a struggle against probabilities.

The possibility of a "non-Meyersonian" solution affects the past much less than the future. Especially the future of the relationship between what we call science and what we call philosophy. If Meyerson had been right, those relationships would be stable, the scientist repeatedly producing statements that would appear to be a presentation of the "real in itself," the philosopher adopting a critical position, reminding us, now as before, of the illegitimate character of those statements, the illusions on which they are based. And they will continue to provide "fictions of matter," which fictionalize physical reality as able to

explain life or consciousness, and to exhibit the irrepressible "fetishization" of the beings constructed by the experimental sciences. Hasn't the molecule born in the laboratories of physicists, to the great displeasure of those rational chemists who denounced it the way we denounce fetishes, now been offered, in the form of DNA, to the public at large as the key to human salvation, the holder of the—purely genetic—secret of human destiny?

"We must destroy our fetishes!" This is the slogan that provides critical thought with an all-purpose foundation. "Common sense is fetishistic, irrepressibly fetishistic, and the destruction you demand is none other than your own, of the passion that is the life of your intellect." This was Meyerson's reply, which Planck would probably agree with. And Planck might also add, as Einstein did ("the real incomprehensible miracle is that the world turns out to be comprehensible"), that, where physics is concerned, fetishistic faith is *de facto* confirmed. But what those two antagonistic positions have in common is that they both seem to know a great deal, a bit too much in fact, about fetishes, about the way they function, about the "common sense" that all mankind is said to share, about the irrepressible tendencies all cultures are said to manifest. In this sense, Meyerson, Planck, and Mach are indeed *modern*, as the term is understood by Bruno Latour, in that, regardless of their conflicts, they belong to a culture whose curious singularity is that it defines relationships to what are globally referred to as "fetishes" in terms of belief, although they are prepared to disagree over whether such belief is indispensable or not.

When Mach attacks the fetishes that feed on thought, he demands that the decisive break that defines modernity be recognized, and maintained, in the face of the temptations of "regression." "Men" must not only recognize that their practices are an integral part of the referents they cause to exist but that those referents refer only to those practices. They renounce

any syntax that might be directed toward an autonomous reality. Naturally, such renunciation confirms the ability and vocation of modern practices to disqualify all other practices, which do not define themselves as antifetish, but it is this renunciation that Planck refuses to accept on behalf of physics, and Meyerson, on behalf of common sense itself. However, from the point of view of my hypothesis of the possibility of a "a nonrelative sophist," such a refusal is inadequate. It is not fetishistic belief that needs to be defended, but rather a "cult of fetishes" in all their diversity, modern and nonmodern.

This is the decisive step taken by Bruno Latour in his *Petite Reflexion sur le culte moderne des dieux faitiches*,³ and it is Latour I will follow here so I am able to approach Planck's rejection in terms other than those of an unjustifiable faith, justified in fact. What Planck defends against Mach is not only the physicist's "faith" in a vision of the metaphysical-physical world, it is also—and I am gambling that it is primarily—the fact that the beings fabricated by physics may nonetheless be referred to as "real," endowed, no matter that they are "fabricated," with an autonomous existence: "*factishes*," as Latour calls them.

To abandon antifetishistic critical thinking does not imply acceptance of Planck's position as such, or acknowledgment that physics uncontrollably tends toward metaphysics. It is to introduce the *possible* ambiguity of its position. The theme of "faith," which Planck makes a condition of physics, could be understood as a protest by someone who feels forced by an antifetishistic adversary to reject what is, for him, the greatness of his undertaking. The theme of belief—"leave us our fetishes; obviously, we're the ones who create them, but we need to believe, we vitally need to believe in their autonomy"—would reflect the strength of the modern antifetish position: Planck would have no way, other than in terms of belief or faith, to describe what in his eyes makes physics valuable, that which it cannot abandon. But based on this hypothesis, what Planck wants to affirm

is, primarily, that the creatures physics brings into existence possess, as their *constitutive attribute*, the power to legitimately claim an autonomous existence. Without the impassioned yet demanding tests that have verified that legitimacy, they would not exist. As for the large theme of necessary belief in a vision of a unified world, far from reflecting an irrepressible Meyersonian tendency, it would imply that modern antifetishism, which destroyed the words Planck needed, replaced them with a claim that has all the seductiveness of a war cry. The reference, not to the autonomy of "physical beings" (atoms, electrons, neutrinos, etc.), but to an autonomous *world* that would ensure the unique authority of physics, allowed Planck to shift from defense to offense, to counter the authority of critical thinking with the authority of the tradition of physics as a whole.

My (speculative) interpretation means that the question of the vocation of the physicist can be addressed in terms that are no longer "general purpose" but inherent in the art of fabricating "factishes," which singularizes physics. Planck was able to defend this singularity only by joining it to "belief." But isn't the need to affirm such belief associated with the definition of modern practices as "antifetishistic?" And with respect to physical beings, doesn't the possibility that their claim to autonomy can be understood noncritically then suggest a new approach to the theme of the physicist's vocation? In other words, isn't it possible that the "factishes" passionately constructed by physicists, were they recognized as such, might maintain, with the references constructed by other forms of knowledge, relationships that are not hierarchical and polemical?

I have in mind here the creation of a "psychosocial" physicist whose practice would require her to consider, and whose practice would make possible, at the same time and coherently, these two apparently contradictory propositions: that the neutrino is as old as the period in which its existence was first demonstrated, that is, produced, in our laboratories, and that it dates

back to the origins of the universe. It was both constructed and defined as an ingredient in all weak nuclear interactions and, as such, is an integral part of our cosmological models.⁴ Consequently, it can serve as the subject of propositions that make it a product of our understanding and others that make it a participant in a cosmic history that is said to have led to the appearance of beings capable of constructing such understanding.

I choose the neutrino because it exemplifies in a particularly dramatic way the paradoxical mode of existence of all those beings that have been constructed by physics and that exist in a way that affirms their independence with respect to the time frame of human knowledge. The demonstration of the existence of an entity such as the neutrino obviously has nothing in common, as Meyerson showed, with the production of a general law based on observable and reproducible regularities.⁵ It has nothing to do with the modesty of a simple description resulting from the activity of methodical and critical observation, that is, an activity that would boast of finally ridding itself of parasitic passions that paralyze rational inquiry. The neutrino sweeps aside this apparent modesty. It denies the idea that the products of science present no problem other than that of knowing why humans have, for so long, allowed themselves to be swept up by their passions and deceived by their illusions. And it does so in two complementary ways. On the one hand, it is a quintessential example of an object that is difficult to observe, for its primary attribute is to be susceptible only to interactions that occur very rarely: the devices that enabled it to attain its status as existent imply and assume an enormous number of instruments, interpretations, and references to other particles that have already come into existence for human knowledge, and, inseparably, a tangle of human, social, technical, mathematical, institutional, and cultural histories. Moreover, it is even more "charged" because the existence of this genuinely phantom particle, which ignores walls and barriers, had been postulated, for

theoretical-aesthetic reasons of symmetry and conservation, long before the means for "detecting" it were created. However, once the means were created and once it demonstrated its existence under the required conditions, the neutrino existed with all the characteristics of a real "actor," endowed with properties that also enable it to act and explain, autonomous in relation to the detection device that caused it to bear witness to its existence and which is now nothing more than an "instrument." For this was the vocation of the existence it was endowed with: the proofs upon which the legitimacy of that existence within physics depended were supposed to give the physicist the power to claim that the neutrino had existed for all time and in all places, and that the effects that make it observable and identifiable by humans are events that demand to be understood as ingredients not of human history but of the history of the universe.

The neutrino is not, therefore, the "normal" intersection between a rational activity and a phenomenal world. The neutrino and its peers, starting with Newton's scandalous force of attraction, bind together the mutual involvement of two realities undergoing correlated expansions: that of the dense network of our practices and their histories, that of the components and modes of interaction that populate what is referred to as the "physical world." In short, the neutrino exists simultaneously and inseparably "in itself" and "for us," becoming even more "in itself," a participant in countless events in which we seek the principles of matter, as it comes into existence "for us," an ingredient of increasingly numerous practices, devices, and possibles. This apparently paradoxical mode of existence—in which, far from being at odds, as is the case in traditional philosophy, the "in itself" and the "for us" are correlatively produced—is indeed the one targeted by experimental practice in the strong sense, the one whose triumph is measured by its ability to bring into existence *factishes* that are both dated and transhistoric.

To follow Latour in calling "factishes" those beings we fabricate and that fabricate us, from which the scientist (or the technician, via different modes) "receives autonomy by giving [them] an autonomy he does not have,"⁶ does not confer upon them any identity other than the fully developed identity they get in physics. That is why it is important to speak of factishes and not fetishes, for I am not trying to establish a general theory of fetishes, which would never be more than the pseudo-positive counterpart of their general condemnation. On the contrary, beginning with the question of what allows the practitioner to claim that the beings she fabricates exist autonomously, it entails posing the problem of the distinct modes of existence of the beings we bring into existence and that bring us into existence. As will be shown, the distinctions begin within physics itself and their number increases whenever we try to understand the impassioned interest in new artifacts capable of being referred to as "living" or even "thinking."

There is nothing consensual or pacific about the "factishes" we bring into being. Recognizing them as irreducible to a critical epistemology or to the kind of "objects" philosophy likes to contrast with "subjects" is not at all synonymous with pacification and coherence. But to recognize them as such may function as a *proposition* addressed to their "creators." Such a proposition, while affirming the singularity of their practice as being creative, with no obligation to the great narrative that contrasts myth and reason, is not limited to ratifying what they insist on seeing recognized. It is an *active* proposition that can involve them in sorting out whatever it is they claim, and especially to consider superfluous the claim to the power of disqualification. In other words, factishes propose a humor of truth. They create the possibility of a divergence between two themes that are frequently coupled: transcendence and assurance. Yes, the creature transcends its creator, but this is no miracle but an event whose production polarizes the work of the creator.⁷ No,

the produced transcendence does not guarantee membership in a transcendent world, or the availability of that world as such as a reference for judgments or operations of disqualification or annexation. Factishes are a way of affirming the truthfulness of the relative, that is, a way of relating the power of truth to a *practical event* and not to a world to which practices would merely provide access.

The factishistic proposition does not claim a neutrality that would be accepted by all. It invites the physicist and other constructors of factishes to differentiate the conquered-fabricated-discovered autonomy of their creatures from the unengendered autonomy of a world waiting to be discovered. But it also reflects a trust, which the neutrino does not necessarily justify and which is not even specifically addressed to it but which concerns all those existents produced in experimental laboratories. To gamble on the possibility of the humor of a truth that acknowledges its fabrication is to commit oneself to a future where irony does not triumph: these existents will not dissolve inside a mournful and sempiternal network of compromise and negotiation that, once deciphered, would lead to the conclusion that they are fabrications pointing toward a routine of human, all too human, negotiation.

In one sense, I'm trying to reenact the scene between Planck and Mach. Mach's criticism does not allow the physicist to "present himself," to define his vocation, because the words offered require that he deny his passion for truth. Is the factishistic proposition able to do so? Can the vision of a "physical world" defended by Planck lose its seductiveness? Can it be recognized as a "default" response, accepting, for want of anything better, the adversary's references, the opposition between antifetishistic rationality and an irrational but fecund faith? Can factishes free physicists from a mode of presentation that encloses them in an alternative that is somewhat vulnerable to irony: either invoking a faith that would lead them forward the way a carrot

leads a donkey, or laying claim to the successes of physics in order to affirm that it is really on its way to achieving its quest for the world's truth, for penetrating "the mind of god"? It is not up to me to decide.

In any event, the touchstone of my undertaking is much less the fabricators themselves than the way in which they are, or might be, present among us.

The sciences, as they are taught, that is, as they are presented once their results are unlinked from the practices of science "as it is practiced," do not have a meaning that is appreciably different from a religious engine of war, pointing out the path to salvation, condemning sin and idolatry. And it is not by appealing to an improved "scientific culture" that this problem is going to be resolved—the problem of the mode of existence among us of neutrinos, genes, fossils, and other scientific creatures. That such a culture is what is always missing, the thing whose absence is always invoked, whose existence would be a kind of panacea, without anyone being able to say what it might consist of (because the majority of scientists are, apparently, the first to lack this well-known culture), is a good reflection of the ghostly existence of what is being invoked. A ghost is not always lacking in power, however. In some cultures its appearance forces its members to think, connect, act.

In our culture the sempiternal return of the great theme of the necessary adjunct of "conscience," without which, apparently, science would be "the ruin of the soul," commits us to nothing, because what is asked is unclear. No practices exist, akin to those used by others to heed what insists and construct a message, a message that would create a difference. In our case, it would make connections and add new questions to those asked by scientists. In other words, we are haunted by the necessity of scientific culture although our practices do not provide it with the means to exist.

The manner in which the neutrino and other scientific

factishes "are presented" to those who do not share in their production can become a cultural question only if that culture is actively dissociated from "information," from the possession of "cultural knowledge." An awareness of the history of the neutrino's creation and the problems to which it responded cannot prevent its existence from being generalized into a "neutral" fact, that is, both an *authenticated* fact that everyone "should" be familiar with if they are to be modern citizens, and an *available* fact, which anyone may pick up and use for their own purposes. The question of knowing how the neutrino's existence is, could be, or will be celebrated does not find an answer either in the willingness that recalls, under no obligation, that the sciences are human works, or in the irony that recognizes the work behind the fact.

That the struggle not to forget the multiple components of the event that caused the neutrino to exist seems endless and hopeless does not reflect a "psychological" difficulty (humans prefer to believe than to understand) or an "epistemological" question (the context of the justification takes precedence over the context of discovery). It reflects the fact that the "discovery" of the neutrino is not an event likely to interest "mankind" as such. The neutrino does not mark a step along the path that leads "mankind" from ignorance to understanding; it owes its existence to the fact of having fulfilled what Latour calls a very demanding set of "specifications," of having satisfied very specific proofs, which allow "specific people," the community of its fabricators, to forget the avatars of its fabrication, to celebrate its existence "in itself." If something is to be celebrated or must force others to think, it is not the neutrino but the coproduction of a community and a reality of which, from now on, from the point of view of the community, the neutrino is an integral part. Such an event has yet to deserve interesting others. The cultural traditions that are not antifetishist cultivate such an interest. They know how the constructors of fetishes need to

be addressed, what can be expected of them, why they should be feared. To consider the social, cultural, and political presence among us of the highly specific communities formed by the constructors of factishes may be a way of "materializing" the ghostly reference to a "scientific culture" that is always lacking.

The "acculturation" of the neutrino is, therefore, a practical question, inseparable from the relationships that need to be developed with those who brought it into existence, those whose proofs it satisfied. Other than that of a "neutral fact," the neutrino's identity will find stability only in a network of relationships through which new "immanent modes of existence" for our practices are invented. The touchstone of the factishistic proposition, and more specifically of what I am trying to do with it, is not to convince scientists but to bring about a transformation of the interests that identify them. And this, of course, is to be understood in the radically indeterminate sense authorized by the concept of interest: the way in which what one does interests others, that is, becomes an integral part of the present of others, or "counts" for others, does not conflict with the way in which one is interested in what one does oneself, but is an ingredient of it. Who is interested, how can one be interested, at what price, by what means and under what constraints—these are not secondary questions associated with the "diffusion" of knowledge. They are the ingredients of its identity, that is, the way in which it exists for others and the way in which it situates others.

NOTES

PREFACE

1. [The present translation is based on the updated two-volume French edition of *Cosmopolitics* published in 2003. The contents of that two-volume edition were compiled from an earlier edition of *Cosmopolitics* published in 1997 in seven volumes. *Cosmopolitics I* includes volumes I, II, and III of the original edition; *Cosmopolitics II* includes volumes IV, V, VI, and VII of the original edition. Volume references throughout this text follow this numbering scheme. For example, Book IV refers to volume 4 of the original edition, which is included in volume 2 of the present edition. Please note that the current English-language edition of *Cosmopolitics* has been revised by the author and varies slightly from the 2003 French edition. All translations of quoted French works are my own, except where otherwise noted. —Trans.]

1. SCIENTIFIC PASSIONS

1. See *D'une science à l'autre: Les concepts nomades*, ed. Isabelle Stengers (Paris: Le Seuil, 1987).

2. Ilya Prigogine and Isabelle Stengers, *Order out of Chaos: Man's New Dialogue with Nature* (New York: Random House, 1984). However, the quotation, which is found in the conclusion of the French edition of *Order out of Chaos (La Nouvelle Alliance)*, does not appear in the English translation. See Isabelle Stengers, *Power and Invention* (Minneapolis: University of Minnesota Press, 1997), 42.

3. Ilya Prigogine and Isabelle Stengers, *Entre le temps et l'éternité* (Paris: Flammarion, 1992), 193–94.

4. Max Planck, "Die Einheit des Physikalischen Weltbildes," *Physikalische Zeitschrift* 10, 62–75, reproduced in *Physical Reality*, ed. S. Toulmin (New York: Harper Torchbooks, 1970).

5. In Gilles Deleuze and Félix Guattari, *What Is Philosophy?*, trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 66–68, the distinction between "psychosocial type" and "conceptual personae" ("psychosocial types . . . become susceptible to a determination purely of thinking and of thought that wrests from them both the historical state of affairs of a society and the lived experience of individuals," 70) refers to the distinction between history and event. Every psychosocial

type—Greek, capitalist, proletarian, and so on—makes perceptible the corresponding territory it establishes, its vectors of deterritorialization, its processes of reterritorialization. The compound adjective—"psycho" and "social"—indicates that the type is relative to a given society, a given historical moment: it is only under these conditions that such adjectives have meaning.

6. Mach is only an example. However, some may recall Bergson's criticism of Einstein's theory of relativity, as well as, in the field of quantum mechanics, the way in which the proponents of the Copenhagen interpretation fought against the "positivist curse," that is, against the presentation of their hypotheses as an illustration of empirico-critical doctrines (see Book IV, "Quantum Mechanics: The End of the Dream").

7. Isabelle Stengers, *The Invention of Modern Science*, trans. Daniel W. Smith (Minneapolis: University of Minnesota Press, 2000), 145. My approach to capitalism is not unrelated to that found in *Anti-Oedipus: Capitalism and Schizophrenia* by Gilles Deleuze and Félix Guattari, trans. Robert Hurley, Mark Seem, and Helen R. Lane (Minneapolis: University of Minnesota Press, 1983), which illustrates capitalism's radical indifference to values such as those associated with "modernity." The movement of capitalist deterritorialization has as its correlate continued operations of reterritorialization: the resurrection of "new archaisms" or the maintenance of old territorialities redefined by new forms of coordination-conjunction (for example, family territory is redefined by its conjunction with the household appliances industries, just as the "protection of nature" can be redefined by its conjunction with the "green" label).

8. Deleuze and Guattari, *What Is Philosophy?*, 113.

9. For a remarkable presentation of this obviously crucial distinction, see François Zourabichvili, *Deleuze: Une philosophie de l'événement* (Paris: Presses Universitaires de France, 1994).

10. I am giving to the word *possible* the meaning frequently given by Deleuze to *virtual*. To create a more explicit connection with scientific practices, I have decided to use the term "probable" for the Deleuzian "possible," which lacks only reality. The calculation of probabilities assumes, like all calculations, the conservation of whatever the calculation has been constructed from. That is why probability commits whoever makes reference to it to maintaining that conservation. Naturally, this commitment assumes very different meanings depending on whether it reflects the creation of a measurement (the rate of disintegration of radioactive nuclei, for example), the risk of decision making, or the claim to a "realist" vision of things.

2. THE NEUTRINO'S PARADOXICAL MODE OF EXISTENCE

1. Émile Meyerson, *Identity and Reality*, trans. Kate Loewenberg (London: Gordon and Breach, 1989), 230–31. Here, Meyerson appears to be

anticipating Einstein's general theory of relativity. Moreover, he has recognized the "acosmic" vertigo brought on by the four-dimensional cosmos of general relativity. *Relativistic Deduction* (1925, 1989) is the first exposé of Einstein's work that does not focus on special relativity and the operationalist arguments supporting it, and directly addresses Einstein the "metaphysician," who assumed such importance to his surprised colleagues and embarrassed positivist philosophers. Similarly, in *Réel et déterminisme dans la physique quantique* (Paris: Hermann, 1933), Meyerson predicted that the painful denial quantum physics has forced physicists to accept may very well be unstable: "There can be little doubt that if there were the slightest possibility, researchers would quickly return to a somewhat concrete image, realizable in thought, of the universe, a *Weltbild* to use Planck's expression" (49). I emphasize this point because the Bachelardian philosophical tradition in France has followed Bachelard in a systematic counterreading of Meyerson, who, according to Dominique Lecourt, for example, embodies "that pretentious philosophy that glorifies the longevity of its questions and wants to subject scientific knowledge to its decrees" (*L'Épistémologie historique de Gaston Bachelard* [Paris: Vrin, 1974], 34). This should be compared with Einstein's correspondence with Meyerson, published in Albert Einstein, *Œuvres choisies*, vol. 4, *Correspondances françaises* (Paris: Seuil-CNRS, 1989). Even Lenin, in *Materialism and Empirio-Criticism*, treated his adversaries better than Bachelard and his emulators have treated Meyerson.

2. Meyerson, *Identity and Reality*, 377.

3. Bruno Latour, *Petite Réflexion sur le culte moderne des dieux faitiches* (Le Plessis-Robinson: Synthélabo, "Les Empêcheurs de penser en rond," 1996).

4. This construction is ongoing. The question of knowing whether neutrinos have mass and therefore of knowing "what" we are detecting is still open, or was until 2002 when the Nobel Prize for physics was awarded to three physicists for determining that neutrinos are not massless.

5. For a different approach to the same distinction, see Rom Harre, *The Principle of Scientific Thinking* (London: Macmillan, 1970), and Roy Bhaskar, *A Realist Theory of Science* (Leeds: Leeds Books, 1975).

6. Latour, *Petite Réflexion sur le culte moderne des dieux faitiches*, 99.

7. For the theme of the event considered in terms of scientific coordinates, see Isabelle Stengers, *The Invention of Modern Science*, trans. Daniel W. Smith (Minneapolis: University of Minnesota Press, 2000).

3. CULTURING THE PHARMAKON?

1. See the magisterial text by Jacques Derrida, "Plato's Pharmacy," in *Dissemination*, trans. Barbara Johnson (Chicago: University of Chicago Press, 1983). However, I do not necessarily accept the point of view proposed,

where the multiplicity of *pharmaka* is subtly channeled toward the overarching question of writing.

2. Tobie Nathan, *L'influence qui guérit* (Paris: Éditions Odile Jacob, 1994), 29.

3. A disparate series, as its unity is found only in the fact that its members function as a kind of foil. Its number includes David Hume, whose critique of the concept of causality awakened Kant from his "dogmatic sleep," and prompted him to search for a foundation that would allow us to forget Humeian "habits," Henri Bergson, who was accused of reducing human freedom to that of an apple, the American pragmatists at the beginning of the twentieth century, accused of seeing no other justification for values than as a kind of utilitarian calculus, and Michel Foucault, denounced by the real "philosophers of communication" for not claiming to establish the universal validity of his political commitment. That's just a sample. The weakness of this series is the monotony of the accusation and the perspective it leads to: each author is asked to justify the very thing he had taken the risk to create. On the other hand, this series is a good illustration of the difference pointed out by Deleuze and Guattari between "majority" and "minority." Here, the majority can always appeal to the good sense of everyone else and function as a "restoring force" in the history of philosophy: a restoring force in the mechanical sense, where it pulls the stretched spring back to its initial position of equilibrium, and in the memorial sense, where it reenacts the primitive scene of the exclusion of the sophists.

4. See Léon Chertok, *L'Énigme de la relation au cœur de la médecine*, ed. and introd. Isabelle Stengers (Le Plessis-Robinson: Delagrangé/Synthélabo, 1992).

5. See Tobie Nathan and Isabelle Stengers, *Médecins et sorciers* (Le Plessis-Robinson: Synthélabo, "Les Empêcheurs de penser en rond," 1995).

6. Isabelle Stengers, *The Invention of Modern Science*, trans. Daniel W. Smith (Minneapolis: University of Minnesota Press, 2000), 89.

7. In *Demystifying Mentalities* (Cambridge: Cambridge University Press, 1990), Geoffrey Lloyd illustrates the practical irreversibility created by the enunciation of explicit categories, such as those that refer to magic, or metaphor, or the *pharmakon*: "The questions, then, of how the actors themselves perceive their own activity, or the conventions within which it fits or from which it deviates, the traditions that do or do not sanction it, are prior to and independent of the question of the existence of some such category as magic itself. But once that category exists, it can hardly fail to change the perception. . . . for the category enabled the challenge to justify the activity to be pressed. . . . and the activity could no longer remain, or could not do so easily, an unquestioned item invisible—or indistinctive—against the background of the traditions to which it belonged" (69).