FASHIONABLE NONSENSE

POSTMODERN INTELLECTUALS' ABUSE OF SCIENCE

ALAN SOKAL AND
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PICADOR

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*Please note that some of the links referenced in this work are no longer active.

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For Marina

For Claire, Thomas, and Antoine

Preface to the English Edition

The publication in France of our book *Impostures Intellectuelles*[1] appears to have created a sma storm in certain intellectual circles. According to Jon Henley in *The Guardian*, we have shown th "modern French philosophy is a load of old tosh."[2] According to Robert Maggiori in *Libération*, w are humorless scientistic pedants who correct grammatical errors in love letters.[3] We would like t explain briefly why neither is the case, and to answer both our critics and our overenthusiast supporters. In particular, we want to dispel a number of misunderstandings.

The book grew out of the now-famous hoax in which one of us published, in the America cultural-studies journal *Social Text*, a parody article crammed with nonsensical, but unfortunate authentic, quotations about physics and mathematics by prominent French and America intellectuals.[4] However, only a small fraction of the "dossier" discovered during Sokal's libra research could be included in the parody. After showing this larger dossier to scientist and no scientist friends, we became (slowly) convinced that it might be worth making it available to a wid audience. We wanted to explain, in non-technical terms, why the quotes are absurd or, in many case simply meaningless; and we wanted also to discuss the cultural circumstances that enabled the discourses to achieve such renown and to remain, thus far, unexposed.

But what exactly do we claim? Neither too much nor too little. We show that famous intellectua such as Lacan, Kristeva, Irigaray, Baudrillard, and Deleuze have repeatedly abused scientific concep and terminology: either using scientific ideas totally out of context, without giving the slighte justification—note that we are not against extrapolating concepts from one field to another, but on against extrapolations made without argument—or throwing around scientific jargon in front of the non-scientist readers without any regard for its relevance or even its meaning. We make no claim th this invalidates the rest of their work, on which we suspend judgment.

We are sometimes accused of being arrogant scientists, but our view of the hard sciences' role in fact rather modest. Wouldn't it be nice (for us mathematicians and physicists, that is) if Gödel theorem or relativity theory *did* have immediate and deep implications for the study of society? Or the axiom of choice could be used to study poetry? Or if topology had something to do with the huma psyche? But alas, it is not the case.

A second target of our book is epistemic relativism, namely the idea—which, at least whe expressed explicitly, is much more widespread in the English-speaking world than in France—th modern science is nothing more than a "myth", a "narration" or a "social construction" among mar others.[5] Besides some gross abuses (e.g. Irigaray), we dissect a number of confusions that are rath frequent in postmodernist and cultural-studies circles: for example, misappropriating ideas from th philosophy of science, such as the underdetermination of theory by evidence or the theory-ladenne of observation, in order to support radical relativism.

This book is therefore made up of two distinct—but related—works under one cover. First, there the collection of extreme abuses discovered, rather haphazardly, by Sokal; this is the "fashionab nonsense" of our title. Second, there is our critique of epistemic relativism and of misconceptio about "postmodern science"; these analyses are considerably more subtle. The connection betwe these two critiques is primarily sociological: the French authors of the "nonsense" are fashionable many of the same English-speaking academic circles where epistemic relativism is the coin of t realm.[6] There is also a weak logical link: if one accepts epistemic relativism, there is less reason to upset by the misrepresentation of scientific ideas, which anyway are just another "discourse".

Obviously, we did not write this book just to point out some isolated abuses. We have larg targets in mind, but not necessarily those that are attributed to us. This book deals with mystificatio deliberately obscure language, confused thinking, and the misuse of scientific concepts. The texts w quote may be the tip of an iceberg, but the iceberg should be defined as a set of intellectual practice not a social group.

Suppose, for example, that a journalist discovers documents showing that several highly respect politicians are corrupt, and publishes them. (We emphasize that this is an analogy and that we do n consider the abuses described here to be of comparable gravity.) Some people will, no doubt, leap the conclusion that *most* politicians are corrupt, and demagogues who stand to gain politically fro this notion will encourage it.[7] But this extrapolation would be erroneous.

Similarly, to view this book as a generalized criticism of the humanities or the social sciences— some French reviewers did—not only misunderstands our intentions, but is a curious assimilatio revealing a contemptuous attitude toward those fields in the minds of those reviewers.[8] As a matter logic, either the humanities and social sciences are coterminous with the abuses denounced in th book, or they are not. If they are, then we would indeed be attacking those fields *en bloc*, but it wou be justified. And if not (as we believe), there is simply no reason to criticize one scholar for wh another in the same field says. More generally, any construal of our book as a blanket attack on X- whether X is French thought, the American cultural left or whatever—presupposes that the whole of is permeated by the bad intellectual habits we are denouncing, and that charge has to be established whoever makes it.

The debates sparked by Sokal's hoax have come to encompass an ever-wider range of ever-mor tenuously related issues, concerning not only the conceptual status of scientific knowledge or t merits of French poststructuralism, but also the social role of science and technolog multiculturalism and "political correctness", the academic left versus the academic right, and t cultural left versus the economic left. We want to emphasize that this book does *not* deal with most these topics. In particular, the ideas analyzed here have little, if any, conceptual or logical connecti with politics. Whatever one's views on Lacanian mathematics or the theory-ladenness of observatio one may hold, without fear of contradiction, any view whatsoever on military spending, nation health insurance, or gay marriage. There is, to be sure, a *sociological* link—though its magnitude often exaggerated—between the "postmodernist" intellectual currents we are criticizing and son

sectors of the American academic left. Were it not for this link, we would not mention politics at al
But we do not want our book to be seen as one more shot in the dreary "Culture Wars", still less as or
from the right. Critical thinking about the unfairness of our economic system and about racial ar
sexual oppression has grown in many academic institutions since the 1960s and has been subjected,
recent years, to much derision and unfair criticism. There is nothing in our book that can be construe
even remotely, in that genre.

Our book faces a quite different institutional context in France and in the English-speaking worl
While the authors we criticize have had a profound impact on French higher education and hav
numerous disciples in the media, the publishing houses and the intelligentsia—hence some of th
furious reactions to our book—their Anglo-American counterparts are still an embattled minorit
within intellectual circles (though a well-entrenched one in some strongholds). This tends to mak
them look more "radical" and "subversive" than they really are, both in their own eyes and in those
their critics. But our book is not against political radicalism, it is against intellectual confusion. Ou
aim is not to criticize the left, but to help defend it from a trendy segment of itself. Michael Alber
writing in *Z Magazine,* summarized this well: "There is nothing truthful, wise, humane, or strateg
about confusing hostility to injustice and oppression, which is leftist, with hostility to science ar
rationality, which is nonsense."[9]

* * *

This edition is, in most respects, a straight translation from the French original. We have omitted
chapter on the misunderstandings of relativity by Henri Bergson and his successors, which seemed
us of marginal interest for most British and American readers.[10] Conversely, we have expanded a fe
discussions concerning intellectual debates in the English-speaking world. We have also made man
small changes to improve the clarity of the original text, to correct minor imprecisions, and
forestall misunderstandings. We thank the many readers of the French edition who offered us the
suggestions.

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agreement with the contents or even the intention of this book.

Finally, we thank Marina, Claire, Thomas, and Antoine for having put up with us for the past tw
years.

I. Introduction

> So long as authority inspires awe, confusion and absurdity enhance conservative tendencies in society. Firstly, because clear and logical thinking leads to a cumulation of knowledge (of which the progress of the natural sciences provides the best example) and the advance of knowledge sooner or later undermines the traditional order. Confused thinking, on the other hand, leads nowhere in particular and can be indulged indefinitely without producing any impact upon the world.
>
> —*Stanislav Andreski, Social Sciences as Sorcery (1972, p. 90)*

The story of this book begins with a hoax. For some years, we have been surprised and distressed b the intellectual trends in certain precincts of American academia. Vast sectors of the humanities an the social sciences seem to have adopted a philosophy that we shall call, for want of a better term "postmodernism": an intellectual current characterized by the more-or-less explicit rejection of th rationalist tradition of the Enlightenment, by theoretical discourses disconnected from any empiric test, and by a cognitive and cultural relativism that regards science as nothing more than a "narration a "myth" or a social construction among many others.

To respond to this phenomenon, one of us (Sokal) decided to try an unorthodox (and admitted uncontrolled) experiment: submit to a fashionable American cultural-studies journal, *Social Text*, parody of the type of work that has proliferated in recent years, to see whether they would publish The article, entitled "Transgressing the Boundaries: Toward a Transformative Hermeneutics o Quantum Gravity"[1], is chock-full of absurdities and blatant non-sequiturs. In addition, it asserts a extreme form of cognitive relativism: after mocking the old-fashioned "dogma" that "there exists a external world, whose properties are independent of any individual human being and indeed humanity as a whole", it proclaims categorically that "physical 'reality', no less than social 'reality' is at bottom a social and linguistic construct". By a series of stunning leaps of logic, it arrives at th conclusion that "the π of Euclid and the G of Newton, formerly thought to be constant and universa are now perceived in their ineluctable historicity; and the putative observer becomes fatally d centered, disconnected from any epistemic link to a space-time point that can no longer be defined b geometry alone". The rest is in the same vein.

And yet, the article was accepted and published. Worse, it was published in a special issue o *Social Text* devoted to rebutting the criticisms levelled against postmodernism and soci constructivism by several distinguished scientists.[2] For the editors of *Social Text*, it was hard imagine a more radical way of shooting themselves in the foot.

Sokal immediately revealed the hoax, provoking a firestorm of reaction in both the popular an academic press.[3] Many researchers in the humanities and social sciences wrote to Sokal, sometim very movingly, to thank him for what he had done and to express their own rejection of th postmodernist and relativist tendencies dominating large parts of their disciplines. One student fe that the money he had earned to finance his studies had been spent on the clothes of an emperor wh

as in the fable, was naked. Another wrote that he and his colleagues were thrilled by the parody, bu asked that his sentiments be held in confidence because, although he wanted to help change h discipline, he could do so only after securing a permanent job.

But what was all the fuss about? Media hype notwithstanding, the mere fact the parody wa published proves little in itself; at most it reveals something about the intellectual standards of *on* trendy journal. More interesting conclusions can be derived, however, by examining the *content* of th parody.[4] On close inspection, one sees that the parody was constructed around quotations fro eminent French and American intellectuals about the alleged philosophical and social implications mathematics and the natural sciences. The passages may be absurd or meaningless, but they a nonetheless authentic. In fact, Sokal's only contribution was to provide a "glue" (the "logic" of whic is admittedly whimsical) to join these quotations together and praise them. The authors in questio form a veritable pantheon of contemporary "French theory": Gilles Deleuze, Jacques Derrida, Fél Guattari, Luce Irigaray, Jacques Lacan, Bruno Latour, Jean-François Lyotard, Michel Serres, and Pau Virilio.[5] The citations also include many prominent American academics in Cultural Studies an related fields; but these authors are often, at least in part, disciples of or commentators on the Frenc masters.

Since the quotations included in the parody were rather brief, Sokal subsequently assembled series of longer texts to illustrate these authors' handling of the natural sciences, which he circulate among his scientific colleagues. Their reaction was a mixture of hilarity and dismay: they cou hardly believe that anyone—much less renowned intellectuals—could write such nonsense. Howeve when non-scientists read the material, they pointed out the need to explain, in lay terms, exactly *wh* the cited passages are absurd or meaningless. From that moment, the two of us worked together produce a series of analyses and commentaries on the texts, resulting in this book.

What We Intend to Show

The goal of this book is to make a limited but original contribution toward the critique of th admittedly nebulous Zeitgeist that we have called "postmodernism". We make no claim to analyz postmodernist thought in general; rather, our aim is to draw attention to a relatively little-know aspect, namely the repeated abuse of concepts and terminology coming from mathematics an physics. We shall also analyze certain confusions of thought that are frequent in postmoderni writings and that bear on either the content or the philosophy of the natural sciences.

The word "abuse" here denotes one or more of the following characteristics:

1) Holding forth at length on scientific theories about which one has, at best, an exceedingly haz idea. The most common tactic is to use scientific (or pseudo-scientific) terminology without botherin much about what the words actually *mean.*

2) Importing concepts from the natural sciences into the humanities or social sciences witho giving the slightest conceptual or empirical justification. If a biologist wanted to apply, in h research, elementary notions of mathematical topology, set theory or differential geometry, she woul

be asked to give some explanation. A vague analogy would not be taken very seriously by h colleagues. Here, by contrast, we learn from Lacan that the structure of the neurotic subject is exact the torus (it is no less than reality itself, cf. see here), from Kristeva that poetic language can l theorized in terms of the cardinality of the continuum (see here), and from Baudrillard that mode war takes place in a non-Euclidean space (see here)—all without explanation.

3) Displaying a superficial erudition by shamelessly throwing around technical terms in a conte where they are completely irrelevant. The goal is, no doubt, to impress and, above all, to intimida the non-scientist reader. Even some academic and media commentators fall into the trap: Rolan Barthes is impressed by the precision of Julia Kristeva's work (see here) and *Le Monde* admires th erudition of Paul Virilio (see here).

4) Manipulating phrases and sentences that are, in fact, meaningless. Some of these authors exhib a veritable intoxication with words, combined with a superb indifference to their meaning.

These authors speak with a self-assurance that far outstrips their scientific competence: Laca boasts of using "the most recent development in topology" (see here) and Latour asks whether he h taught anything to Einstein (see here). They imagine, perhaps, that they can exploit the prestige of th natural sciences in order to give their own discourse a veneer of rigor. And they seem confident th no one will notice their misuse of scientific concepts. No one is going to cry out that the king is nake

Our goal is precisely to say that the king is naked (and the queen too). But let us be clear. We ar not attacking philosophy, the humanities or the social sciences *in general;* on the contrary, we fe that these fields are of the utmost importance and we want to warn those who work in them (especial students) against some manifest cases of charlatanism.[6] In particular, we want to "deconstruct" th reputation that certain texts have of being difficult because the ideas in them are so profound. In man cases we shall demonstrate that if the texts seem incomprehensible, it is for the excellent reason th they mean precisely nothing.

There are many different degrees of abuse. At one end, one finds extrapolations of scientif concepts, beyond their domain of validity, that are erroneous but for subtle reasons. At the other en one finds numerous texts that are full of scientific words but entirely devoid of meaning. And there i of course, a continuum of discourses that can be situated somewhere between these two extreme Although we shall concentrate in this book on the most manifest abuses, we shall also briefly addre some less obvious confusions concerning chaos theory (Chapter 7).

Let us stress that there is nothing shameful in being ignorant of calculus or quantum mechanic What we are criticizing is the pretension of some celebrated intellectuals to offer profound though on complicated subjects that they understand, at best, at the level of popularizations.[7]

At this point, the reader may naturally wonder: Do these abuses arise from conscious fraud, sel deception, or perhaps a combination of the two? We are unable to offer any categorical answer to th question, due to the lack of (publicly available) evidence. But, more importantly, we must confess th we do not find this question of great interest. Our aim here is to stimulate a critical attitude, n merely towards certain individuals, but towards a part of the intelligentsia (both in the United Stat

and in Europe) that has tolerated and even encouraged this type of discourse.

Yes, But …

Before proceeding any further, let us answer some of the objections that will no doubt occur to th reader:

1. *The quotations' marginality.* It could be argued that we are splitting hairs, criticizing autho who admittedly have no scientific training and who have perhaps made a mistake in venturing on unfamiliar terrain, but whose contribution to philosophy and/or the social sciences is neverthele important and is in no way invalidated by the "small errors" we have uncovered. We would respon first of all, that these texts contain much more than mere "errors": they display a profou indifference, if not a disdain, for facts and logic. Our goal is not, therefore, to poke fun at litera critics who make mistakes when citing relativity or Gödel's theorem, but to defend the canons rationality and intellectual honesty that are (or should be) common to all scholarly disciplines.

It goes without saying that we are not competent to judge the non-scientific aspects of the authors' work. We understand perfectly well that their "interventions" in the natural sciences do n constitute the central themes of their oeuvre. But when intellectual dishonesty (or gro incompetence) is discovered in one part—even a marginal part—of someone's writings, it is natural want to examine more critically the rest of his or her work. We do not want to prejudge the results such an analysis, but simply to remove the aura of profundity that has sometimes intimidated studen (and professors) from undertaking it.

When ideas are accepted on the basis of fashion or dogma, they are especially sensitive to t exposure even of marginal aspects. For example, geological discoveries in the eighteenth a nineteenth centuries showed that the earth is vastly older than the 5000-or-so years recounted in t Bible; and although these findings directly contradicted only a small part of the Bible, they had t indirect effect of undermining its overall credibility as a factual account of history, so that nowada few people (except in the United States) believe in the Bible in the *literal* way that most Europea did only a few centuries ago. Consider, by contrast, Isaac Newton's work: it is estimated that 9 percent of his writings deal with alchemy or mysticism. But, so what? The rest survives because it based on solid empirical and rational arguments. Similarly, most of Descartes' physics is false, b some of the philosophical questions he raised are still pertinent today. If the same can be said for t work of our authors, then our findings have only marginal relevance. But if these writers have becom international stars primarily for sociological rather than intellectual reasons, and in part because th are masters of language and can impress their audience with a clever abuse of sophisticat terminology—nonscientific as well as scientific—then the revelations contained in this essay ma indeed have significant repercussions.

Let us emphasize that these authors differ enormously in their attitude toward science and t importance they give it. They should not be lumped together in a single category, and we want to wa the reader against the temptation to do so. For example, although the quotation from Derri

contained in Sokal's parody is rather amusing[8], it is a one-shot abuse; since there is no systemat misuse of (or indeed attention to) science in Derrida's work, there is no chapter on Derrida in th book. By contrast, the work of Serres is replete with more-or-less poetic allusions to science and i history; but his assertions, though extremely vague, are in general neither completely meaningless n completely false, and so we have not discussed them here in detail.[9] Kristeva's early writings relie strongly (and abusively) on mathematics, but she abandoned this approach more than twenty yea ago; we criticize them here because we consider them symptomatic of a certain intellectual style. Th other authors, by contrast, have all invoked science extensively in their work. Latour's writing provide considerable grist for the mill of contemporary relativism and are based on an alleged rigorous analysis of scientific practice. The works of Baudrillard, Deleuze, Guattari and Virilio a filled with seemingly erudite references to relativity, quantum mechanics, chaos theory, etc. So we a by no means splitting hairs in establishing that their scientific erudition is exceedingly superficia Moreover, for several authors, we shall supply references to additional texts where the reader can fin numerous further abuses.

2. *You don't understand the context.* Defenders of Lacan, Deleuze *et al*. might argue that the invocations of scientific concepts are valid and even profound, and that our criticisms miss the poi because we fail to understand the context. After all, we readily admit that we do not always understan the rest of these authors' work. Mightn't we be arrogant and narrow-minded scientists, missin something subtle and deep?

We would respond, first of all, that when concepts from mathematics or physics are invoked i another domain of study, some argument ought to be given to justify their relevance. In all the case cited here, we have checked that no such argument is provided, whether next to the excerpt we quo or elsewhere in the article or book.

Moreover, there are some "rules of thumb" that can be used to decide whether mathematics a being introduced with some real intellectual goal in mind, or merely to impress the reader. First of al in cases of legitimate use, the author needs to have a good understanding of the mathematics he/she purporting to apply—in particular, there should be no gross mistakes—and he/she should explain th requisite technical notions, as clearly as possible, in terms that will be understandable to the intende reader (who is presumably a non-scientist). Secondly, because mathematical concepts have precis meanings, mathematics is useful primarily when applied to fields in which the concepts likewise hav more-or-less precise meanings. It is difficult to see how the mathematical notion of compact spac can be applied fruitfully to something as ill-defined as the "space of *jouissance*" in psychoanalysi Thirdly, one should be particularly suspicious when abstruse mathematical concepts (like the axiom choice in set theory) that are used rarely, if at all, in physics—and certainly never in chemistry biology—miraculously become relevant in the humanities or the social sciences.

3. *Poetic licence.* If a poet uses words like "black hole" or "degree of freedom" out of context an without really understanding their scientific meaning, it doesn't bother us. Likewise, if a scienc fiction writer uses secret passageways in space-time in order to send her characters back to the era

the Crusades, it is purely a question of taste whether one likes or dislikes the technique.

By contrast, we insist that the examples cited in this book have nothing to do with poetic licenc These authors are holding forth, in utter seriousness, on philosophy, psychoanalysis, semiotics, sociology. Their works are the subject of innumerable analyses, exegeses, seminars, and doctor theses.[10] Their intention is clearly to produce theory, and it is on this ground that we criticize ther Moreover, their style is usually heavy and pompous, so it is highly unlikely that their goal principally literary or poetic.

4. *The role of metaphors.* Some people will no doubt think that we are interpreting these autho too literally and that the passages we quote should be read as metaphors rather than as precise logic arguments. Indeed, in certain cases the "science" *is* undoubtedly intended metaphorically; but what the purpose of these metaphors? After all, a metaphor is usually employed to clarify an unfamili concept by relating it to a more familiar one, not the reverse. Suppose, for example, that in theoretical physics seminar we were to explain a very technical concept in quantum field theory b comparing it to the concept of aporia in Derridean literary theory. Our audience of physicists wou wonder, quite reasonably, what is the goal of such a metaphor—whether or not it is apposite—apa from displaying our own erudition. In the same way, we fail to see the advantage of invoking, eve metaphorically, scientific concepts that one oneself understands only shakily when addressing readership composed almost entirely of non-scientists. Might the goal be to pass off as profound rather banal philosophical or sociological observation, by dressing it up in fancy scientific jargon?

5. *The role of analogies.* Many authors, including some of those discussed here, try to argue b analogy. We are by no means opposed to the effort to establish analogies between diverse domains human thought; indeed, the observation of a valid analogy between two existing theories can often very useful for the subsequent development of both. Here, however, we think that the analogies a between well-established theories (in the natural sciences) and theories too vague to be teste empirically (for example, Lacanian psychoanalysis). One cannot help but suspect that the function these analogies is to hide the weaknesses of the vaguer theory.

Let us emphasize that a half-formulated theory—be it in physics, biology, or the social sciences- cannot be redeemed simply by wrapping it in symbols or formulae. The sociologist Stanislav Andres has expressed this idea with his habitual irony:

> The recipe for authorship in this line of business is as simple as it is rewarding: just get hold of a textbook of mathematics, copy the less complicated parts, put in some references to the literature in one or two branches of the social studies without worrying unduly about whether the formulae which you wrote down have any bearing on the real human actions, and give your product a good-sounding title, which suggests that you have found a key to an exact science of collective behaviour. (Andreski 1972, pp. 129–130)

Andreski's critique was originally aimed at American quantitative sociology, but it is equall applicable to some of the texts cited here, notably those of Lacan and Kristeva.

6. *Who is competent?* We have frequently been asked the following question: You want to preven philosophers from speaking about science because they don't have the requisite formal training; b

what qualifications do you have to speak of philosophy? This question betrays a number
misunderstandings. First of all, we have no desire to prevent anyone from speaking about anythin
Secondly, the intellectual value of an intervention is determined by its content, not by the identity
the speaker, much less by his or her diplomas.[11] Thirdly, there is an asymmetry: we do not purport
judge Lacan's psychoanalysis, Deleuze's philosophy, or Latour's concrete work in sociology. W
limit ourselves to their statements about the mathematical and physical sciences or about elementa
problems in the philosophy of science.

7. *Don't you too rely on argument from authority?* For if we assert that Lacan's mathematics a
nonsense, how is the non-scientist reader to judge? Mustn't he or she take our word for it?

Not entirely. First of all, we have tried hard to provide detailed explanations of the scientif
background, so that the non-specialist reader can appreciate *why* a particular assertion is erroneous
meaningless. We may not have succeeded in all cases: space is limited, and scientific pedagogy
difficult. The reader is perfectly entitled to reserve judgment in those cases where our explanation
inadequate. But, most importantly, it should be remembered that our criticism does *not* deal primari
with errors, but with the manifest *irrelevance* of the scientific terminology to the subject supposed
under investigation. In all the reviews, debates and private correspondence that have followed t
publication of our book in France, no one has given even the slightest argument explaining how th
relevance could be established.

8. *But these authors are not "postmodernist".* It is true that the French authors discussed in th
book do not all regard themselves as "postmodernist" or "poststructuralist". Some of these texts we
published prior to the emergence of these intellectual currents, and some of these authors reject a
link with these currents. Moreover, the intellectual abuses criticized in this book are n
homogeneous; they can be classified, very roughly, into two distinct categories, correspondi
roughly to two distinct phases in French intellectual life. The first phase is that of extrem
structuralism, extending through the early 1970s: the authors try desperately to give vague discours
in the human sciences a veneer of "scientificity" by invoking the trappings of mathematics. Lacan
work and the early writings of Kristeva fall into this category. The second phase is that
poststructuralism, beginning in the mid-1970s: here any pretense at "scientificity" is abandoned, a
the underlying philosophy (to the extent one can be discerned) tends toward irrationalism or nihilis
The texts of Baudrillard, Deleuze and Guattari exemplify this attitude.

Furthermore, the very idea that there exists a distinctive category of thought call
"postmodernist" is much less widespread in France than in the English-speaking world. If w
nevertheless employ this term for convenience, it is because all the authors analyzed here are utiliz
as fundamental points of reference in English-language postmodernist discourse, and because som
aspects of their writings (obscure jargon, implicit rejection of rational thought, abuse of science
metaphor) are common traits of Anglo-American postmodernism. In any case, the validity of o
critiques can in no way depend on the use of a word; our arguments must be judged, for each autho
independently of his or her link—be it conceptually justified or merely sociological—with the broad

"postmodernist" current.

9. *Why do you criticize these authors and not others?* A long list of "others" has been suggeste both in print and in private correspondence: these include virtually all applications of mathematics the social sciences (e.g. economics), physicists' speculations in popular books (e.g. Hawkin Penrose), sociobiology, cognitive science, information theory, the Copenhagen interpretation quantum mechanics, and the use of scientific concepts and formulas by Hume, La Mettrie, D'Holbac Helvetius, Condillac, Comte, Durkheim, Pareto, Engels, and sundry others.[12]

Let us begin by observing that this question is irrelevant to the validity or invalidity of o arguments; at best it can be used to cast aspersions on our intentions. Suppose there are other abus as bad as those of Lacan or Deleuze; how would that justify the latter?

However, since the question of the grounds for our "selection" is so often asked, let us try answer it briefly. First of all, we have no desire to write a ten-volume encyclopedia on "nonsens since Plato", nor do we have the competence to do so. Our scope is limited, firstly, to abuses in tho scientific fields in which we can claim some expertise, namely mathematics and physics[13]; secondl to abuses that are currently fashionable in influential intellectual circles; and thirdly, to abuses th have not previously been analyzed in detail. However, even within these constraints, we do not clai that our set of targets is exhaustive or that they constitute a "natural kind". Quite simply, Sok stumbled on most of these texts in the course of writing his parody, and we decided, after reflectio that it was worth making them public.

Furthermore, we contend that there is a profound difference between the texts analyzed here a most of the other examples that have been suggested to us. The authors quoted in this book clearly do not have more than the vaguest understanding of the scientific concepts they invoke and, mo importantly, they fail to give any argument justifying the relevance of these scientific concepts to th subjects allegedly under study. They are engaged in name-dropping, not just faulty reasoning. Thu while it is very important to evaluate critically the uses of mathematics in the social sciences and th philosophical or speculative assertions made by natural scientists, these projects are different from- and considerably more subtle than—our own.[14]

A related question is:

10. *Why do you write a book on this and not on more serious issues? Is postmodernism such great danger to civilization?* First of all, this is an odd question. Suppose someone discove documents relevant to the history of Napoleon and writes a book about it. Would anyone ask hi whether he thinks this is a more important topic than World War II? His answer, and ours, would b that an author writes on a subject under two conditions: that he is competent and that he is able contribute something original. His subject will not, unless he is particularly lucky, coincide with th most important problem in the world.

Of course we do not think that postmodernism is a great danger to civilization. Viewed on a glob scale, it is a rather marginal phenomenon, and there are far more dangerous forms of irrationalism- religious fundamentalism, for instance. But we do think that the critique of postmodernism

worthwhile for intellectual, pedagogical, cultural and political reasons; we shall return to these them in the Epilogue.

* * *

Finally, to avoid useless polemics and facile "refutations", let us emphasize that this book is not right-wing pamphlet against left-wing intellectuals, or an American imperialist attack against th Parisian intelligentsia, or a simple know-nothing appeal to "common sense". In fact, the scientif rigor we are advocating often leads to results at odds with "common sense"; obscurantism, confuse thinking, anti-scientific attitudes and the quasi-religious veneration of "great intellectuals" are in n way left-wing; and the attachment of part of the American intelligentsia to postmodernis demonstrates that the phenomenon is international. In particular, our critique is in no way motivate by the "theoretical nationalism and protectionism" that French writer Didier Eribon claims to detect the work of some American critics.[15] Our aim is, quite simply, to denounce intellectual posturing an dishonesty, from wherever they come. If a significant part of the postmodernist "discourse" i contemporary American and British academia is of French origin, it is equally true that Englis language intellectuals have long since given it an authentic home-grown flavor.[16]

Plan of This Book

The bulk of this book consists of an analysis of texts, author by author. For the convenience of non specialist readers, we have provided, in footnotes, brief explanations of the relevant scientif concepts as well as references to good popular and semi-popular explanatory texts.

Some readers will no doubt think that we are taking these texts too seriously. That is true, in som sense. But since these texts *are* taken seriously by many people, we think that they deserve to b analyzed with the greatest rigor. In some cases we have quoted rather long passages, at the risk o boring the reader, in order to show that we have not misrepresented the meaning of the text by pullin sentences out of context.

In addition to abuses in the strict sense, we have also analyzed certain scientific and philosophic confusions that underlie much postmodernist thinking. First, we shall consider the problem cognitive relativism, and show that a series of ideas coming from the history and philosophy science do not have the radical implications that are often attributed to them (Chapter 4). Next w shall address several misunderstandings concerning chaos theory and so-called "postmodern scienc (Chapter 7). Finally, in the Epilogue, we shall situate our critique in a wider cultural context.

Many of the texts quoted in this book originally appeared in French. Where a published Englis translation exists, we have most often used it (sometimes noting our corrections); it is cited in th bibliography, along with the original French source in brackets. In other cases, the translation is our We have endeavored to remain as faithful as possible to the original French, and in case of doubt w have reproduced the latter in brackets or even *in toto*. We assure the reader that if the passage seem incomprehensible in English, it is because the original French is likewise.

2. Jacques Lacan

> Lacan finally gives Freud's thought the scientific concepts it requires.
>
> —*Louis Althusser, Écrits sur la psychanalyse (1993, p. 50)*

> Lacan is, as he himself says, a crystal-clear author.
>
> —*Jean-Claude Milner, L'œuvre claire (1995, p. 7)*

Jacques Lacan was one of the most famous and influential psychoanalysts of this century. Each yea dozens of books and articles are devoted to the analysis of his work. According to his disciples, h revolutionized the theory and practice of psychoanalysis; according to his critics, he is a charlatan an his writings are pure verbiage. We shall not enter here into the debate concerning the purel psychoanalytic part of Lacan's work. Rather, we shall limit ourselves to an analysis of his freque references to mathematics, and show that Lacan illustrates perfectly, in different parts of his œuvr the abuses listed in our introduction.

"Psychoanalytic Topology"

Lacan's mathematical interests centered primarily on topology, the branch of mathematics dealin (among other things) with the properties of geometrical objects—surfaces, solids, and so forth—th remain unchanged when the object is deformed without being torn. (According to the classic joke, topologist is unable to tell a doughnut from a coffee cup, as both are solid objects with a single hole Lacan's writings contained some references to topology already in the 1950s; but the first extende (and publicly available) discussion goes back to a celebrated conference on *The Languages Criticism and the Sciences of Man*, held at Johns Hopkins University in 1966. Here is an excerpt fro Lacan's lecture:

> This diagram [the Möbius strip[17]] can be considered the basis of a sort of essential inscription at the origin, in the knot which constitutes the subject. This goes much further than you may think at first, because you can search for the sort of surface able to receive such inscriptions. You can perhaps see that the sphere, that old symbol for totality, is unsuitable. A torus, a Klein bottle, a cross-cut surface[18], are able to receive such a cut. And this diversity is very important as it explains many things about the structure of mental disease. If one can symbolize the subject by this fundamental cut, in the same way one can show that a cut on a torus corresponds to the neurotic subject, and on a cross-cut surface to another sort of mental disease. (Lacan 1970, pp. 192–193)

Perhaps the reader is wondering what these different topological objects have to do with the structu of mental disease. Well, so are we; and the rest of Lacan's text does nothing to clarify the matte Nevertheless, Lacan insists that his topology "explains many things". In the discussion following h lecture, one finds the following dialogue:

HARRY WOOLF: May I ask if this fundamental arithmetic and this topology are not in themselves a myth or merely at best an analogy for an explanation of the life of the mind?

JACQUES LACAN: Analogy to what? "S" designates something which can be written exactly as this S. And I have said that the "S" which designates the subject is instrument, matter, to symbolize a loss. A loss that you experience as a subject (and myself also). In other words, this gap between one thing which has marked meanings and this other thing which is my actual discourse that I try to put in the place where you are, you as not another subject but as people that are able to understand me. Where is the analogon? Either this loss exists or it doesn't exist. If it exists it is only possible to designate the loss by a system of symbols. In any case, the loss does not exist before this symbolization indicates its place. It is not an analogy. It is really in some part of the realities, this sort of torus. This torus really exists and it is exactly the structure of the neurotic. It is not an analogon; it is not even an abstraction, because an abstraction is some sort of diminution of reality, and I think it is reality itself. (Lacan 1970, pp. 195–196)

Here again, Lacan gives no argument to support his peremptory assertion that the torus "is exactly th structure of the neurotic" (whatever this means). Moreover, when asked explicitly whether it is simpl an analogy, he denies it.

As the years passed, Lacan became increasingly fond of topology. A text from 1972 begins b playing on the etymology of the word (Greek *topos*, place + *logos*, word):

In this space of jouissance, to take something that is bounded, closed [*borné*, *fermé*] constitutes a locus [*lieu*], and to speak of it constitutes a topology. (Lacan 1975a, p. 14; Lacan 1998, p. 9; seminar originally held in 1972[19])

In this sentence, Lacan has used four technical terms from mathematical analysis *(space*, *bounde closed*, *topology)* but without paying attention to their *meaning;* the sentence is meaningless from mathematical point of view. Furthermore—and most importantly—Lacan never explains the relevan of these mathematical concepts for psychoanalysis. Even if the concept of "*jouissance*" had a cle and precise meaning, Lacan provides no reason whatsoever to think that *jouissance* can be considere a "space" in the technical sense of this word in topology. Nevertheless, he continues:

In a text soon to be published that is at the cutting edge of my discourse last year, I believe I demonstrate the strict equivalence between topology and structure.[20] If we take that as our guide, what distinguishes anonymity from what we talk about as jouissance—namely, what is regulated by law—is a geometry. A geometry implies the heterogeneity of locus, namely that there is a locus of the Other.[21] Regarding this locus of the Other, of one sex as Other, as absolute Other, what does the most recent development in topology allow us to posit?

I will posit here the term "compactness."[22] Nothing is more compact than a fault [*faille*], assuming that the intersection of everything that is enclosed therein is accepted as existing over an infinite number of sets, the result being that the intersection implies this infinite number. That is the very definition of compactness. (Lacan 1975a, p. 14; Lacan 1998, p. 9)

Not at all: although Lacan uses quite a few key words from the mathematical theory of compactne (see note 22), he mixes them up arbitrarily and without the slightest regard for their meaning. H "definition" of compactness is not just false: it is gibberish. Moreover, this "most recent developme in topology" goes back to 1900–1930.

He continues as follows:

The intersection I am talking about is the same one I put forward earlier as being that which covers or poses an obstacle to the supposed sexual relationship.

Only “supposed,” since I state that analytic discourse is premised solely on the statement that there is no such thing, that it is ~~impossible to found [*poser*] a sexual relationship. Therein lies analytic discourse’s step forward and it is thereby t~~hat it determines the real status of all the other discourses.

Named here is the point that covers the impossibility of the sexual relationship as such. Jouissance, qua sexual, is phallic—in other words, it is not related to the Other as such.

Let us follow here the complement of the hypothesis of compactness.

A formulation is given to us by the topology I qualified as the most recent that takes as its point of departure a logic constructed on the investigation of numbers and that leads to the institution of a locus, which is not that of a homogeneous space. Let us take the same bounded[23], closed, supposedly instituted space—the equivalent of what I earlier posited as an intersection extending to infinity. If we assume it to be covered with open sets, in other words, sets that exclude their own limits—the limit is that which is defined as greater than one point and less than another, but in no case equal either to the point of departure or the point of arrival, to sketch it for you quickly[24]—it can be shown that it is equivalent to say that the set of these open spaces always allows of a subcovering of open spaces, constituting a finity [*finitude*], namely, that the series of elements constitutes a finite series.

You may note that I did not say that they are countable. And yet that is what the term “finite” implies. In the end, we count them one by one. But before we can count them, we must find an order in them and we cannot immediately assume that that order is findable.[25]

What is implied, in any case, by the demonstrable finity of the open spaces that can cover the space that is bounded[26] and closed in the case of sexual jouissance? What is implied is that the said spaces can be taken one by one [*un par un*]—and since I am talking about the other pole, let us put this in the feminine—*une par une*.

That is the case in the space of sexual jouissance, which thereby proves to be compact. (Lacan 1975a, pp. 14–15; Lacan 1998, pp. 9–10)

This passage illustrates perfectly two “faults” in Lacan’s discourse. Everything is based—at best—o analogies between topology and psychoanalysis that are unsupported by any argument. But, in fac even the mathematical statements are devoid of meaning.

In the mid-1970s, Lacan’s topological preoccupations shifted towards knot theory: see, f example, Lacan (1975a, pp. 107–123; 1998, pp. 122–136) and especially Lacan (1975b–e). For detailed history of his obsessions with topology, see Roudinesco (1997, chapter 28). Lacan’s disciple have given full accounts of his *topologie psychanalytique:* see, for example, Granon-Lafont (198 1990), Vappereau (1985, 1995), Nasio (1987, 1992), Darmon (1990) and Leupin (1991).

Imaginary Numbers

Lacan’s predilection for mathematics is by no means marginal in his work. Already in the 1950s, h writings were full of graphs, formulas and “algorithms”. Let us quote, by way of illustration, th excerpt from a seminar held in 1959:

> If you’ll permit me to use one of those formulas which come to me as I write my notes, human life could be defined as a calculus in which zero was irrational. This formula is just an image, a mathematical metaphor. When I say “irrational,” I’m referring not to some unfathomable emotional state but precisely to what is called an imaginary number. The square root of minus one doesn’t correspond to anything that is subject to our intuition, anything real—in the mathematical sense of the term —and yet, it must be conserved, along with its full function. (Lacan 1977a, pp. 28–29, seminar held originally in 1959)

In this quote, Lacan confuses irrational numbers with imaginary numbers, while claiming to l “precise”. They have nothing to do with one another.[27] Let us emphasize that the mathematic

meanings of the words “irrational” and “imaginary” are quite distinct from their ordinary philosophical meanings. To be sure, Lacan speaks here prudently of a metaphor, though it is hard t see what theoretical role this metaphor (human life as a “calculus in which zero was irrational”) cou fulfill. Nevertheless, a year later, he further developed the psychoanalytic role of imaginary numbers

> Personally, I will begin with what is articulated in the sigla S(Ø) by being first of all a signifier.…
>
> And since the battery of signifiers, as such, is by that very fact complete, this signifier can only be a line [*trait*] that is drawn from its circle without being able to be counted part of it. It can be symbolized by the inherence of a (−1) in the whole set of signifiers.
>
> As such it is inexpressible, but its operation is not inexpressible, for it is that which is produced whenever a proper noun is spoken. Its statement equals its signification.
>
> Thus, by calculating that signification according to the algebraic method used here, namely:
>
> $$\frac{\text{S (signifier)}}{\text{s (signified)}} = \text{s (the statement), with S} = (-1), \text{ produces: } \text{s} = \sqrt{-1}.$$
>
> (Lacan 1977b, pp. 316–317, seminar originally held in 1960)

Here Lacan can only be pulling the reader’s leg. Even if his “algebra” had a meaning, the “signifier “signified” and “statement” that appear within it are obviously not numbers, and his horizontal bar (a arbitrarily chosen symbol) does not denote the division of two numbers. Therefore, his “calculation are pure fantasies.[28] Nevertheless, two pages later, Lacan returns to the same theme:

> No doubt Claude Lévi-Strauss, in his commentary on Mauss, wished to recognize in it the effect of a zero symbol. But it seems to me that what we are dealing with here is rather the signifier of the lack of this zero symbol. That is why, at the risk of incurring a certain amount of opprobrium, I have indicated to what point I have pushed the distortion of the mathematical algorithm in my use of it: the symbol $\sqrt{-1}$, which is still written as ‘*i*’ in the theory of complex numbers, is obviously justified only because it makes no claim to any automatism in its later use.
>
> …
>
> Thus the erectile organ comes to symbolize the place of *jouissance*, not in itself, or even in the form of an image, but as a part lacking in the desired image: that is why it is equivalent to the $\sqrt{-1}$ of the signification produced above, of the *jouissance* that it restores by the coefficient of its statement to the function of lack of signifier (−1). (Lacan 1977b, pp. 318–320)

It is, we confess, distressing to see our erectile organ equated to $\sqrt{-1}$. This reminds us of Woody Alle who, in *Sleeper*, objects to the reprogramming of his brain: “You can’t touch my brain, it’s m second-favorite organ!”

Mathematical Logic

In some of his texts, Lacan does less violence to mathematics. For example, in the quote below, h mentions two fundamental problems in the philosophy of mathematics: the nature of mathematic objects, in particular of the natural numbers (1, 2, 3,…), and the validity of reasoning b “mathematical induction” (if a property is true for the number 1 and if one can show that its truth f the number *n* implies its truth for the number *n* + 1, then one can deduce that the property is true f

all natural numbers).

> After fifteen years I have taught my pupils to count at most up to five which is difficult (four is easier) and they have understood that much. But for tonight permit me to stay at two. Of course, what we are dealing with here is the question of the integer, and the question of integers is not a simple one as I think many people here know. It is only necessary to have, for instance, a certain number of sets and a one-to-one correspondence. It is true for example that there are exactly as many people sitting in this room as there are seats. But it is necessary to have a collection composed of integers to constitute an integer, or what is called a natural number. It is, of course, in part natural but only in the sense that we do not understand why it exists. Counting is not an empirical fact and it is impossible to deduce the act of counting from empirical data alone. Hume tried but Frege demonstrated perfectly the ineptitude of the attempt. The real difficulty lies in the fact that every integer is in itself a unit. If I take two as a unit, things are very enjoyable, men and women for instance—love plus unity! But after a while it is finished, after these two there is nobody, perhaps a child, but that is another level and to generate three is another affair. When you try to read the theories of mathematicians regarding numbers you find the formula "*n* plus 1" (*n* + 1) as the basis of all the theories. (Lacan 1970, pp. 190–191)

So far, this is not too bad: those who already know the subject can recognize the vague allusions t classic debates (Hume/Frege, mathematical induction) and separate them from some rath questionable statements (for example, what does it mean to say "The real difficulty lies in the fact th every integer is in itself a unit"?). But from here on, Lacan's reasoning becomes increasingly obscur

> It is this question of the "one more" that is the key to the genesis of numbers and instead of this unifying unity that constitutes two in the first case I propose that you consider the real numerical genesis of two.
>
> It is necessary that this two constitute the first integer which is not yet born as a number before the two appears. You have made this possible because the *two* is here to grant existence to the first *one:* put *two* in the place of *one* and consequently in the place of the *two* you see *three* appear. What we have here is something which I can call the *mark*. You already have something which is marked or something which is not marked. It is with the first mark that we have the status of the thing. It is exactly in this fashion that Frege explains the genesis of the number; the class which is characterized by no elements is the first class; you have one at the place of zero and afterward it is easy to understand how the place of one becomes the second place which makes place for two, three, and so on.[29] (Lacan 1970, p. 191, italics in the original)

And it is at this moment of obscurity that Lacan introduces, without explanation, the alleged link wi psychoanalysis:

> The question of the two is for us the question of the subject, and here we reach a fact of psychoanalytical experience in as much as the two does not complete the one to make two, but must repeat the one to permit the one to exist. This first repetition is the only one necessary to explain the genesis of the number, and only one repetition is necessary to constitute the status of the subject. The unconscious subject is something that tends to repeat itself, but only one such repetition is necessary to constitute it. However, let us look more precisely at what is necessary for the second to repeat the first in order that we may have a repetition. This question cannot be answered too quickly. If you answer too quickly, you will answer that it is necessary that they are the same. In this case the principle of the two would be that of twins—and why not triplets or quintuplets? In my day we used to teach children that they must not add, for instance, microphones with dictionaries; but this is absolutely absurd, because we would not have addition if we were not able to add microphones with dictionaries or as Lewis Carroll says, cabbages with kings. The sameness is not in *things* but in the *mark* which makes it possible to add things with no consideration as to their differences. The mark has the effect of rubbing out the difference, and this is the key to what happens to the subject, the unconscious subject in the repetition; because you know that this subject repeats something peculiarly significant, the subject is here, for instance, in this obscure thing that we call in some cases trauma, or exquisite pleasure. (Lacan 1970, pp. 191–192, italics in the original)