Beyond the Hoax

Science, Philosophy and Culture

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Alan Sokal achieved notoriety and became a local hero through his hoax perpetrated in the mid-nineties. The hoax consisted in a paper written in current post-modernistic jargon being submitted to a fashionable journal [1] and being accepted. The point of the hoax was to highlight the pretentious writings of social philosophers and the total lack of content and credentials, save that of a sophisticated language and flattery of editors, that go with the activity. The spoof created much more attention in the major news media than he had expected and ever since then he has become an intellectual celebrity with the advantages and possibilities such a position entails. In the book under review, consisting of a collection of partially overlapping essays[2], the hoax is reprinted in the first part of the book, along with a lengthy annotation, which takes almost as much space as the main text itself, which, by intention, is more or less unreadable. The writing of the hoax, which involved some non-trivial empirical research[3], obviously afforded the author great pleasure, and the point of the lengthy annotation is to point out all the clever in-jokes embedded in the text, a temptation of self-congratulation that should have been resisted, but the difficulty to do so I can very well understand[4]. The author is disarmingly frank about it, he is very proud of the text, which many of the victims (direct as well as indirect) of the hoax could not really believe was the product of a mere scientist on the other side of the cultural divide. The challenge was to write well-formed sentences with no meaning and content whatsoever, a challenge to which he admits he was not able to rise completely.[5] In fact Sokal reveals that the most outrageous examples he was not able to produce himself but were culled from his extensive reading and incorporated in the text with appropriately laudable comments.

Now what are we going to make of all this? Are those post-modernist writers raving madmen, who should be confined to institutions? [6] In one sense they already are, marginal

[1] Social Text

[2] Such overlapping is of course inevitable, but it is of course a little bit disconcerting to see passages repeated more or less ad verbatim from one essay to another.

[3] Waddling through an extensive literature of post-modernist outpourings, which by itself is a testimony to the commitment and stamina of the perpetrator and which should enlist our admiration as well as commiseration.

[4] Under the same circumstances I would certainly not have resisted myself

[5] William James remarks caustically in his Principles of Psychology that we are all disposed to look for meaning in syntactically correct texts, and that some even carry this ambition to the output of Hegel.

[6] In fact some actually were, such as Lacan, whose advanced state of dementia was masked by his post-modernist jargon.

(if fashionable) figures in academia with little practical impact. Why bother about them at all? The reason being that they are symptoms of a general malaise not only of anti-rational thinking but also more to the point of muddled and lazy such. Most of those people are in everyday matters very sane and reasonable and many of the motivations that inspire their outpourings are valid ones, but they suffer from a lack of criticism, which makes them uninformed and liable to gross misunderstandings. In fact rather than having them condemned and dismissed, we should in my opinion, consider the phenomena as a series of cautionary tales, indicating to what silliness we can lend ourselves when we start to pontificate on matters philosophical with no checks and restraints. A silliness none of us should consider ourselves immune to[7].

The crux of the matter is that science and scientists are being subjected to a sophisticated meta-analysis, in which their activities and the products of the same are treated from a sociological standpoint. Nothing wrong with that, no one should be exempt from critical inquiry, and there certainly is food for sociological reflection on how scientists form a collective, in particular the way in which funding is distributed, promotion decided, prizes awarded, and generally how hierarchies of power are constructed and implemented. But the point is that the end results of this activity, interesting as it is, transcends the very activity itself. The sociologists may condemn and dismiss the validity of the methods and epistemologies of the scientists, forgetting that the same strictures they apply to them should also be applied to their own methods. In fact the rigor and sophistication employed in hard core scientific inquiry is far superior to the rather naive methods designed by the sociologists themselves. There may be no truths, as they claim, all being just social constructs. But this very statement itself, is that not purported to be a truth, when in fact if anything it is but a social construct? To an outsider the predictions of contemporary cosmologists of what will happen millions of years into the future may seem rather ludicrous in view of the fact of how much our scientific world view has changed in a mere 400 years, and what guarantees are there that it will be so stable millions of years from now, and if not surely their very predictions may crumble? Strictly speaking there are no such guarantees of course, the future is by nature mostly unknowable, yet this very cynical view is based on a rather primitive induction. It could very well be that the accomplishments of the last 400 years or so are rather unique in the history, not only of mankind but of the universe itself, and that the insights acquired will prove to have been very sound and will not significantly change ever after, constituting a very good approximation of what actually and factually is. The logic and notion of rational thinking has in fact not changed since antiquity[8], the contributions of the Greek mathematicians, limited as they were, have not been superseded, unlike the attempts of their contemporary natural scientists. And one may very well argue with Whitehead, that western philosophy is but a series of footnotes to Plato. It could even happen, and the thought may be both depressing and reassuring, depending on mood, that we have soon exhausted the supply of major discoveries of which humans are capable of making, and what will remain is just the tedious working out of details. This of course is but frivolous speculation, intended to indicate what options are available once we exalt ourselves to a meta inquiry about science and its prospects.

[7] This applies in particular to the present writer of this review.

[8] before that we have of course no real written documentation of which we can directly partake

Now what is science? Science itself cannot in fact be treated scientifically, once we start to pontificate on science we enter the realm of metaphysics. That is nothing wrong with that, just as there is nothing wrong or avoidable about metaphysics, only that one should realize that we are dealing with metaphysics and hence entering into a poetic mode so to speak, where truths cannot be rigorously derived from formal machinery, but have to be evoked in oblique ways. In my opinion the best articulated view of what science is has been given by Popper. Sokal is rather dismissive of Popper, although the characterization of science which he subsequently suggests is in its essence the same as that of Popper, be it not quite as lucidly and strikingly expressed as in Poppers writings themselves. The reason for this is probably due to a misunderstanding. Popper is not out to give a blue-print of how science should be performed, he is giving a metaphysical description that as such is not amenable to explicit scientific manipulation. Sokal is right in claiming that Popper is not original, Popper obviously did not launch the scientific method (whatever that is) he simply is describing what is going on, collecting observations on the subject made long before him. It is very difficult to be original in philosophy and at the same time saying something which is profound and correct as well as valuable. Now most people have a superficial notion of what Popper stands for, namely an emphasis not on verification of theories but their potential falsification. This might at first appear somewhat perverse, as well as silly. Silly because there seems to be a symmetry between verification and falsification. If you falsify A you are at the same time verifying not A.[9] Perverse because it seems to indicate that we cannot verify things in science, everything is potentially up for doubt. This might seem to be an endorsement or relativism, but on the contrary, Popper is a realist, who believes in an absolute truth, but one to which we can never hope to fully attain, only asymptotically approach. There is in fact a real difference between ontology and epistemology. Popper only claims, as all scientists know in their hearts, that there is no absolute certainty, that, in the words of Popper, we are only driving the supporting poles on which our edifices rest deeper and deeper into the marsh. All scientific knowledge is provisional liable to be modified in the light of future evidence, but that does not prevent us from accepting what we have at the moment in a pragmatic spirit. A scientific theory is considered robust, when it has withstood repeated attempts at refutation and hence beautifully fits into the interconnected web of other (provisional) facts[10]. Thus this can be seen as Poppers statement of what it means to prove (provisionally of course) by induction,

[9] If you give a counterexample to a proposed theorem in mathematics, a textbook example of a falsification if ever there was any, you prove at the same time that every single purported proof of the same is false, even without having to inductively prove this by going through one by one a list which surely is infinite. This of course assumes implicitly that the system of axioms in which you are working are consistent, which is beyond proof. A more elementary formulation, would be to locate an individual at a certain place, and then conclude that the individual is nowhere be seen anywhere else in the universe, in particular not on a planet of Sirius, even without having to go to that (admittedly hypothetical) location to check. Once again this is based on the reasonable (?) assumption that individuals are unique.

[10] Sokal makes a distinction between fact and our conceptions of such. Once again ontology versus epistemology, I am a bit sloppy here, but without abuse of language, language itself would be forbiddingly tedious, language is after all not primarily a formal procedure, but intended for interpersonal communication

taking into account Humes famous objections. Now the focusing on falsification rather than verification, no matter how problematic the former notion may be, is crucial. There is never any difficulty in amassing confirmation for a theory or belief, no matter how hair-brained; the real criterion is to look for the weak points. This is familiar to a mathematician, who if encountering a conclusion he is not sure of, tries instinctively to find as many drastic consequences as possible the better to believe his eyes[11]. In social settings our instincts tend to be different, one only has to consider evidence for conspiracy theories. The notion of falsification is of course not straightforward. As Popper admits, ad hoc explanations can always be cooked up in order to save a theory that seems to be contradicted. Of course those explanations have to be subjected to further tests. Also, a falsification is never a black and white matter, there is no such thing as an observation stripped of theory. Also to some extent falsifications are provisional. Now from a purely logical point of view this seems to make nonsense of Popper. On the other hand what we are concerned with, as pointed out above, is not an algorithm for doing science, but a description of what is going on. In practice the judgment of individual scientists come into play, and a notion of what is established beyond reasonable doubt. Now one cannot in advance codify criteria for what is rational thinking and what is unreasonable doubt, those depend on circumstances. But we all more or less recognize rational thinking when we encounter it, just as we recognize conviction when we attain it.[12]. There is a kind of general conviction, to which Sokal adheres, that scientific pursuit cannot be scientifically codified, and as such is something of a mystery to our finite minds. Popper stresses that it does not matter how scientific hypothesis are actually formed, it is a creative act and as such it can draw on anything, including hallucinatory or religious delusions as well as cultural prejudices. Sokal agrees with this, and points out the useful distinction between coming up with ideas and having them justified. The former is indeed an individual enterprise, while the latter is social. The first is subjective, the latter (supposedly) objective.[13]. Popper goes so far as to claim that science is necessarily a social enterprise, a single individual cannot practice science, because he cannot transcend his own subjective limitations and come up with sufficiently varied schemes of falsification. Now, falsification is intimately connected with democracy in even more ways that Popper seems to fully appreciate, at least in what I have read by him so far. To Popper science is democratic because of its lack of dogma[14], and of the shared

[11] This is what C.S.Pierce calls arguing by ablation.

[12] This is a bit similar to Platos theory that we achieve knowledge by remembering what he have always known but have forgotten.

[13] I am of course speaking in principal terms, justification is of course just as falsification, to which it is intimately connected, problematic. In the past scientists have of course justified erroneous beliefs, they are of course but humans, but of course as we have noted, the pronouncement of science are always tentative and subject to future modifications, an insight that goes at least as far back as Hume in its explicit form

[14] Now inherent in this there is a potential contradiction. Should we be tolerant towards the intolerant? No, Popper claims, we should not tolerate the intolerant. Of course the formal contradiction can be evaded more or less artfully. This has of course connection to the standard dilemma of a democracy. Is it allowed to reject itself? Can one democratically elect a tyrant? Plato and Aristotle considered the possibility, and at least in a formal way, this has happened in recent history. Poppers position would be no. Democracy is not entitled to abolish itself.

realization that everyone is fallible and can be mistaken. This makes it adamant to hear all kinds of people, to judge what they are saying not on whom they are but on the merits of their arguments[15]. In particular it makes freedom of speech essential to democracy, an illustration that democratic institutions are more crucial than mere representation, with which democracy often is confused. Furthermore in addressing the by Kuhn purported incommensurability between different paradigms, the point of a falsification is to establish it at the common ground of two disputants. Few people would be able to judge the accuracy of the mathematical and physical reasoning that lies behind a nuclear bomb, but few among even the most militant post-modernists would doubt the occurrence of a nuclear blast when exposed to one. This is also a democratic aspect, because in addition to provide a scheme for objectivity it makes it impossible for some coterie to claim that the ultimate truth of their endeavors cannot be judged by somebody not privy to those[16]. It is of course true, as already Darwin pointed out, that every observation is made on basis of a theory; thus so called different paradigms make us look at the world in different ways, because just as any sensory observation is made possible by a prejudiced selection, the form of a science is conditioned by the kind of questions it asks and methods it employs. But this does not imply ultimate incommensurability, nor that truths of the results of a science depend on its paradigm, only the form they takes.

As to criticizing Popper Sokal points out that a single falsification is not enough, that in fact the scientific community lives with contradictions, confident that those will iron itself out in the long run[17]. There is a difference in mathematics and in less precise sciences. In the former a single contradiction does indeed collapse the whole thing, this is what the method of argument by contradiction is based on[18] . And surely if Eddington's confirmation of Einstein's prediction of the bending of light had not been confirmed, clearly this would have been a major blow to the theory of general relativity. But if some miracle is reported going against the grain of established science, people remain skeptical, and the onus is on the duplication of the miracle[19]. Now whether Popper is a strict Popperian or not, I find the censure somewhat pedantic (although the clarification is of course in order) especially if it is used to disown him. Similarly his censure that Poppers criteria for a

[15] As Sokal points out the division between justification of a hypothesis and coming up with it, makes it pointless to inquire into the individual and his process of discovery as to the ultimate justification. However if the hypothesis turns out to be wrong, there could be of some sociological interest to do so

[16] This is typical of many pseudo-sciences as well as marginal social sciences such as didactics.

[17] Chomsky has among others explicitly endorsed this view.

[18] However, even in mathematics there have been problems, especially with the foundations at the turn of the previous century, which have been laid on ice and business has proceeded as usual. In a similar way the foundations of Algebraic Geometry was relaid in the 50's and 60's to counter the problems caused by too intuitive thinking by the Italian school.

[19] The negative result of Michelson-Morley surely must have appeared as an unreal miracle, the addition of velocities having been a foregone conclusion, almost something of a synthetic a priori to people. The standard explanations of the fact did try to keep this evident fact intact. Although Lorentz and Poincaré did come up with similar formalisms as that of Einstein, the latter differed essentially and ontologically from the previous, by postulating as a physical law the invariance of the speed of light (with respect to fames in uniform motion with each other)

clear demarcation between science and pseudo-science is misguided, as we really have a continuum of more or less scientific theories. This argument becomes rather strange as Sokal earlier[20] has invoked what is essentially Poppers criterion to characterize science. In contrast to the positivists of the Vienna Circle, Popper was not primarily interested in rejecting metaphysics[21], but he wanted instead to exclude Psychoanalysis and Marxism. In fact Popper sees a continuum of proto-scientific processes in the natural world, in fact natural evolution is the result of testing hypothesises, the difference being that in the scientific age, this testing process can be made virtual, failure not automatically extinguishing the tester along with the hypothesis. The metaphor of natural selection involving rejection, explains why the natural sciences are able to penetrate so deeply into the configuration space of ideas, by eliminating false leads. Popper also makes it clear that all is not science, and that the falsification criterion does not apply to everything. In particular it does not apply to itself (being a metaphysical construct). Finally Poppers description of science makes clear that much of it is theoretical, making up theories and deducting various consequences, and that the testing is not done so much continuously as strategically. In fact the great success of the hard sciences seems to be due to a fortuitous (?) concordance between the way our minds work and the universe at large, a fact remarked upon by generations of philosophers and scientists[22]. Elegance of theories do play a very important role, not only in the conceptions of the same, but also to some extent as to their justification.[23] Much of the fascination with hard core science lies in a conceptual understanding, something which is absent in say medicine, a discipline that lies much closer to the understanding of the public of science, with clinical trials, concerns with double-blindness and replicability, and where especially statistical tests play a crucial role in forming judgement on effectiveness of treatments.[24] Now medicine has not the luxury of being (at least entirely) curiosity driven, it has to confront problems in real time and address issues in which it is not yet mature to do so. Hence the somewhat fluid line

[20] see e.g. on the bottom of page 264

[21] This confusion of the Vienna Circle with Popper may have been the cause for Sokals opinion. A confusion that involved the Vienna Circle itself as Carnap used to say that the distance between him and Popper was small, but between Popper and himself apparently quite large.

[22] Hume and C.S.Peirce to take some examples at random, or Wigner in recent time. Sokal also points out that if the distribution of matter had been confusing, it would have been very hard to test Newtons theory, (and maybe we would not have been around in the first place?). Connected to this is that theories are in fact underdetermined, an observation made a long time ago by Duheim and elaborated on by Quine. Thus any given data can be fitted to an infinite number of theories. How can we ever make a choice? Elegance is one a priori criterion, the confirmation of unexpected consequences a powerful a posterior one. Thus normally redictions seem not as conclusive as predictions, because of the possibility to 'cook up'. However Sokal notes that Weinberg actually has counter-examples to this reasonable principle.

[23] The principle of the old scholastic philosopher Ockhams razor is a case in point of an aesthetic condition.

[24] The idea of establishing correlations between different phenomena is a very tricky business when there is no explaining theory. Hume discarded the notion of cause and effect, and maybe those concepts only make sense within the confines of a particular theory. In medicine all kinds of silly correlations are being routinely exhibited.

between established medicine and alternatives, some of which, after certain examinations are allowed inside, even when not properly understood.

Finally Sokal stresses the continuity between everyday life and scientific work in establishing the truth. The Popperian criteria at work in science are also at work in less exalted circumstances. Anyone being told an everyday fact not immediately verifiable certainly deduces a number of consequences thereof as a matter of fact, each one amenable to inspection. The same thing holds for criminal investigations, and historical research, the latter being a further development of the former. Thus in particular the scientific method is not constrained to the natural sciences, but can as well be developed in the humanities, especially history[25].

Now post-modernism with its exaggerated doubt and pseudo-science with its excessive culpability make up bed-fellows if not always easily so.[26]. Total skepticism, although irrefutable, is a lazy activity being totally predictable. As the British philosopher Collingwood remarks, a skeptic refuses to budge, while a critic travels with you. Not surprisingly excessive skepticism is not incompatible with extreme gullibility (if everything is equally doubtful, then everything is also equally likely). Solipsism is an irrefutable logical stand, but few if any who professes to be so, are actually so deep down[27]. Thus post-modernist thinkers are more liable to endorse various pseudo-scientific theories, if for no other reasons that provocation and ill-advised sympathy. While pseudo-scientists, often resort to post-modernist rhetoric, partly to find confirmation and partly out of ineptness. One powerful incentive for pseudo-scientific work is apart from an inability to adhere to the exacting standards of a true scientific inquiry, a sentimental umbrage to what is seen as an overly mechanistic and reductive attitude of modern science, replacing such tedious approaches with holism and spiritualism, postulating in addition to the standard scientific categories, typically also mysterious life-forces. The problem is that from an intellectual point of view those have no explanatory power, and once they are being subsumed by being formally manipulatable they lose their transcendent mystery[28]. The subject of pseudo-science leads to the notion of religion, the subject of the concluding section of the review.

Sokal joins Dawkins, Dennett and a whole of other vocal intellectuals in attacking religion as the last protected bastion of superstition and delusion, as well as being if not

[25] A very convincing and provocative source for this is Collingswoods 'What is History'. I have also argued for science in its popular presentation, to put more emphasis on its forensic aspects, as most people seem to enjoy the yarns of a detective novel; and less on a compendium of 'facts' . But more on that later.

[26] But not to quite the same extent that Sokal thought at first, as he is forthcoming in admitting.

[27] Another interpretation is that we are all solipsists, but only in the face of impending death and disaster are we woken up from our comfortable dream.

[28] The force that we humans are directly familiar with is gravity. Electric attraction is in no way reducible to the former, and hence is seen as somewhat miraculous when (first) encountered. Indeed miracles, in the sense of being unexplainable by standard physical theories are no stranger to physics. A metaphysical question is whether there is a finite set of fundamental physical laws and notions, from which all other can be derived (a theory of everything, after which in some sense the time for miracles will be over), or whether there will turn out to be an unending list of such, appearing under more and more extreme conditions.

a force at least an excuse for political evil[29] . Many will find such aggressive behavior bordering on the autistic, because after all their criticism seems so literal and focused on incidental features of religion, which really do not play such a fundamental role. Sokal is elsewhere very careful of making distinctions and to avoid the trap of eliding different aspects of a phenomenon to score points. To equate religion with pseudo-science is grossly misleading in addition to being startling. Of course there is no denial that the factual contents of holy texts are patently absurd, and would it not be for the socially condoned practice, adherence to such views would ordinarily lead to institutionalization[30]; but there are other aspects to religion. There is the church and its power structure, there are the myths, not necessarily to be taken literally as much as metaphorically, the rituals, the social cohesion, the traditions, and of course also the moral teachings. Finally one also has art not only inspired by religion but also to a large extent making up its contents[31]. What is the difference really by enjoying a work of art or to partaking in a religious ritual? We all are familiar with fairy-tales and other fictional representations. Of course we know that we cannot take their contents literally, but that seems rather to enhance our enjoyment rather than detract from it [32] How many practicing people in this modern age do take the holy texts literally? Most likely only a tiny minority[33]. To what extent does a professed belief in some higher deity, often of a very abstract form, actually impair the rational ability and scope of an individual? Most philosophers up to the 19th century stated a belief in God (with the honest exception of Hume). So did Darwin (if I am not mistaken), compartmentalizing in order to accommodate conventional Victorian pieties. What is God? Sokal provides a standard definition about an anthropomorphic being taking a mixed interest of sympathy and revenge in us humans. But what about identifying God with the abstract notion of Truth? Much of what is said in the holy writs make perfect metaphorical sense. Such that there is but one Truth, that we should love Truth (without

[29] Sokal has the sense not to single out Islam as particularly dangerous and virulent, in fact Christian Fundamentalists in the States pose as much if not more of a danger, due to their potential influence on the most militarily powerful state. Furthermore one should not ignore Hindi revivalism, while Buddhism seems much less of a threat in such apocalyptic scenarios, to say nothing about Japanese Shintoists or Jansenites

[30] I do suspect that in liberal churches, be they Protestant or Catholic excessive literal belief would be a source of deep embarrassment, a symptom of mental instability rather than religious revelation.

[31] Of course not all religions have all those features. Greek religion with its pantheon of mischievous gods, hardly qualifies to us. It is actually nothing more than myth, with no moral teaching, rudimentary rituals, and I believe no church, no theology. An artful elaboration on primitive animism, and as such closely connected to Homeric epics, the latter probably being the closest we have to a bible in the Greek world. To look for religion in the Greek world we need to look at different sects, such as the Pythagoreans. A variant of the Greek type or religion surviving into modern age is Hinduism. It does strike us as more elaborate, but maybe because we know more about it.

[32] But it seems true though, that in most accounts, we take more interest in it if we are assured it is taken from real life rather than just being made up.

[33] In the States that might not be true, in which case the crusading efforts of Dawkins et al are laudable, although I fear ineffective; but surely not in more enlightened western European countries! Of course I might be naive.

expecting to be loved back) and that we should not deny it. It also make the question of who created Truth moot, Truth just exists there. Principles of faith, if we want, that most scientists would subscribe to. Of course this has very little to do with traditional piety to say nothing about naive fundamentalism, but it certainly has a religious ring to it. Everything cannot be proved by rational reasoning, the belief in an external world is a leap of faith, a belief in factual Truth is something we all feel, although we cannot of course argue for it in any real way. I do not claim that science is just one religion among others, only that we cannot escape metaphysics, and that we all have some kind of religious sensibility. Using a Platonic image one may argue that there is a kind of religious essence, of which the various religions are but imperfect shadows. Platonism is of course a very 'religious' philosophy[34] , although not in any conventional meaning, having nevertheless been an inspiration for the more sophisticated theologians[35]. Thus when it comes to religion on the level of metaphysics (i.e, the awareness of something 'beyond' by many referred to as the 'spiritual') it is in no way incompatible with rational sophistication. And finally as to the moral teachings. Throughout its history people have ignored the injunctions of say Christianity, which hence have not had any inhibiting influence on those who have seemed it fit to flaunt them. Why should its cosmological teaching not been as easily ignored by free thinking spirits?[36] The factual teachings of the church have been ridiculed, the moral only exceptionally so (by Nietzsche).

Now if you compare religion with art it becomes to most people more intellectually palatable. The traditional concerns of philosophy have been ontology, ethics and aesthetics, the latter two are clearly within the (limited) domain of man. Thus unlike ontology it does make some sense to study those things as being conditioned by culture and psychology. While in ontology contradictions cannot be accepted, in morals and art, different truths may very well coexist, just as in real political life, different interests are legitimately motivated. All that post-modernist drivel does make sense in the sphere of religion. One religion being as good as another, all being social constructs and ultimately of private concern. This attitude of course antedates modern post-modernism by a couple of centuries. The idea of explaining religion is of course later, and it was only the theory of evolution which supplied the tools to do so. Sokal speculates that pseudo-science might be more natural to people than actual science; that we all are drawn to wishful thinking, and that religion, at least in its earthy manifestations (i.e. I am not talking of its very abstract and intellectually tolerable aspect) provide comfort and meaning. If people are deprived of religion, or rather its trappings, what are they to be provided with instead[37]? This is of

[34] It is interesting that while a denial of a physical world independent of us humans, is the prerequisite of the post-modernist fringe; while a similar attitude towards mathematics is concerned mainstream, and a contrary belief in the real existence of mathematical objects is considered as a kind of naive superstition. To a devoted mathematician, the reality of mathematical concepts is as palpable as the table he may be sitting at.

[35] One obvious example is St Augustine, or the later medieval scholastics, although as Russell laments, they were more influenced by Aristotle.

[36] Some of them were sent to the stake, many were threatened by the same fate.

[37] This is religion for therapeutic reasons, a notion deeply offensive for atheists and others who take religion seriously.

course a rather condescending attitude[38] but it is invited by the invocation of natural selection[39]. One should be careful though to employ such schemes of explanation, tempting as they may be, as the spectacle of evolutionary psychology shows, where unchecked speculations yield as many Kiplingesque So-So stories. Specifically is the human race evolved adaptively[40] in such a way that the ideas of natural evolution become congenial to it. If so it may just be a paradigm of adaptation an illusion not really existing, foisted on it by natural evolution itself!

The ignorance of the general public is appalling. The fact that only a minority of Americans take Darwin seriously, is of course shocking at least to evolutionary biologists. But does it really matter? Most things people learn about the world not directly pertaining to their own physical life are taken on trust. Some authority tells you that the world was created in seven days by some intelligent being, another authority tells you that it took billions of years, involving no conscious design. Neither factoid has any pressing implications on their lives, choosing the one above the other does not really make to much difference. If a majority of people would instead parrot some garbled version of evolution, would that really mean that the world would be a better place? Engaging in research means much more than learning isolated factoids, it means putting things together into a meaningful whole, and the intellectual excitement that comes with it[41]. An excitement and a satisfaction that in its exalted forms compares well with that of religious experience. (As Sokal notes, only a thin veneer of the population can actually derive spiritual comfort from science, and those who can usually only within their own narrow specialties). Educational optimists assume that those blessings can be conveyed to a much larger segment of the population. [42]

The most fundamental aspect of philosophy is that of the ontological aspects. What does not exist should not concern us. In principle the morality should be derivable from science, unless we are Cartesian Dualists. No one nowadays wants to be seen as such, at least not if an intellectual, on the other hand no one has any idea of how to derive the mind from the brain, in particular its moral prerogatives[43]. Thus in practice we are all dualists. Science and morals are thus for all intents disconnected, although neither aspect can be

[38] Not unusual among leftist intellectuals. In this context the quip by Marx that religion is the opium of the people, comes to mind. (Sokal does quote it in context, in which the meaning appears subtly different). On the other hand Marx, as Popper points out, actually revived Christian ethics out of self-complacent Victorian stultification. Communism in its ideal aspects being a secular form of Christianity.

[39] In the words of Dennett being a natural phenomenon.

[40] Mark, only adaptive evolution is explainable, anything else is of course pure chance.

[41] An elementary form of this excitement occurs in having a puzzle explained, such as in a detective story when different factoids come together. Cf. a footnote above, in which I made a reference as how to try and present science popularly.

[42] And Sokal indicates that when the general level of education rises, as well as financial security, the need for archaic religion decreases and is replaced by alternative sources of spiritual satisfaction. Religion continued with other means?

[43] There are of course evolutionary attempts at explaining morality, especially altruism which seems to go against the grain of ruthless competition. Such explanations are inevitably rather instrumental and hence somewhat unsatisfactory.

isolated. The exploration of moral issues thus transcends (if you like) the (mere) cognitive aspects of science, by being not fully amenable to a purely rational analysis. Thus ethics is a separate domain. Sokal claims that our sense of ethics is independent of religion, that religions show a striking similarity and universality as to moral teaching (as opposed to practice) and in fact that religion is a latter rationalization of universal human ethics. Thus ethics can be thought of religion shorn of delusional myths, and thus be perceived as religion lite. One can ask on what authority moral concepts rest, the closest explanation being a kind of shared conscience, or in Jungian terms a collective subconsciousness. Thus we are in the position of doing science with only our faculty for rational thought at disposal, not an empirical program for feedback [44]. The philosophical problems are thorny, and the arguments against relativism are not at all as strong and clear cut as in the ontological domain.

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[44] On the other hand conscience plays an important role especially in Protestantism, which also emphasizes the personal relationship with God, and can thus be charitably compared to reaching understanding not by authority but by rational argument.