

Science and the citizen

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Contemporary issues and controversies

edited by Marco Mamone Capria

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Preface

This collection of essays (the third to date, the first in English) comes from the international project "Science and Democracy", most of them from the last conference (of five) held in 2011 in Naples (April 14-16, 2011). It offers an examination of several controversial issues, *within* and *about* science, of wide-ranging social relevance.

A partial list runs as follows: the role of scientific technology in shaping our life; the influence of corporations on contemporary medicine; grass-roots activism and new technologies; environmental constraints on economical growth; nuclear power; GMOs; nanotechnologies; the HIV/AIDS controversy; the Wakefield trial and the MMR vaccine-autism link; the organ transplant ideology and business; the debate on the terrorist attacks in USA of September 11, 2001; the role of whistleblowers in science; etc.

This variety of topics aims at bringing home the concept that mainstream media disinformation is not accidental or occasional, but *systemic* – it serves the propagandistic purposes for which the mainstream media have been created and go on being funded.

The authors do not necessarily agree on all points, but they concur on the need of discussing all issues in an evidence-based manner, and of sharing their results with the interested citizens, without submitting to any censorship. The references appended to most chapters make it possible for readers to investigate further and check by themselves the authors' claims.

Though academic accuracy has been pursued, this is not an academic book in the now, alas, frequently well-earned secondary meaning of a CV-inflating publication that no ordinary reasonable person is presumed to read, or to profit from reading. I hope that this book will encourage readers to rethink opinions too often taken for granted and to proceed, individually and collectively, to some much overdue corrective actions. Whatever democracy consists of, it will never be based on indoctrination and outright lies camouflaged as campaigns for a "public understanding of science".

The last essay, by an experienced science writer, Anthony Liversidge, who contributes also an enlightening and lively interview (chapter 16) with the late mathematician and campaigner Serge Lang (a good portrait “in his own words”), is an unpublished review of the second conference (2003) of the “Science and Democracy” series and, at the same time, a colourful account of the host institution, the “Istituto Italiano per gli Studi Filosofici” (IISF), based in Naples (chapter 18).

The IISF has much suffered in the last years from cultural insensitivity, political neglect, and academic resentment. I wish to take this opportunity to thank its founder, Gerardo Marotta, and its secretary, Antonio Gargano, for the outstanding and internationally recognized contribution they have made for decades to the promotion of both scientific and humanistic culture, and to the dialogue between them.

The Science and Democracy project would not have been possible without the generous contributions and encouragement of many scholars from around the world, some of them, but by no means all, featuring in this volume. I wish to mention with special thanks first the late Serge Lang, Hans Ruesch, and Irwin Bross for their important support and inspiration, and then Ermenegildo Caccese, Stefano Dumontet, David Rasnick, Martin Walker, Anthony Liversidge, Gordon Moran, Jenner Barretto Bastos Filho, Marcos Cesar Danhoni Neves, Halton Arp, Santa Passaniti, Mwananyanda Mbikusita Lewanika, Rocco Maruotti, Pascal Mwale, Sergio Ulgiati, Jean-Pierre Berlan, Peter Doshi, Henry Bauer, Massimo Mazzucco, Frank Lad, Sergio Siminovich, Sean Westmoreland. Thanks are also due to all the other contributors to the Science and Democracy website (www.dmi.unipg.it/mamone/sci-dem).

Marco Mamone Capria
July 2013

Presentation

The "Scienza e democrazia / Science and Democracy" conference, held in Naples at the Istituto Italiano per gli Studi Filosofici (April 20-21, 2001), has been probably the first of its kind to take place in Italy and in many other countries for many years. The idea of the conference was sketched in the Program, of which the most relevant section follows.

* * *

The aim of this conference is to re-open the debate on a theme whose relevance for everybody's life - and not only *intellectual* life - is by far superior to the theoretical and analytical effort spent on it today.

The question of the democratic control on science, forcefully relaunched by the epistemologist Paul K. Feyerabend in the Seventies, is on the whole repressed in the present cultural atmosphere, partly because of automatic associations with notorious incidents of political stymieing of research, such as the Galileo and Lysenko affairs. However, it would be difficult to interpret these historical events in terms of a supposedly overpowering public opinion, since in fact the latter at most echoed decisions and condemnations made "behind closed doors", in the usual seats of power (cultural and not).

More recently, instead, in Western democracies currents of opinion have developed - expressing themselves through public initiatives of individuals and groups - mainly related to concerns over health, environment, and the integrity of the human person. They have been occasioned, for instance, by the introduction of new systems of energy production and agriculture; by technologies which are already present in our daily life (electric lines, portable phones); by the legal definition of new scientific criteria of "life" and "death"; the absence or insufficiency of official recognition of alternative medicines etc. That at present the relationship between citizens and scientists - who often act as "experts" and consultants for political representatives - is not balanced enough to permit a genuine dialogue, is shown, on one hand, by the frequent appeals signed by "experts" and inviting fellow-citizens to free themselves

from a supposedly endemic "scientific illiteracy", and on the other hand by the growing distrust of citizens towards the scientific community, suspected of collusion with powerful vested interests.

It is clear that trying to dissolve the problem by confining the decisive discussions within privileged circles and pouring propaganda anywhere else, will only have the effect of widening the gap between scientists on one side, and the civil society supporting them and guaranteeing them a public role on the other. Therefore it is important to study how a space for substantial cognitive exchange can be created, equally distant from the refusal to be informed (rather rare) and attempts at indoctrination (far more frequent). An instance of the second kind is the identification – made to discredit lay criticism – between rejection of *one* technology, with rejection of the whole of technology, or indeed, science.

But in order to solve the problem of the democratic control over scientific research, another problem has to be tackled first which is rarely thought of as connected to it, namely, that of the internal politics of the scientific communities. Although scientific knowledge has the ambition to be free of political and ideological biases, as a matter of fact it is a profoundly "social" knowledge: it is produced by hierarchically organized groups, which evaluate, award, and punish their own members, and control in various fashions what opinions can be held or even just discussed in a public setting, and so on.

This dimension of science has been too long ignored by epistemologists and historians, but a new generation of scholars has started in the last two decades to offer interesting reconstructions of the social context of research, thus giving back to it that character of human activity which had been essentially erased in standard treatments. And as is the case for state politics, the internal politics of the scientific communities cannot be understood if one neglects their "foreign politics", that is, their relationship with society – political institutions, economic powers, media etc.; conversely, this relationship depends to a large extent on the aspirations of those communities, first of all the necessity of financial support for research projects which

are more and more costly, and laden with social consequences which are at least in need of being seriously debated.

Thus science is a meeting point, and sometimes a collision point, between demands for reassurance and problem solving, by the society at large, and group or individual aspirations, of its practitioners. For this reason, to analyse correctly the nexus between science and democracy one needs different viewpoints and data, and the cooperation of different competences and experiences.

Brave New Science and Its Discontents

1. Marco Mamone Capria

Reshaping the World: Contemporary Science as Damper of Social Conflict*

If the arrangement of society is bad (and ours is), and a small number of people have power over the majority and oppress it, every victory over Nature will inevitably serve only to increase that power and that oppression. That is what is actually happening.

L. Tolstoy, 1898

There are indefinitely many topics that may be investigated. Human desire for knowledge can be satisfied in many ways, and knowledge can be pursued in sundry manners and directions. To justify the present course of scientific research, in particular where the highest investments (of money and people's time and effort) are made, simply one cannot get away with just referring to vague notions from a tentative philosophical anthropology. In particular, an individual's "desire for knowledge" might be satisfied with an higher probability of success by studying the huge amount of notions that can be considered as already reasonably tested and settled, rather than by trying to solve open problems. This is enough to show how flawed it is to base a defence of scientific research on that supposed "desire".¹

In the Sixties – quite a long time ago, in many ways – the idea that a new form of society would have come hand-in-hand with a new form of science was commonplace in some political and intellectual circles, and enjoyed a wide circulation well beyond those circles, often eliciting shocked or indignant reactions. In its Marxist version it predicted that after the communist revolution had taken place, what we now call science, and in fact is just *bourgeois* science, would have been substituted by *proletarian* science – something that for the moment could only be dimly imagined. As was to be expected, there were a few people

* Unless otherwise specified, all italics in the citations are added.

¹ This point was developed very eloquently by the German sociologist and philosopher Georg Simmel [73, ch. 3].

that used these concepts to pursue concrete objectives, more or less effectively, and most others who were just glad to adopt a jargon which aligned them with current fashion, and its associated prospects, or fancies, of social or academic self-promotion.

As everyone knows, the Sixties were followed by the Seventies... and other decades up to the present, nebulous times. The world did not undergo a general revolutionary overhauling – or at least *not* one in the direction of more freedom and democracy –, and people found themselves coping with the same old science, except that in the meantime it had become even more pushy and aggressive. The concept of a politically coloured science – a «non-neutral» science² – gradually disappeared from the public discourse on science, although, as the inscription of this essay proves, it was more than a century old. Today, particularly after the demise of self-defining “communist” governments in East Europe, science is portrayed by the mainstream media as it were in command of political life, rather than the reverse.

In this essay I wish to discuss the political role of science and technology in our world, to describe the ideology which supports them in the mainstream media, and to briefly examine some concrete examples. We shall see that technoscience has never been so politically important, notwithstanding the eclipse of a serious reflection on this phenomenon in both political “wings”, and particularly in the “left”.

To put it in a nutshell, technoscience occupies today the place left empty by religion as *the main ideological tool to*

² Charles Snow’s 1961 lecture on «the moral un-neutrality of science» is still worth pondering, notwithstanding a fair amount of naivete [75]. A famous philosophical text of the Sixties discussing the non-neutrality issue (with typical, confusing abstractness) is [41, ch. 6]. Waddington’s chapter 2 of his [79] is entitled: «Science is not neutral», meaning that «[a] movement as powerful as science has been in our civilization is bound to affect, even if unconsciously and at second-hand, the outlook of all those concerned with any aspect of the society’s culture» [79, p. 34].

repress or prevent, by both promises and "miracles", political protests and claims by exploited groups.

I do not claim any originality for this opinion, I only wish to provide an updated (to some extent) argument for it.

1. The current ideology of science

Here is a preliminary sketch of the current ideology of science. Scientists are shaping our future and leading us to an epoch of unheard-of progress and happiness. They do what they want, when they want. It so happens that quite often their free thoughts lay the ground for some invention that will change our life – for the better, of course.

Scientists are led by their curiosity. Admittedly, scientific curiosity can be satisfied only when a sufficient amount of money is available to pay for the expenses of research and, more often than not, this is a nontrivial condition. Someone *has* to pay, it is true. But *who* pays is regarded as a question of no relevance, as far as the content, soundness, and direction of science are concerned. Science is essentially an unmoved mover, like Aristotle's God.

An indirect consequence of this view is that social conflict is obsolete – although not in the sense that the utopian communist classless society has come to the fore. The idea is that the only way for members of a downtrodden social class to improve their condition is to give their honest contribution to augmenting the economical strength of the whole society. In particular, they have to applaud the pouring of taxpayer money into scientific research, and to

donate as much as they can privately to it.³ Science will take care of the rest.

The fact that industries have private owners seems to be no more an issue, since it has apparently been proven by historical experience that private ownership of the means of production is the key to good applied science, economical progress, and widespread well-being. Moreover, private entrepreneurship is not only a good thing in itself, but can only thrive if it is *free* – which involves also big public expenditures to protect its workers in case of crash of a firm, and to cover the costs of the social impact of new technologies. There is a small problem, though: the free market has a dangerous tendency to limit its own freedom, and also not to make an honest use of it. The solution seems to be – to paraphrase Rousseau – *to force it to be free*. This is done quite comfortably by establishing several kinds of regulatory agencies and “authorities”, which supervise – in a very discreet way – industry and prevent proprietors from making secret agreements between them in order to keep prices high, and quality, safety and salaries low (because, it is half-heartedly admitted, to care too much for quality and workers' rights is sadly detrimental to profits).

This fairytale is the main political and historical ideology passed off, most often in an implicit way, by the mainstream media and intellectuals. They are skilful in

³ That scientists assume as a rule that everyone should be glad to offer financial support to their activity was already remarked by Swift's Gulliver (1726), when he described as follows his encounter with a scientist: «He had been eight years upon a project for extracting sunbeams out of cucumbers, which were to be put into vials hermetically sealed, and let out to warm the air in raw inclement summers. He told me, he did not doubt in eight years more, that he should be able to supply the Governor's gardens with sunshine at a reasonable rate; but he complained that his stock was low, and entreated me to give him something as an encouragement to ingenuity, especially since this had been a very dear season for cucumbers. I made him a small present, *for my Lord had furnished me with money on purpose, because he knew their practice of begging from all who go to see them*» (*Gulliver's Travels*, III, 5).

suggesting that individual or collective opposition to any supposedly scientific innovation or line of research is in itself a symptom of “scientific illiteracy” (this is the catch phrase) – and, politically, of a craving for a past which either never existed or is gloriously lost. Voltaire’s Pangloss could hardly have been more optimistic than today’s apologists of the capitalism-plus-science alliance.

In the following I wish to deal with evidence that *a sizeable portion of scientific research today can be best understood as a well-funded endeavour to make this world-view viable or, at least, palatable* (with a *big* help from the mainstream media), so that the present system’s gross inequalities and iniquities can be guaranteed to persist for the foreseeable future.

2. Human nature in brave new world

The current ideology has encouraged a major change in our perception of ourselves – of our needs and aims.

The classical (for instance Aristotelian)⁴ concept of man included the notion that there are basic needs whose satisfaction defines what is meant by living a happy life. These needs are not identical to our subjective desires. There is no guarantee that what we wish, no matter how intensely, is going to bring us any nearer to individual or collective happiness; on the contrary, it is all too easy to long for something which will decrease, in the medium or long term (and sometimes even in the shortest term!), our happiness. Desires are not the ultimate criterion of value. They must be themselves evaluated in terms of a *normative ideal of human nature*.

Current ideology runs counter to all that. Desires are seen as the spring of human progress – particularly, desires of commodities or services which are on offer now or in the near-future. To create in the mass new desires of marketable things and services is not only morally unobjectionable, it is a *good* undertaking.⁵

⁴ See e.g. [4, ch. 6].

⁵ The embryonic theorization of this notion can be found in Mandeville’s *Fable of Bees* (1717-1732).

As to individual well-being, there is no such a thing as “natural” health. Health (mental and physical) is the name we give to our success in establishing a (temporary) balance between our desires, whatever they are, and our ability to satisfy them. The achievement of such a balance does not depend on following the Socratic advice of knowing oneself, body and mind. In the utopian future, everyone will be programmed to have the desires appropriate to their stance in the world, and endowed with the necessary means to satisfy them. There is no practical limit to the scientific malleability of “human nature”. Everyone will be as happy as conceivable, and such words as social and economic inequality will go out of usage.

According to the currently prevailing ideology, what we call “nature” is just a set of accidental constraints – both internal and external – that humans in their prime worshipped, only to discover, millennia later, that they had rather to learn how to master them and, if so they wished, modify them.

There is nothing intrinsically “good” in nature, nothing in it deserving human reverence. Moreover, humans are themselves part of nature. Whatever humans do, nature does. There is no opposition between nature and history since, as we know since the demise of the Bible’s authority and the advent of transformism in biology, nature also has an history. Indeed, nature *is* history (except perhaps at the most basic level of physical laws), and human history is just a very short segment of it. In particular, *human* nature – for all that this notion is worth – is historical and society-dependent.

A school of thought (*posthumanism* or *transhumanism*) has recently gone to the lengths of welcoming whatever changes in the design of human body and mind that might be judged as improvements with respect to the frame built through trial and error by evolution.⁶

⁶ Cf. the website www.transhumanism.org and, for a criticism, [44], where the following quotation (2005) from Max More, «one of the most celebrated advocates of transhumanism», can be found: «“Transhumanism” is a blanket term given to the school of thought that refuses to accept traditional human limitations such as death, disease and other

3. Reactionary scientism as a religion

While it is ready to pour scorn on traditional values, and especially on religious ones, the ideology described here is in fact a religion itself, having as its main ingredient the idolatry of science (for this reason it may be classified as a variety of *scientism*); in particular it firmly believes in science's purported ability to 1) inspire timely technological solutions to social problems, 2) solve any problems it has itself generated. This frame of mind is what I have called elsewhere *technological fideism*.

For instance, here is what Nobel prize winner Peter Medawar had to say in 1969 on environmental pollution [45, p. 337]:

The deterioration of the environment produced by technology is a technological problem for which technology has found, is finding, and will continue to find solutions.

In a way, this is a compromise statement, since the standard scientific ideology involves a flat denial that scientific technology may have *any* relevant role in producing the evils suffered by people: nuclear power is safe, air pollution does not cause any serious illnesses, power lines and masts are at worst only ugly to see, food additives and chemical enhancers are innocuous, GMOs are the key to solve the problem of world hunger, and so on. If only people knew more about science, then they would welcome just anything science is lavishing on them. Conversely, for every positive change that we see in our lives, particularly the increase in life expectancy, credit is given to scientific research, even without any specific evidence. For every problem the ideology's answer is the well-known mantra "more research is needed" (and ought to be funded). A quarter of a century later, as one of the many possible examples of this attitude we can cite the

biological frailties. Transhumans [or rather "transhumanists"! – MMC] are typically interested in a variety of futurist topics, including space migration, mind uploading and cryonic suspension. Transhumans are also extremely interested in more immediate subjects such as bio- and nano-technology, computers and neurology. Transhumans deplore the standard paradigms that attempt to render our world comfortable at the sake of human fulfilment».

following statement from a 2006 article on *Nature* [49, p. 512]:

[...] in the light of the sheer intensity of scientific research today, and of our apparent newfound capacity to solve whatever problems afflict us, the twenty-first century must surely rank by far the finest time to be alive.

You need to have a real cheek to write such stuff after Chernobyl (1986), and it is particularly disconcerting to read similar statements with hindsight after Fukushima (2011) – and after decades of unsuccessful attempts at solving the problem of radioactive waste of nuclear reactors worldwide.⁷ As a matter of fact the whole idea of a technology-driven “sustainable growth” appears to be largely delusional thinking.⁸ But cheek and wishful thinking are qualities mainstream science writers never lack.

The version of scientism we are considering is very different from the XVIII century exaltation of science as a means to liberate humans from religious fears and traditional authority. The old version fuelled popular request for political change, by questioning and, indeed, debasing the whole power system. The new one sedates popular unrest by rejecting in principle that some of the people's suffering may be linked with the very introduction of some scientific technology, and by promising technological solutions for just anything in an indefinite future. Those who protest their condition should just wait and see the wonders scientists are concocting to help the world. Therefore this political ideology (typically endorsed by the front groups set up by polluting industries and other dangerous and/or ethically dubious technological activities) well deserves the name of *reactionary scientism*. Notwithstanding its emphasis on “science”, it is in fact a variety of irrationalism, geared to preserve the political *status quo*.

Notice that there is no denying that technology-building, in the widest sense, is an important component of human nature. No one can be “against technology”, but one can certainly be against *certain* technologies, both in the sense that to develop them is an inadequate solution to certain

⁷ See section 1.2 of chapter 7.

⁸ See chapter 2.

problems, and in the sense that their unintended and harmful consequences may more than counter-balance any positive contributions.

4. The ideal researcher according to reactionary scientism

In order to fit the agenda of reactionary scientism well, researchers must accept a very limited role in deciding what research objectives they are to pursue. They must develop a narrow sort of curiosity, which is content to dwell within the borders of recognized disciplines and subfields, abhors from asking ultimate questions about their activity, and is just aroused by the prospect of solving a puzzle in a manner which could win the admiration, or perhaps merely the envy, of colleagues. On top of that, they must accept to have their curiosity assigned by external authorities or sponsors.⁹ This is one of the most surprising facts of life that newcomers to the scientific profession have to face: usually they are not supposed to develop their own research interests, but rather to get interested in whatever their superiors ask them to delve in. What is mostly appreciated in them is an *alienated* sort of curiosity. In this frame of mind it is clear that the way scientific results will affect society or even the very survival of the humankind comes to be perceived as professionally beside the point.

On April 13, 1954, at his hearings Robert Oppenheimer described very well this attitude with reference to the development of the H Bomb [59, pp. 46-7]:

I think we have to keep strictly away from the technical questions. I do not think we want to argue technical questions here, and I do not think it is very meaningful for me to speculate as to how we would have responded had the technical picture at that time been more as it was later.

⁹ [70, ch. 4] («Assignable curiosity»). I recommend this book as one of the few in the sociology of science which has distinctively the ring of truth (and is hardly ever cited, as far as I can see, by academic sociologists of science and other scholars in the “science studies” field). The author was fired for publishing it, after 19 years of appointment as editor of *Physics Today*.

However, it is my judgement in these things that *when you see something that is technically sweet, you go ahead and you argue about what to do about it only after you have had your technical success. That is the way it was with the atomic bomb.*

To understand what is meant here by «technically sweet», it is useful to introduce another main actor in the atomic weapons development, the Italian physicist Enrico Fermi. A story is recounted in the memoirs of the general Leslie Groves, the military head of the Manhattan Project, of which Oppenheimer was the scientific head. On the evening of July 15, 1945 (the day before the successful “Trinity” test of the atomic bomb at Alamogordo) Groves «had become a bit annoyed with Fermi». This is why:

[...] he suddenly offered to take wagers from his fellow scientists on whether or not the bomb would ignite the atmosphere, and if so, *whether it would merely destroy New Mexico or destroy the world.* He had also said that after all it wouldn’t make any difference whether the bomb went off or not because it would still have been a well worthwhile scientific experiment.

On second thoughts, Groves guessed that Fermi perhaps by this talk had meant to «ease the tension», but «[c]ertainly, he himself showed no signs of tension that I could see» [21, pp. 296-7].

One should not consider this attitude as restricted to special circumstances like those surrounding military research in war time. Consider the experiments performed on the Large Hadron Collider (LHC) at the CERN laboratory near Geneva (Switzerland) from 20 November 2009, after a first failed attempt in September 2008. The collisions have reached energies of 3.5-4.5 TeV (1 teraelectronvolt = 10^{12} eV), and concerns had been voiced by some theoretical physicists that at such energies very peculiar entities could be produced, like strangelets and micro-blackholes, having the theoretical power of engulfing our whole planet – an effect comparable to that on which Fermi was merrily taking wagers.

In a paper published in 2000 the Italian physicist Francesco Calogero wrote, concerning the reassurances on this issue provided by the official reports about the Relativistic Heavy

Ion Collider (RHIC) at the Brookhaven National Laboratory, that they sometimes gave him «the impression that they are biased towards allaying fears “beyond reasonable doubt”», and added:

I am also somewhat disturbed by what I perceive to be the lack of candour in discussing these matters of many people – including several friends and colleagues with whom I have had private discussions and exchanges of messages – although I do understand their motivations. Many, indeed most, of them seem to me to be more concerned with the public relations impact of what they, or others, say and write, than in making sure that the facts are presented with complete scientific objectivity.¹⁰

What makes these remarks frightening is that the attitude that an experienced physicist and Pugwash member like Calogero perceives in some of his colleagues is deployed not with respect to some “minor” risk, but in face of the possibility *that the whole Earth might be destroyed as a side effect of experiments* performed out of mere “scientific curiosity”! Ten years later, in December 2010 an article on *Nature* announced [5]:

The end of the world is not nigh after all. Flouting predictions from some theorists, microscopic black holes have so far failed to appear inside the Large Hadron Collider (LHC), scientists there have revealed. [...] Physicist Guido Tonelli, the detector’s spokesperson, says that *by the end of the next run*, the LHC should be able to exclude the creation of black holes entirely.

Obviously there is something deeply pathological about our civilization in the fact that a small minority of egotistic intellectuals is allowed to play this way with the destiny of the planet, but what I wish to emphasize is that these people are the final and most exquisite product of the scientific education and training in contemporary world.

This type of researcher *likes* to be connected with the power system, and in particular they consider the scientific career not as an attempt to go to the deepest level of understanding allowed to themselves, but as a variety of social and hierarchic climbing. For instance, participation to

¹⁰ [8, p. 198], cit. in [31, pp. 830-1].

conferences is not aimed at sharing results and understanding with fellow-travellers in the knowledge landscape, but at enhancing one's status. A satirical article anonymously published in US during the Vietnam war by a «young physicist» describes as follows the performance of the (humorously named) master at a conference as viewed by his student and collaborator (cit. in [70, pp. 142-3], italics in the original):

Fartsworth's goal is to glibly mention ideas it took both of you two months to duly grasp; to be both confusing and smooth, bored and witty; and above all, to *impress*. And the audience *is* impressed; a few wise guys make attempts to steal away the victory with irrelevant and puzzling questions, but Fartsworth can handle them. He's a real pro. Everyone is properly bamboozled and Fartsworth is smiling.

Ten minutes later, after the next talk, no one in the room remembers anything about lanthanum-doped CaF₂, but they do remember Dr Fartsworth. Mission accomplished.

Also the way scientific papers are written is revealing: usually the authors try to disclose as little of what led to their discoveries as is compatible with their claiming priority on them. This is the main reason – not elegance or brevity – why most scientific papers are impervious not only to outsiders, let alone to lay people, but even to scientists working *in the same field*. No matter if the less understandable a paper is, the more difficult is to detect errors in it, and therefore the slower the progress of science made possible by its publication.

5. Causality and the intervention levels

Reactionary scientism is the ideology which underlies the representation of scientific, medical and energy policy topics in the establishment media. It provides a natural ideological common ground ensuring a stable alliance between researchers and the power elites. In the following I shall give some detailed evidence for this claim.

Scientists usually insist that they are not supporting any political agenda, but just trying to make their contribution at the level they are professionally equipped to deal with; and that their work does not prevent other people, at

different levels, to make their own contributions. The fallacy in this view is that the decision of working in a certain field *is itself a political decision, not merely a professional one*. And the fact that a certain line of research is better funded than others is strong evidence of its bigger economical and political relevance for the financing institutions or industries.

For instance, it is clear that many chronic diseases (like type II diabetes, heart disease, stroke) are linked to a sedentary way of life. The WHO recommendation for physical exercise is a task difficult to accomplish for most people in the “developed” countries. Strange as it may seem, physical exercise has become a *commodity*, often purchased by subscribing to gymnasia and fitness centres, rather than a freely available opportunity *ingrained* in our daily life.

The politics-ladenness of the choice of the intervention level can be explained by means of a very simple example. A glass falls from the table, hits the floor, and breaks down. What is the cause of this event? In an absolute sense, one might argue that the “cause” is a sufficient set of conditions for the event to occur in the light of our knowledge of natural laws (in the widest sense). However, this is not the way we normally talk of the “cause” of an event. We may say that the glass broke down because, for example, 1) the floor was hard, 2) the glass was fragile, 3) being absent-minded you touched the glass with your elbow, and made it fall on the ground, 4) someone put the glass on the table in a position where your elbow could inadvertently hit it and did not warn you (perhaps he mischievously wanted to embarrass you), etc. It is clear that the choice of the causal explanation of what happened embodies very different possible measures to prevent the repetition of the event: 1') the floor should be made in a softer material, 2') glasses should be made more resistant, 3') you should be more careful of your body's whereabouts, 4') some people should be rebuked for making pranks in such a bad taste, etc. Now the important point is that *all the above explanations are compatible*. And yet they lead to very different countermeasures.

This has to do with a general feature of our ordinary concept of causality. When we say that a certain event *a* caused an event *b*, we mean that *a* and *b* are instances of two classes of events, *A* and *B* respectively, and that there is a generalization stating that an instance of *A* is always (or very often) followed by an instance of *B*, *whenever certain background conditions hold*. In other words, causality talking always assumes that a background has been selected as fixed, but of course this selection is largely subjective. For instance, if we assume that a floor, as a floor, *must* be hard, then we automatically exonerate the floor from any *explicit* role in our statement of what caused the rupture of the glass. Similarly, those medical advisers who typically insist on lifestyle changes by individuals (e.g. "get more exercise!") are as a rule reticent on the importance of social and environmental factors, that is, of those factors whose change is not within the power of an individual.

It follows that causality talk has an intrinsic non-neutrality as it depends on one's decision of what should count as fixed and what should count as changeable in a given process. And when this process is a social one, then we are in a case of *political* non-neutrality.

A particularly striking example is given by current projects aimed at contrasting the Earth's global warming by large-scale projects. This is called *geoengineering*. Examples of such projects are 1) stimulating the growth of phytoplankton in the oceans by iron or nitrogen in order to increase the absorption of carbon dioxide, 2) injecting sulphur or aluminum aerosol in the stratosphere to screen the solar radiation; 3) screening the solar radiation by

constructing 20 electromagnetic guns, each more than a mile long and positioned at high altitudes, that would shoot Frisbee-size ceramic disks. Each gun would launch 800,000 disks every five minutes – day and night, weekends and holidays – for 10 years. The guns would aim at the gravitational midpoint between the Earth and the sun, so that the disks would hang in space, providing a huge array of sunshades that would block and scatter sunlight and put the Earth in a permanent state of annular eclipse.

The proponent of 3), a scheme based on an hypothetical technology not yet available, is a US professor of astronomy and optics, who is honest enough to admit: «I know it sounds like mad science», though he corrects the impression of not lacking common sense altogether by immediately adding: «But unfortunately we have a mad planet» [82a].¹¹ These are revealing words. In fact, geoengineering aims at enabling the military-industrial complex to go on in its business-as-usual style. In other words, geoengineers are agreed with those in power about what should stay the same and what might be changed, and they are ready to risk catastrophic experiments with our planet not to disturb the agenda of the political and economical establishment.

6. New technology is not always needed and does not necessarily improve life

Reactionary scientism tends to portray all technological changes as progressive, and to represent opposition to new technology as ideological, that is, as based, essentially, on a neo-romantic rejection of science. In fact not all technological changes are apt to improve our lives, and not all solutions to important problems are best achieved by the introduction of high-tech tools. In fact, as we shall see by some simple examples, new technology often changes our life in ways that have never been explicitly negotiated in a public forum, and which bear the imprint of the profit-driven industry that marketed and advertised it in the first place.

6.1 Shoes

A particularly interesting example is also one of the simplest ones: shoes [32, 36, 42]. Of course there are in our daily life many reasons for protecting our feet when we walk, although it must also be remembered that in the millions of years that hominins have been around walking on their two legs (bipedalism), – well, for 99% of that time they have been barefoot. However what I am concerned with here is the use of running shoes to improve performance and avoid

¹¹ For details on some of the very big hazards of geoengineering see [69]; see also [82b, 82c].

injuries to feet. People have been told by sports doctors for decades that to run barefoot means risking both more injuries and worse performances. However a recent research studying the running styles of both barefoot and shoes-wearing runners has shown that «experienced barefoot runners» adapt the way they land on the ground to the ground surface and hardness, in a way that the shoes-wearing runners are often prevented to do by the very shape of the shoe. An anatomist commented [32, p. 434]:

Although there is no hard proof that running in shoes, especially high-tech or PCECH (pronation control, elevated cushioned heel) versions, causes injuries, in my view there is no compelling evidence that it prevents them either. However, there are data that implicate shoes more generally as a plausible source of some types of chronic foot problems.

I suppose that most of my readers (like myself) have been educated to have a very high opinion of running in shoes as compared to the “primitivism” of barefoot running, and perhaps never thought of even there being here an issue.

This is a fact which instantiates a general social phenomenon: industry and its public relations employees have often succeeded in convincing the masses that they would have got a considerable advantage from using a certain commodity *even though no evidence for this claim had ever been provided*. The recent emphasis on evidence-based medicine is only a case of a more general attempt at defining and implementing a much needed *evidence-based consumerism* – and consumers associations usually publish magazines trying, more or less honestly, to provide their readers with factual quality assessments of commodities.

6.2 Roundabouts

An example of a problem which has been solved not by more technology but by less, is the problem of managing the car traffic at the crossroads. Traffic lights might be made indefinitely more “intelligent” by introducing a computer which records and statistically elaborates the car flows in the different directions, so that it can modify accordingly, on a daily basis, the time the green signal is on for each direction.

However, shifting the viewpoint from centrally directing traffic to exploiting its natural self-regulating power leads to a completely different solution: roundabouts. This is a virtually zero-technology system, whose introduction has been delayed for several decades due to an authoritarian approach to the problem, with its stress on technology simulating a human traffic director. In Britain the first roundabout was built in 1909, but only after the mid-1960s this solution started to be widely used. What is more, roundabouts are actually safer than standard junctions, with or without traffic lights [81]:

Roundabouts are safer than both traffic circles and traditional junctions—having 40% fewer vehicle collisions, 80% fewer injuries and 90% fewer serious injuries and fatalities (according to a study [...] of a sampling of roundabouts in the United States, when compared with the junctions they replaced). Roundabouts also reduce points of conflict between pedestrians and motor vehicles and are therefore considered to be safer for them. [...]

At traditional junctions with stop signs or traffic lights, the most serious accidents are right-angle, left-turn, or head-on collisions that can be severe because vehicles may be moving fast and collide at high angles of impact. *Roundabouts virtually eliminate those types of crashes* because vehicles all travel in the same direction and most crashes are glancing blows at low angles of impact.

It is clear that if electric engineers only had been charged with solving the problem of vehicle traffic, the solutions would have been more and more traffic lights and an increasingly sophisticated software controlling them. This would have given the deceptive impression of a serious and reliable approach to the problem, and no one of the appointed “experts” would have been likely to come about with a different solution making their own professional expertise useless.

6.3 E-books

Let us consider now the issue of the technological improvement of traditional tools. An instance is provided by the electronic versions of one of the best established commodities in the last 5 centuries: the book ([46]). The simple truth about this tool of learning and entertainment is

that it solves optimally most of the problems it has been created to solve. To most book-lovers it may only seem ludicrous to suppose that one might improve on it as far as its standard uses are concerned. Here is how a student from Princeton university put it, after having been involved in an experiment to evaluate the respective usefulness of books and e-books in learning [38]:

"I hate to sound like a Luddite, but this technology is a poor excuse of an academic tool", said Aaron Horvath '10, a student in Civil Society and Public Policy. "It's clunky, slow and a real pain to operate".

Horvath said that using the Kindle [a well-known e-book lector – MMC] has required completely changing the way he completes his coursework.

"Much of my learning comes from a physical interaction with the text: bookmarks, highlights, page-tearing, sticky notes and other marks representing the importance of certain passages — not to mention margin notes, where most of my paper ideas come from and interaction with the material occurs", he explained. "All these things have been lost, and if not lost they're too slow to keep up with my thinking, and the 'features' have been rendered useless".

However, from the viewpoint of those in the publishing business the print book has many serious drawbacks, the main one being that used books can be re-sold, with no gain whatever for the publishers: this is clearly very disturbing to them,¹² no matter how convenient it might be for for both readers and the environment.

The main investors in the development of the e-book technology (in particular Amazon and Sony) have been advertising worldwide in the last decade what a big deal (in every sense) for readers it will be. In July 2010 Amazon has astutely "disclosed" that in a sense the "revolution" has already taken place, since for every 100 hardbacks they

¹² «Thanks to the Internet, what was once the preserve of local used bookstores is now a vast and sophisticated international online market. The US market for new textbooks is estimated at around \$5.5 billion, but the parallel market for used books is around one-third of that, says [Joe] Esposito [a digital-media consultant and former chief executive of *Encyclopaedia Britannica* online]» [7, p. 569].

have sold (or so they say) 143 e-books; in January 2011 they have added a new record: for every 100 *paperbacks*, they have sold 115 e-books. However both data were not as dramatic as they might seem at first, since they are not obviously related to revenues (Amazon preferred not to disclose them), and, as to paperbacks, Amazon holds on one hand only a 15% share of the US sale of paperbacks, and on the other hand 80% of the corresponding share for e-books. In Europe the maximum rate of e-books with respect to all books sold had been reached in United Kingdom, with 2-3%; Italy and Spain were at a scant 0.5%. It is relevant to remark that present-day e-book lectors are white-and-black and have a display of little more than 9 by 12 cm (that is, 35% of an A5 page format). Moreover the results of a 2009 survey at a US university (the North West Missouri State University) seem representative of the general attitude among students [7]:

A survey by NWMSU in February found that, all things being equal, about half the students would prefer print textbooks and about a quarter would prefer e-textbooks, whereas the remainder had no strong feeling. But when asked what they would do if buying a textbook themselves, almost 80% said that they would opt for the cheaper e-textbook offering.

In other words, most students think that to pore over an electronic device is less satisfactory than working on a traditional book, but might be cheaper, and that an opportunity to save money should not be lightly dismissed.

Actually even the *prima facie* plausible conjecture that e-books are cheaper may turn out to be incorrect. In fact – and this shows the eternal “other side” to profit-driven technological innovation – the publishers wishing to enter the e-textbook market want to limit the degree students become proprietors of the e-text they buy, and to prevent unauthorized copying. To this aim they put limits to the number of pages that may be printed at a time (no more than 10) and to the possibility of printing the whole book (no more than once), and, just to be on the safe side, they also put... an expiry date to the e-book itself. Since students usually save half the price of the print textbooks

by selling them (an unfortunate habit, incidentally),¹³ they can be excused if they think that an e-book with a deadline, even at half the price of the print version, is not exactly a bargain.¹⁴

For those who earn money by selling books, often with very little gain to the authors, the transgenerational permanence of print books and the very existence of libraries are a bale, so they try to suggest that the only valuable books are those just or (at least) *still* in print. As a matter of fact, the contrary can be argued in many cases, but newspapers and magazines apparently have no interest in publishing reviews of books that can be taken on loan or bought second-hand, so they try to inoculate their readers with the superstition of “novelty as value” – the last essay, the last novel... Indeed, even the last edition of a *dictionary* or an *encyclopedia* may not always be the best choice.

6.4 Multi-medial teaching

Multi-medial teaching is a related growing industry, whose PR representatives (inside and outside the academia) have been hard trying to convince everybody that e-learning, slides (or PowerPoint presentations), and the ubiquitous use of electronic devices improve the learning ability of students. Now there is no doubt that many, perhaps most students *enjoy* watching pictures on a screen, but it is a very different question whether one can exploit this inclination for pedagogical purposes.¹⁵

¹³ Textbooks are the bedrock of one's culture, and my advice, for what it is worth, is to *keep* them, since this makes it possible to compare and check any new information and teaching against what we were previously supposed to know.

¹⁴ «Charging half the price of a printed textbook for an e-book that expires is “far too costly”, says [Kevin] Hegarty [chief financial officer of the University of Texas at Austin]» [7, p. 570].

¹⁵ It is interesting that many workers in computing science and technology in Silicon Valley send their sons to Waldorf elementary schools, which reject computers and screens («They are not allowed in the classroom, and the school even frowns on their use at home»), and use instead only «blackboards with colorful chalks, bookshelves with encyclopedias, wooden desks filled with workbooks and No. 2 pencils» [63].

Consider PowerPoint (PP), a program for making presentations which has been introduced in 1984 and then adopted by Microsoft. In a conference setting it can certainly be useful, if used sparingly and to supplement the oral explanation with key details, quotations, graphs, or pictures. On the other hand, using it as a primary tool of exposition, and worse of all in the class-room, easily leads to disaster: it produces boredom and passivity in the audience, and a tendency to oversimplifying ideas in the speaker. Edward Tufte, a real expert (a professor of «political science, computer science and statistics, and graphic design at Yale»), puts it very effectively [78]:

[...] slideware – computer programs for presentations – is everywhere: in corporate America [and Europe – MMC], in government bureaucracies, even in our schools. Several hundred million copies of Microsoft PowerPoint are churning out trillions of slides each year. Slideware may help speakers outline their talks, but convenience for the speaker can be punishing to both content and audience. The standard PowerPoint presentation *elevates format over content, betraying an attitude of commercialism that turns everything into a sales pitch.*

In fact the Columbia Accident¹⁶ Investigation Board pointed out, citing Tufte's analysis of a certain PP slide which had been shown to NASA senior managers in January 2003, that «It is easy to understand how a senior manager might read this PowerPoint slide and not realize that it addresses a life-threatening situation».¹⁷ A very dramatic example of MacLuhan's «The medium is the message» phrase, indeed. In general PP presentations have a strong tendency to hide the difficulties in the speaker's claims, and encourage or comfort an authoritarian stance in the speaker.

As to teaching, it has been argued in detail what seems to me, as a university teacher, a rather obvious point: the less

¹⁶ The Space Shuttle Columbia accident occurred on February 1, 2003, when during re-entry into the Earth's atmosphere the shuttle disintegrated. All seven crew members died.

¹⁷ Cit. in [40]. On February 1, 2003, the Space Shuttle "Columbia" disintegrated over Texas at the end of its 28th mission, an accident where all (seven) crew members were killed.

technology teachers bring into their classrooms, the more likely it is that their students will take advantage of going to classes (cf. [3]). This of course does not mean that the Internet has not a legitimate subsidiary role to play in effective teaching.

The viral spreading of PP presentations is an example of how a certain technology, with very serious built-in shortcomings, may propagate and become standard without a real assessment of its usefulness having ever been made. And yet its use may affect negatively vast areas of human activity.

6.5 Cell phones

My last example is cell phones. They have spread like a pandemic disease, thanks to very aggressive marketing campaigns worldwide. Now it is true that the owners of a portable phone have an immense power: they can contact, and be contacted by, everyone everywhere at any time... However, there are important features of the "old phone" communication that have been lost by the introduction of the portable phones: first of all the "stability" of the contact. As has been said humorously [25]:

I started to distrust telephones the instant they stopped working. I can't pinpoint when that was — the first time I "dropped" a call, or someone said, "I'm losing you" — and I don't know why the telephone, the analog landline telephone, was never formally mourned.

The same author goes on remarking that a whole social universe was related to the traditional usage:

A conversation could last hours upon dazed hours, as you sat on your parents' bed, twirling the curly cord, or hauled the house phone into the bathroom, the better to monopolize family telecommunications. Chortling, gasping, sighing, sobbing, throats catching or forming word after idle or impassioned word: you made every sound that humans make and thus joined your solitudes. [...] Your phone voice was distinctive; your phone manner was distinctive. [...]

There were fears, before voicemail, that call-borne opportunities might be missed forever, [what about answering machines? – MMC] but there was no "We have a bad connection," "I'm going into a tunnel," "My battery's

dying,” “I have to take this” or “I have only one bar.” [...] Sound signals, so unfaithful to the original they hardly seem to count as reproductions, come through shallow. You can hardly recognize voices. Fragile, fleeting connections shatter in the wind. You don’t know when to talk and when to pause; voices overlap unpleasantly. You no longer have the luxury to listen for over- and undertones; you listen only for content. Calls have become transactional, not expressive. The oddly popular option to use the speakerphone means that you never know when what’s left of the old telephone intimacy might be compromised. You certainly can’t trust that it will be there anymore, ever.

I think this description, which everyone old enough will recognize as realistic, sufficiently shows that, even from a strictly technical viewpoint, it is very doubtful that there has been a straightforward progress from the analog to the cell phone.

But of course there is much more than that. Portable phones have revolutionized the worker’s life by blurring the demarcation line between workplace and home, acting, so to speak, as electronic leashes which guarantee the ubiquitous and continuous availability of the employees by their employers. The image of freedom that portable phones are normally associated with in marketing campaigns camouflages the reality of a new tool for control and exploitation [39].

Last but not least, exposure to radiation coming from cell phones is another hazard on which very little emphasis has been laid in the mainstream media, notwithstanding a heated contro-versy among public health and industry scientists.¹⁸

7. Work, slavery, and machines

In general, work for the sake of money or status should be recognized as a form of slavery, not as a tool of liberation –

¹⁸ An account with many references is contained in the web site of the National Cancer Institute (NCI) of Unites States [52]. The International Agency for Research on Cancer (IARC) on May 31, 2011, classified the radiation associated to wireless phones as «possibly carcinogenic to humans» [29].

a punishment, not a blessing. In 1845 Friedrich Engels explained it very well in his *Condition of the Working Class in England* [15]:

Another source of demoralisation among the workers is their being condemned to work. As voluntary, productive activity is the highest enjoyment known to us, so is compulsory toil the most cruel, degrading punishment. Nothing is more terrible than being constrained to do some one thing every day from morning until night against one's will. And the more a man the worker feels himself, the more hateful must his work be to him, because he feels the constraint, the aimlessness of it for himself. *Why does he work? For love of work? From a natural impulse? Not at all! He works for money, for a thing which has nothing whatsoever to do with the work itself;* and he works so long, moreover, and in such unbroken monotony, that this alone must make his work a torture in the first weeks if he has the least human feeling left.

It is worth emphasizing that the de-humanizing effect of the division of labour had already been pointed out in the preceding century by an author with a very different world-view, Adam Smith, in his classic work (first published in 1776):

In the progress of the division of labour, the employment of the far greater part of those who live by labour, that is, of the great body of the people, comes to be confined to a few very simple operations, frequently to one or two. But the understandings of the greater part of men are necessarily formed by their ordinary employments. The man whose whole life is spent in performing a few simple operations, of which the effects are perhaps always the same, or very nearly the same, has no occasion to exert his understanding or to exercise his invention in finding out expedients for removing difficulties which never occur. *He naturally loses, therefore, the habit of such exertion, and generally becomes as stupid and ignorant as it is possible for a human creature to become.* The torpor of his mind renders him not only incapable of relishing or bearing a part in any rational conversation, but of conceiving any generous, noble, or tender sentiment, and consequently of forming any just judgement concerning many even of the ordinary duties of private life [74, p. 340 (book 5, chapter 1)].

Engels knew this passage, and expanded on Smith's remarks, emphasizing the role of machines in taking the division of labour to its extremes:

How much human feeling, what abilities can a man retain in his thirtieth year, who has made needle points or filed toothed wheels twelve hours every day from his early childhood, living all the time under the conditions forced upon the English proletarian? It is still the same thing since the introduction of steam. *The worker's activity is made easy, muscular effort is saved, but the work itself becomes unmeaning and monotonous to the last degree.* It offers no field for mental activity, and claims *just enough of his attention to keep him from thinking of anything else.* And a sentence to such work, to work which takes his whole time for itself, leaving him scarcely time to eat and sleep, *none for physical exercise in the open air, or the enjoyment of Nature, much less for mental activity,* how can such a sentence help degrading a human being to the level of a brute?

Now it is true that, due to a century of struggles led by trade unions, working conditions have improved since 1845 (they have been getting considerably worse in the last decade, incidentally); in particular work does not take a person's «whole time for itself», and children are forbidden to work in factories – I am referring to the so-called “developed” countries, of course. And yet very little of the work which is normally offered to people today can be described as «voluntary, productive activity». For instance, there is not much to rejoice for women to be treated *like men* on the work marketplace; we shall have to come back to this.

This agrees with what John Stuart Mill wrote in his *Principles of Political Economy* (1848): «It is questionable if mechanical inventions yet made have lightened the day's toil of any human being», a passage that Marx cited with approval – except that he suggested that the phrase “of any human being” should be substituted by “of any human being not fed by other people's labour” [43, p. 180 (ch. XV)]. And it is worth mentioning that John Maynard Keynes's prediction in 1930 that *his* grandchildren would

have enjoyed «[t]hree-hour shifts or a fifteen-hour week» is to be considered as definitely refuted. In fact

The number of hours worked in the United States has remained pretty much steady for decades, and is 30% higher than in Europe. Europeans tend to use up all their holiday entitlement; Americans, even though their vacations are shorter, do not. [14]

According to the International Labor Organization, one fifth of the workers works for more than 48 hours a week, and there are also workers that make themselves available for 24 h a day. A study by the WHO has linked the extra work to an increase from 30 to 80% of the incidence of cancer [39].

The division of *intellectual* labour is a related issue with even more serious social consequences, as we have seen (section 4).

8. Science helping women to enrol in the labour reserve army

It is easy to show that the mass enrolment of women in the labour reserve army¹⁹ (let alone the army in the military proper sense)²⁰ has caused several adverse effects, first of all to women themselves. What I wish to do in this section is to document the way a sizeable portion of the biomedical research in the last century can be construed as a loyal attempt by the scientific community to smooth the way to the loss of gender-specific social tasks, and the connected ideological denial of specific women's vital needs.

8.1 Reproduction

"Self-actualization" has become a catch-word making conceptual havoc in the pseudo-feminist discourse. This is illustrated by a paradoxical phenomenon which is conspicuous in our society.

¹⁹ See the Appendix.

²⁰ See the very recent admission of women to frontline tasks in war by the US government, which has been greeted by the mainstream media, absurdly but not unexpectedly, as a further step towards women's emancipation [2].

On one hand women are systematically encouraged to postpone child-bearing and rearing, indeed to construe it as an hindrance to their "self-actualization",²¹ and voluntary abortion is accordingly represented as a civilized option for women wishing to avoid career disruption or delay.

On the other hand maternity is increasingly represented in the public discourse not as a natural opportunity for most women which society should support, but as a *formal* civil right which should be recognized to nearly every adult person, of any sex and age, and that only waits for further technological progress to become a *substantial* right.

For instance, recently an American transgendered person (female to male), married to a sterile woman, was reported to have succeeded in getting pregnant by artificial insemination. In an editorial of the science weekly *Nature* we read [13]:

And yet, when we consider this story with the reasoning parts of our brains, exactly what was so "unnatural"? The longing to have a baby? This is a profoundly human desire,

²¹ This discourse often emerges in the form of a woman's apology for neglecting her children; the following quotation is a rather standard statement (a journalist is speaking): «I see my daughter very little indeed: I take her to school in the morning, then I go to my newspaper and come back home late in the evening, when she is sleeping already. Of course I take advantage of all available moments, in the days off-duty and on Sunday (it is lucky that [my newspaper] does not come out on Monday) to stay with her, to grant her that "quality time" [English in the original] which is needed for her serene growth. It is superfluous to speak of my sense of guilt: in the first months [of my job at the newspaper] I felt an inhuman, unworthy, and sometimes a bad mother. I felt the world's eyes on me, the silent questioning of all who thought: how can you prefer your career to your daughter? I really had some bad moments. Then, however, I understood that loving a son does not mean having to renounce to oneself. Had I said farewell to journalism, or even to [my newspaper] only, in order to be again a full-time mother, I would have damaged myself and my baby. Sure, I would have had much more time to devote to her, but it would have always been an anguished and unhappy time. Because the self-actualization of a woman is basic for a balanced development of [her] sons» [12].

whether the prospective parents are male, female or transgendered.

According to the *Nature's* writer, «to have a baby» (whatever its meaning) is such a «profoundly human desire» that the way it is achieved does not really matter – so far as it does not infringe the (country-dependent) criminal laws, I suppose.

From the viewpoint of reactionary scientism, the fact that (almost) all humans are “of woman born” has nothing sacred or eternal. The differences between the sexes are contingent to a certain level of our knowledge of, and power of intervention on, the workings of the human body and mind. The development of an artificial womb, together with the establishment of easily accessible semen banks, will eventually put everyone in the same position.²²

As to women, the idea that they should respect the “seasons of life” is simply dismissed as inappropriate. If women come “late” (to use old-fashioned parlance) to the decision of having a child, no questions need be asked, particularly by scientists, whose only concern must be to provide a technological answer to the increasing demand for “off-season” pregnancies.

When assisted reproductive technology (ART) is mentioned, it is rare to see its problems cited. For instance, the following list of facts seems not to bother in the least the community of mainstream reproduction researchers:²³

- 1) ART, being very expensive,²⁴ is socially discriminatory;
- 2) ART is successful only about one-fourth of the times;
- 3) cycles of hormonal stimulation are stressful and mood-affecting;

²² Ectogenesis (the development of the embryo outside a woman's body) as the normal way in the future of humankind was apparently first advanced as an ideal by biologist J. B. S. Haldane [22] (cf. [56, p. 577]). A very risky and expensive approach, uterus transplant, is on its way [59].

²³ For more details and references see [27, 64, 10].

²⁴ «One cycle of IVF [= in vitro fertilization] alone can cost \$10,000, and couples may spend anywhere between \$44,000 and \$200,000 for a single pregnancy» [10, p. 345].

4) the emotional investment a couple has to make in a program of assisted reproduction may easily be disruptive of their union;

5) multiple and pre-term births are much more common (with all the associated complications, medical and economical, for the parents, for the children, and for public health);

6) adoption of parentless children is arguably a more sustainable and convenient approach, in many ways, to satisfy the desire of parenthood in a sterile couple;

7) sterility is increasingly recognized to depend also on industrial and traffic pollution – by the multitude of synthetic chemicals and micro-particles working as endocrine disruptors which have invaded our air, water, and foods;

8) sterility as due to late attempts at pregnancy is to a large extent a social phenomenon related to the current organization of labour.

Now how do ART researchers react to these points? as to 3)-5), it is a general fact that the biomedical community is, on the whole, in a permanent state of denial of the adverse reactions to *any* medical procedures or drugs and, moreover, one should never forget that science is looking for remedies *also* to any discomfort these procedures may be causing (cf. technological fideism); 6) is dismissed by adopting the apparently libertarian stance that it is to the couple (or to the adult single) to decide the way they want to be parents; as to 7), there are – somewhere – researchers in other fields working to develop less toxic additives, pesticides etc.; finally, to 1) and 8) scientists answer that, *qua* scientists, they don't have to care for socio-political issues.

However, the list above shows clearly that to construe couple sterility as a medical problem is to neglect its multilayered nature. To decide that the correct level for an intervention²⁵ is the medical one is to absolve in principle the economical and political system from its obvious, huge

²⁵ Cf. section 5.

responsibilities.²⁶ To mention just one issue, while access to ART is largely unregulated, particularly in US, as an effect of the market pressures on legislators, adoption is in fact discouraged by subjecting the fitness-to-adopt of a couple to very stringent official examinations.²⁷

8.2 Menstruation

Related to this, there exists also a line of research pursuing how to eliminate menstruation. As an Italian researcher said in an interview, describing a pill presented to the FDA for approval [55]:

[...] thanks to its low hormonal dosage it can be taken 365 days a year. According to some experts two-thirds of the women involved [in the clinical trials] have shown some interest for a product which they consider as innovative: *some of them, for example, hold they are too much busy with their job to have to worry about the menstrual cycle.*

As usual, as long as a need translates into a request for a commodity, no questions are asked on the *origin* of that need.

A Brazilian scientist, Elsimar Coutinho, has written a book the title of which is a question: «Is Menstruation Obsolete?», and whose subtitle gives away his answer: «How suppressing menstruation can help women who suffer from anemia, endometriosis, or PMS [premenstrual syndrome]» [11].

According to Coutinho – the developer of Depo-Provera, a contraceptive which has to be injected, but only twice a year – menstruation is a pathology, a fossil from a remote time when women used to bear 10-12 children during their lives, thus having their menses suppressed in a natural way (that is, through pregnancies and breastfeeding) for most of

²⁶ As explained in chapter 13 the whole transplant business is an outgrowth of this political bias.

²⁷ «[...] fertility clinics freely flourish in a market-driven, unregulated system. Although it is tempting to believe that this freedom stems from deference to reproductive rights, the lack of regulation in the fertility industry is probably due to political influence of fertility physicians and their patients. [...] While screening for adoptive parents is comprehensive and rigorous, parents who use ART face poorly defined and inconsistent scrutiny» [10, pp. 336, 346].

their fertile age. Today, with women having on average no more than 2-3 children, menstruation should be considered as a useless waste.

The interesting thing about this proposal is that a remedy is put forward for a *physiological condition* whose function is, furthermore, by no means well understood. There is an alternative theory, advanced by a biologist from the University of California at Berkeley, Margie Profet, according to whom «Menstruation functions to protect the uterus and oviducts from colonization by pathogens» coming from sperm: «The uterus appears to be designed to increase its bleeding if it detects infection» [60]. Thus to intervene medically to suppress menstruation might be harmful, and promote infection to the female genitals with their attendant complications.

8.3 Menopause

The preceding example has strong resemblances with the promise made to women by proponents of the *hormonal replacement treatment* (HRT), which has been one of the biggest commercial successes ever [80]. In this case the pharmaceutical industries succeeded in convincing millions of women around the world that the secret had been found for them to remain «feminine forever».

Menopause in itself is not a disease, of course, but it may be perceived as such, both by late-comers to sexual romance, and by women intimidated by the role models offered by the media, featuring mature actresses whose hi-tech and disquietingly inconsistent appearance of youth is obsessively and triumphantly advertised.

At the beginning, HRT was prescribed only for menopause disturbances like hot flushes and vaginal dryness, but soon it started to be indicated for many more pathologies, including heart disease, Alzheimer, osteoporosis; eventually, it was prescribed to healthy women seeking improvements in «sexual function, mood, and overall vitality» [9]. In 2001 more than 100 million women all over the world were taking it, and in the same year the sales of these drugs climbed to 3,8 billion dollars.

The bad news arrived soon. In 1977 evidence had already been provided of an increase in endometrial cancer when

oestrogen was used alone; in 1997 the coupling of oestrogen and progestogen was also shown to be associated to the same kind of effect. In May 2003 the renowned medical magazine *BMJ* had a commentary on a very recent study published by the *Journal of the American Medical Association (JAMA)* [49]:

On Wednesday *JAMA* published the study, funded by Wyeth, which shows that the company's [Wyeth] combined oestrogen and progestogen pill doubled the risk of dementia among elderly women from about 1% to 2% over five years. The latest data on dementia come after findings last year which showed that long term use of the drug slightly increases the risks of breast cancer, heart attacks, and strokes in healthy women aged over 50 years (*JAMA* 2002;288:321-33).

In 2003 the British drug agency announced that HRT should not be considered as first choice treatment for osteoporosis in women more than 50 years old. Professor Bruno Müller-Oerlinghausen, chairman of the Germany's Commission on the Safety of Medicines which had recommended use of HRT only for «particularly severe menopausal symptoms», compared HRT to thalidomide [6] – with reference to the tragedy caused in the late 1950s by that painkiller, which had been widely advertised and marketed as «innocuous» to pregnant women.

In April 2004, a study has been published, on HRT with oestrogen without progestogen, concerning 11,000 women from 50 to 70 followed during almost 7 years. It had to be stopped in advance of an year since evidence had been mounting of an increase in the strokes, coupled with absence of heart protection. This time, though, some benefits were found. On 10,000 woman/year of treatment there were 6 hip fractures *less...* and 12 strokes *more*.

In the meantime HRT won a promotion in the carcinogen list of International Agency for Research on Cancer (press release, July 29, 2005): from "Group 2B" (possible carcinogen) it became "Group 1" – that is, a human carcinogen. It is worth mentioning that many more nonfatal, but still very troublesome, illnesses have also been associated to HRT – among them hair loss and deafness.

The hormone replacement mass treatment has been defined «The greatest experiment ever performed on women» [72]. As in many similar cases, the human guinea-pigs ignored that this was the role they had been chosen to play, in the name of greed and profits, masked as medical advance.

9. Science disciplining the mind

Exploitation in a society where the right of the powerful over the weak and the destitute has no official recognition requires dissimulation. In a capitalist society this is made, on one hand, by suggesting that there is no way to intervene at the root of the disturbances the social system creates, and on the other hand by offering commercial palliative remedies to the victims. Much scientific research is funded to develop those remedies, generally in the form of psycho-active drugs.

9.1 Sleep, performance, and "enhancer" drugs

Present-day labour conditions in the Western world have led to a huge increase in sleep disturbances, for instance the basic form of the inability to sleep continuously for 7-8 hours. It has been estimated that 3 out of 4 people have «at least one symptom of a sleep problems a few nights a week or more» [37]. In order to minimize the number and wages of the personnel, labour shifts have often become quite distressing, and it is not surprising that so many people are overworked and tired.

The pharmaceutical industries have found here an excellent field to expand their search for profits. They are funding the dual development of chemicals that enable a person to sleep notwithstanding anxieties and worries, and of chemicals that keep a worker awake notwithstanding accumulated tiredness. Here is how a researcher in this field explains his view to a reporter of the British weekly *New Scientist* [37]:

"The more we understand about the body's 24-hour clock the more we will be able to override it", says Russell Foster, a circadian biologist at Imperial College London. "In 10 to

20 years we'll be able to pharmacologically turn sleep off. Mimicking sleep will take longer, but I can see it happening". Foster envisages a world where it's possible, or even routine, for people to be active for 22 hours a day and sleep for two.

Doubts on this research programme are not only suggested by plain common sense, but have been expressed also by professionals, who are on record for stating that natural sleep can hardly be substituted with chemically-induced sleep: «But most sleep researchers agree that it is inevitable».

So the research in this field has gone on producing some commercially successful drugs, like modafinil (Provigil) and CX717. The following passage from the cited article is enlightening [37, p. 52]:

We seem to be moving inescapably towards a society where sleep and wakefulness are available if not on demand then at least on request. It's not surprising, then, that many sleep researchers have nagging worries about the long-term impact of millions of us using drugs to override the natural sleep-wake cycle.

[Neil] Stanley believes that drugs like modafinil and CX717 will tempt people to overdose on wakefulness at the expense of sleep. "Being awake is seen to be attractive", he says. "It's not cool to be asleep". Foster has similar worries. "It seems like that technology will help us cope with 24/7, but is coping really living?" he asks. Others point out that there are likely to be hidden health costs to overriding our natural sleep-wake cycles. "Pharmaceuticals cannot substitute for normal sleep", says [Jeffrey] Vaught [president of R&D at Cephalon, modafinil's Pennsylvania-based manufacturer].

Still, even the doubters admit that *to all intents and purposes we are already too far down the road of the 24-hour society to turn back.* For millions of people, good sleep and productive wakefulness are already elusive, night work or nightlife a reality, and the "stimulant-sedative" loop all too familiar. As Vaught puts it, "We're already there". So why not make it as clean and safe as possible?

"We are already too far down the road of the 24-hour society to turn back": this is a typical argument from the

bag of reactionary scientism: by assuming the impossibility of changing the social conditions which make being awake at any time in the day and the night, «attractive» and «cool» (indeed!), the researchers working to develop drugs which alleviate the symptoms of overwork, noise, stress etc. can be depicted as *benefactors* – while in fact what they do is instrumental in making it possible for the mental balance of people to be ever more imperilled.

Scientists are also giving in the most direct fashion their loyal contribution to the expansion of the market of drugs purportedly modulating sleep and/or attention – that is, by taking them. As a recent article on *Nature* explained [68]

In academia, we know that a number of our scientific colleagues in the United States and the United Kingdom already use modafinil to counteract the effects of jetlag, to enhance productivity or mental energy, or to deal with demanding and important intellectual challenges [...]

The authors blandly comment upon this tendency:

There are also situations in which many would agree that the use of drugs to improve concentration or planning may be tolerated, if not encouraged, such as by *air-traffic controllers, surgeons and nurses who work long shifts*. One can even imagine situations where such enhancing-drug-taking would be recommended, such as for airport-security screeners, or by soldiers in active combat.

Clearly the fact that there are many people who work stressful shifts is not something to be questioned or worried about. In fact next follows the inevitability song, with the standard reference to the laws of the market:

We believe it would be difficult to stop the spread in use of cognitive enhancers given a global market in pharmaceuticals with increasingly easy online access. The drive for self-enhancement of cognition is likely to be as strong if not stronger than in the realms of “enhancements” of beauty and sexual function.

The editorial in *Nature* magazine from which we have already quoted [13] replies as follows to the objection that performances realized thanks to «neuroenhancing drugs» are «somehow less worthy because they aren’t natural»:

But again, what is “natural”? Devices such as glasses, hearing aids, pacemakers and artificial hips are unnatural. Yet they are widely accepted as legitimate ways to enhance the human experience. By the same token, if drugs enhance performances on a standardized test, what is so “natural” about prep courses designed to improve scores?

Even the theoretical stronghold against drug enhancement of natural abilities, athletics, is under the threat of a new wave of bioethicists according to which «enhancers have become so prevalent that the only realistic option is for the sporting authorities to let athletes use what they want, as long as they do it safely» (sic!). And science magazines like *Nature* are, not unexpectedly, hurrying to give their blessing to this position.²⁸

9.2 Bad memories

In France and in the United States (but also in Italy, as explained in an interview [62] broadcast in 2004), there is ongoing research to develop drugs “erasing” bad memories. A drug formerly used as anti-hypertensive, propranolol, has been recently experimented on humans to check its efficacy against *post-traumatic stress disorders* (PTSD). The basic mechanism of this drug is supposed to be that

it acts on the amygdale, making it “insensitive” in the hours and days subsequent to the trauma, and inhibits the production of noradrenalin and cortisol, which help us to remember an event precisely. [72]

The idea is to preserve the factual details contained in a bad memory but to turn its emotional import off. Clearly this kind of treatment is very much in demand among those who work in that important occupational sector named “war”. It has been recognized since a very long time that to earn one's living by killing perfect strangers, and risking one's life in the process,²⁹ for no other reason than that one has been ordered to do it is not exactly conducive to a good mental balance. The figures are terrifying, as regards the US war veterans:

²⁸ See [77], from which the previous citation has been extracted.

²⁹ The drone technology is increasingly developed to obviate to this admittedly unpleasant side effect (a drone is what is technically defined a “unmanned aerial vehicle”).

Eighteen American war veterans kill themselves every day. One thousand former soldiers receiving care from the Department of Veterans Affairs attempt suicide every month. More veterans are committing suicide than are dying in combat overseas.

These are statistics that most Americans don't know, because the Bush administration has refused to tell them. Since the start of the Iraq War, the government has tried to present it as a war without casualties. [...]

According to an April 2008 study by the Rand Corporation, 300,000 Iraq and Afghanistan war veterans currently suffer from post traumatic stress disorder or major depression. Another 320,000 suffer from traumatic brain injury, physical brain damage. A majority are not receiving help from the Pentagon and VA system which are more concerned with concealing unpleasant facts than they are with providing care.³⁰

No wonder, then, that a pharmacological fix should be conceived as the ideal solution for this epidemics [20]:

"I'd take it in a second", said Sgt. Michael Walcott, an Iraq War veteran, referring to an experimental drug with the potential to target and erase traumatic memories.

Walcott, who served in a Balad-based transportation unit that regularly took mortar fire, now suffers from post-traumatic stress disorder. Since returning to the United States two years ago, he has been on antidepressants and in group therapy as he tries to put his life back together and heal from the psychological scars of war. "There are moments", he said, "when you just want be alone and don't want to deal with everyone telling you that you've changed".

There are many others like Walcott. The Army estimates that one in eight soldiers returning home from Iraq suffers from post-traumatic stress disorder. Symptoms of the

³⁰ Of course these data would not have been disclosed without a lawsuit: «In fact, they never would have come to light were it not for a class action lawsuit brought by Veterans for Common Sense and Veterans United for Truth on behalf of the 1.7 million Americans who have served in Iraq and Afghanistan. The two groups allege the Department of Veterans Affairs has systematically denied mental health care and disability benefits to veterans returning from the conflict zones» [19].

disorder, once known as shell shock, include flashbacks, nightmares, feelings of detachment, irritability, trouble concentrating and sleeplessness.

In the list of the symptoms "sense of guilt" is absent.

What is the "scientific" approach to traumas suffered by soldiers? An ordinary person would think that to remove the association of psychological traumas to wicked actions is the devil's recipe to increase the amount and intensity of evil in the world. But scientists do not bother. Their way of seeing the issue is different, and can be outlined as: "Here is an interesting neurological problem". Let us continue our quotation:

Much about why painful memories come back to haunt soldiers and those who live through other traumatic experiences remains unknown. Scientists say that is because little is known about how the brain stores and recalls memories.

But in their early efforts to understand the way in which short-term memories become long-term memories, researchers have discovered that certain drugs can interrupt that process. Those same drugs, they believe, can also be applied not just in the immediate aftermath of a traumatic event — like a mortar attack, rape or car accident — but years later, when an individual is still haunted by memories of event.

Now we are offered an impressive example of the interplay between committees of bioethics, funding agencies, and scientific research: «The President's Council on Bioethics has condemned memory-altering research». So we know, at least, that the former US President G. W. Bush had his own Council on Bioethics, and a rather strict at that.

The National Institutes of Health, however, has funded some experiments that use propranolol for post-traumatic stress disorder treatment, and Pitman said he has received a grant from the Army to begin conducting similar research with Iraq veterans. [20]

So we have made full circle. One last point is worth mentioning. As I have said, propranolol has been "deviated" to a different use from the original one, but in fact it has been around for quite a long time. So a look is warranted at

the list of recognized adverse effects. It is long, but it is worth to read it through [16]:

The following adverse reactions have been observed, but there is not enough systematic collection of data to support an estimate of their frequency. Within each category, adverse reactions are listed in decreasing order of severity. Although many side effects are mild and transient, some require discontinuation of therapy.

Propranolol hydrochloride (Inderal® (propranolol))

Cardiovascular: Congestive heart failure; hypotension; intensification of AV block; bradycardia; thrombo-cytopenic purpura; arterial insufficiency, usually of the Raynaud type; paresthesia of hands.

Central Nervous System: Reversible mental depression progressing to catatonia; mental depression manifested by insomnia, lassitude, weakness, fatigue; an acute reversible syndrome characterized by disorientation for time and place, short-term memory loss, emotional lability, slightly clouded sensorium, decreased performance on neuropsychometrics; hallucinations; visual disturbances; vivid dreams; light-headedness. Total daily doses above 160 mg (when administered as divided doses of greater than 80 mg each) may be associated with an increased incidence of fatigue, lethargy, and vivid dreams.

Gastrointestinal: Mesenteric arterial thrombosis; ischemic colitis; nausea, vomiting, epigastric distress, abdominal cramping, diarrhea, constipation.

Allergic: Hypersensitivity reactions, including anaphylactic/anaphylactoid reactions; laryngospasm and respiratory distress; pharyngitis and agranulocytosis; fever combined with aching and sore throat; erythematous rash.

Respiratory: Bronchospasm.

Hematologic: Agranulocytosis; nonthrombocytopenic purpura; thrombocytopenic purpura.

Autoimmune: In extremely rare instances, systemic lupus erythematosus has been reported.

Miscellaneous: Male impotence. Alopecia, LE-like reactions, psoriasiform rashes, dry eyes, and Peyronie's disease have been reported rarely. [...]

Skin: Stevens-Johnson Syndrome; toxic epidermal necrolysis; exfoliative dermatitis; erythema multi-forme; urticaria.

Not exactly an unmixed medical success... Contrary to the spirit of the prevailing utilitarian ideology, it is very rare that when describing the presumed benefits of some technological innovation (including drugs, vaccines, therapies, and mass screenings for some disease) the mass media ever present a real utilitarian balance sheet – including the adverse effects, that is. The above list (looking like that of countless prescription drugs) suggests a general explanation for this otherwise curious phenomenon.

10. A smoking gun

Most of the medical and pharmaceutical results (including counterproductive effects!) we have described in sections 8 and 9 have been preceded by *experiments on living animals*. The role this methodology plays in contemporary biomedical research was described, somewhat ironically, by F. M. McFarlane Burnet in 1967:

One might justly summarize American medicine (and all those who reverently follow the American lead) as being based on the maxim that what can cure a disease condition (assumed, simulated or natural) in a mouse or a dog can with the right expenditure of money, effort and intelligence, be applied to human medicine.³¹

I have in several occasions argued for the view³² that this methodology – i.e. using one or more animal species in order to find out what is the case *in still another animal species* – is scientifically untenable, and that historically has collected an incredibly high number of tragic failures. Incredible, that is, if people (let alone animals) mattered.

³¹ Cit. in [51, p. 168]. (MacFarlane Burnet got the Nobel prize in “Physiology or Medicine” in 1960).

³² An historically important, poignant, and still largely relevant indictment of vivisection from a methodological and historical point of view is the Swiss writer Hans Ruesch's book [66]. Several Italian or English writings of mine on the topic can be recovered from the website www.hansruesch.net.

It has been extensively documented that even those who practice it do not take it seriously, although they accept it in practice as a means to enhance their own academic or professional standing. But reactionary scientism *needed* to put forward a method which could be presented to the misinformed majority as having a *prima facie* chance to solve the countless problems to the citizen's health that the capitalist system generates. Vivisection (such is the historical name of this methodology, whether it involves "section" or not), with its deep-rooted psychological link to the ancient notion of sacrificing animals to the gods as a surrogate for human victims, *was and remains particularly suitable for this propagandistic purpose*.

For instance, to mention just one instance related to section 8.1, everybody in the field knows that animal models of uterus transplant are misleading, but a "false common sense" has been inoculated by the mass media as to the validity of the conclusions to humans drawn from them, which made it possible to researchers to produce with no fear of public chastisement such statements as the following [58]:

"Once we show the first monkey baby, people will step up and say they want to do it" [...] "People are so desperate to have children, they wouldn't wait for ten babies to be born to show it's safe".

In a market logic you need not prove that something (a food, a drug, a surgery) is safe as long as you succeed in selling it to a sufficient number of customers.

However, in this article I will limit myself to stress the indisputable historical fact that there have been and still there are many people around the world who hate the very idea of vivisection, because they think that it is awful to exploit sentient beings in such a systematically cynical and cruel fashion. Most of these people are unmoved by the (unwarranted) pretence that by experimenting on animals wonderful cures for human illnesses are continually being discovered.

One such person was "Mahatma" Gandhi, one of the truly great men of 20th century [50]. Answering a question posed by a postgraduate student, he wrote in 1925:

I am not opposed to the progress of science as such. On the contrary, the scientific spirit of the West commands my admiration and, if that admiration is qualified, it is because the scientist of the West takes no note of God's lower creation. *I abhor vivisection with my whole soul. I detest the unpardonable slaughter of innocent life in the name of science and humanity so-called, and all the scientists' discoveries stained with innocent blood I count of no consequence.* If the circulation of blood theory could not have been discovered without vivisection the human kind could well have done without it. And I see the day clearly dawning when the honest scientist of the west will put limitations upon the present methods of pursuing knowledge. Future measurements will take note not only of the human family, but of all that lives and even as we are slowly but surely discovering that it is an error to suppose that Hindus can thrive upon the degradation of a fifth of themselves or that peoples of the west can rise or live upon the exploitation and degradation of the eastern and African nations, so shall we realise in the fullness of time, that our dominion over the lower order of creation is not for their slaughter, but for their benefit equally with ours. For I am as certain that they are endowed with a soul as that I am. [18, vol. 33, p. 312]

This is by no means an isolated statement in Gandhi's works.³³ It seems obvious that those who make nonviolent³⁴

³³ For instance the following is taken from *Hind Swaraj* (1909-1910), which occupies pp. 245-315 of [18, vol. 10]: «Hospitals are institutions for propagating sin. Men take less care of their bodies and immorality increases. European doctors are the worst of all. For the sake of a mistaken care of the human body, they kill annually thousands of animals. They practise vivisection. No religion sanctions it. All say that it is not necessary to take so many lives for the sake of our own bodies» (p. 278). «If a doctor, he will understand that no matter to what religion he belongs, it is better that bodies remain diseased rather than they are cured through the instrumentality of the diabolical vivisection that is practised in European schools of medicine» (p. 309).

³⁴ Roughly speaking: a nonviolent action is one not purposely causing and/or threatening enduring physical or psychical harm to *people or other sentient beings*. Picking a lock or otherwise damaging *things* may be illegal and certainly annoying to someone, but in the large majority of cases it is not an example of "violence" in the ethically relevant

irruptions in laboratories to boycott this research activity would have received Gandhi's blessing.³⁵

Now the Animal Liberation Front is considered in the United States by the FBI to be the «number one domestic terrorist threat». However, hard as it might be to believe, this is not the bottom line. A new law, which Project Censorship has inserted among the top 25 most censored stories for 2008, prosecutes *as terrorism* much milder animal-rightist protests [61]:

The term "terrorism" has been dangerously expanded to include *acts that interfere, or promote interference, with the operations of animal enterprises*. The Animal Enterprise Terrorism Act (AETA), signed into law on November 27, 2006, broadens punishment present under the Animal Enterprises Protection Act (AEPA) of 1992. One hundred and sixty groups [...] oppose this Act on grounds that its terminology is dangerously vague and poses a major conflict to the US Constitution.

The broad definition of an "animal enterprise," for example, may encompass most US businesses: "any enterprise that uses or sells animals or animal products." The phrase "loss of any real or personal property," is elastic enough to include loss of projected profit. Concerns deepen as protections against "interference" extend to any "person or entity having a connection to, relationship with, or transactions with an animal enterprise."

So it appears that to oppose what Gandhi considered «the unpardonable slaughter of innocent life in the name of science and humanity so-called» is today in the US legally classified and accordingly prosecuted as a form of terrorism. It is hard to imagine, and yet it is true,³⁶ that this happened in 2006 in the very country which had only 5 years earlier suffered the most notorious act of *real*

sense. On the other hand, vivisection *is* violence in this sense.

³⁵ However Gandhi was never awarded a Nobel prize for Peace, notwithstanding five nominations. He was probably considered a more dangerous person than Henry Kissinger decades later...

³⁶ And less surprising in the light of the analysis presented in chapter 15 of this book.

terrorism in the last half-century – the attacks on the World Trade Center in New York City on September 11, 2001.

No one can imagine, even in their wildest wishful thinking, that the US right-wing government was so harsh against animal-rightists because as a consequence of their actions ill people might have been left without precious new drugs or treatments... And no one can suppose that this occurred out of love for science either, in a country where so many bills favouring creationism have been and are still being introduced.³⁷ The reason antivivisectionists are so feared is that their protests and affirmative actions are endangering the covenant between science and corporations, by undermining the angular stone of the house of (open-ended and deceptive) promises built by reactionary scientism to contrast criticism of the corporate destruction of environment and health.

11. Conclusion

We have argued that the ideology guiding the development of a considerable part of contemporary technoscience is reactionary scientism, or the belief that science can make political unrest seem irrational thanks to technological intervention, thus avoiding a redefinition of the power relationships in society. It is the world (including the human body and mind) that must be changed and tinkered with, according to this ideology, lest the present social order were to be disturbed.

Reactionary scientism requires from researchers a rather definite social and psychological profile, characterized by subservience to hierarchy (both within and without the scientific community), and by an alienated sort of curiosity.

We have seen several examples of technological innovations illustrating two related points: 1) it is doubtful whether technological innovation can in general be identified with

³⁷ «In the first three months of 2011, nine creationism-related bills have been introduced in seven states – that's more than in any year in recent memory [...]». The seven states are Texas, Kentucky, Florida, Tennessee, Oklahoma, New Mexico, and Missouri [24].

progress, even from a strictly performative point of view; 2) in a society where work exploitation (including programmed mass unemployment – see the Appendix) is the rule, technological innovation is normally used to ensure a tighter control on the citizens, which is deceptively advertised as promoting individual freedom.

The crucial issue of the political non-neutrality of science has been historically first submerged into fatuous intellectualism and scholasticism, and then into oblivion, and this has happened while the phenomenon itself – that is, the dependence of scientific research on an agenda fixed by a transnational political and economical oligarchy – has been constantly on the rise for decades. It is time for science to be the focus of a renewed political debate, to which scientists should participate by rethinking their role in a much more radical way than they have grown accustomed to in recent times.

Appendix – Women liberation, the labour reserve army, and home management

No one, at least in the cultivated citizenship of contemporary western societies, would hold that there is some political right that a person should be denied *merely because of their sex*. A different and nontrivial issue is whether sex is involved in preferences and abilities that people have for playing certain social roles or for fixing to themselves certain objectives. There is a variety of “feminism” which denies bluntly that any such preferences exist. One may doubt the sincerity and, more importantly, the soundness of this position.

For instance, while it is false that *all* women in *all* societies have been motivated by an irresistible inner drive to devote an important part of their lives to child bearing and nursing [1], nevertheless the human kind would not be here at present if *most* women had not lived this way during most of human history and pre-history. It is ludicrous to suppose that this may have happened only or mainly because of male coercion. Clearly most women have an inborn physical and psychological potentiality to motherhood such that, even though special social circumstances, or a vocational

attitude for an artistic or professional activity, may hinder or stifle it, they actively seek to express it whenever barely appropriate conditions are satisfied.³⁸

Granted this premise, it seems obvious that women's rights should include the conditional right to be a mother, because of the obvious public interest in promoting this attitude when it exists; for the same reason public support should be provided to those women who could not otherwise afford to have children.

Women's liberation should have included from the start the most obvious meaning of *enabling women (and men) to make their choice* as to whether and when to procreate and how much time to devote to parental work. In general true liberation means *shifting the spectrum of available options in the right direction, or at least expanding it*. Instead, in western countries a very convenient notion of "women's liberation" has prevailed – channelling women into the labour force pool,³⁹ a feat which has been accomplished by the simple trick of making a single average salary insufficient to sustain a family,⁴⁰ and simultaneously by creating and advertising a new gospel – consumerism – with its elastic notion of poverty. Sociologist and historian Ivan Illich described the latter transformation as follows [30, p. 94]:

³⁸ This conjecture might be tested, for instance, by a relatively simple and beneficial social experiment: introducing a guaranteed minimum income for "unemployed" people, and then measuring in the following 10 years 1) the variation in the average number of children for each couple, and 2) in the case of couples with small children, the sex ratio with respect to the choice of working at home.

³⁹ Needless to say, this was perfectly clear to socialist women a century ago. See for instance Lily Gair Wilkinson's essay [17], published around 1910 (cf. [65, pp. 99-103]).

⁴⁰ In United States «[s]ince World War II, two out of three new jobs have been taken by calling up a "reserve army" of married women. Concurrently, partially as a result of the premium placed on education for upward mobility in a service and information economy, and partially as a result of the call-up of married women, middle-income families with only one wage earner no longer can afford to rear even one of two children» [23, p. 381].

By 1970 poverty in public parlance had acquired a new connotation – that of an economic threshold. And this changed its nature for modern humans. Poverty became a measure of a person's lack in term of "needed" goods, and even more of "needed services". By defining the poor as those who lack what money could buy for them to make them "fully human", poverty, in New York City as well as in Ethiopia, became an abstract universal measure of underconsumption. Those who survive in spite of indexed underconsumption were thereby placed into a new, sub-human category, and perceived as victims of a double bind. Their *de facto* subsistence became almost inexplicable in economic terminology, while their actual subsistence activities came to be labelled as sub-human, if they were not frankly viewed as inhuman and indecent.

Consumerism is the contemporary ideology underlying the mass production of voluntary slaves.⁴¹ In ancient times an individual's freedom was usually exchanged for nothing less than survival. In our world a much more common bargain is between the best part of an individual's life and the possibility of purchasing certain commodities and services, whose usefulness, in any sense, to that individual is at least dubious and at best limited to the shreds of time spared from the salaried occupation. The psychological compensatory mechanism seems to be the opportunity of exchanging roles between service-provider and user, or master and slave.⁴²

One century earlier, Marx had lucidly stressed, following Ricardo, the intrinsically socially expansive character of capitalism, which needs to create a «redundant popu-

⁴¹ The concept of "voluntary slavery" as the social basis of tyranny was first explored by Etienne La Boétie (1530-1563) in a classic essay, which is still very worth reading [35].

⁴² Fielding in *Tom Jones* (1749) got the idea right: «It is my intention therefore to signify, that, as it is the nature of a kite to devour little birds, so it is the nature of such persons as Mrs Wilkins, to insult and tyrannize over little people. This being indeed the means which they use to recompense to themselves their extreme servility and condescension to their superiors; for nothing can be more reasonable, than that slaves and flatterers should exact the same taxes on all below them, which they themselves pay to all above them» (I, 6).

lation», or the «industrial reserve army», in order to keep wages at the lowest possible level:

[...] the capitalistic employment of machinery [...] produces, partly by opening out to the capitalist new strata of the working class previously inaccessible to him, partly by setting free the labourers it supplants, a surplus working population, [...] which is compelled to the dictation of capital. [43, p. 199]

In particular women (and children, of course) had to be forced into the factory work, thus provoking a social chain reaction the main features of which are today more prominent than they were in Marx's time. Marx, however, could already describe them very lucidly:

Since certain family functions, such as nursing and suckling children, cannot be entirely suppressed, *the mothers confiscated by capital must try substitutes of some sort*. Domestic work, such as sewing and mending, must be replaced by the purchase of ready-made articles. Hence, the diminished expenditures of labour in the house is accompanied by an increased expenditure of money. *The cost of keeping the family increases and balances the greater income*. In addition to this, *economy and judgement in the consumption and preparation of the means of subsistence becomes impossible*. [43, p. 193n]

In the final statement Marx makes a very important point. The exercise of «judgement in the consumption and preparation of the means of subsistence» has always been one of the main tasks of the *home manager* (usually a woman), and it is obviously even today not only of the utmost importance for a family, but also of high *political* relevance for the whole of society. This is an incomplete list of the tasks inherent to good home management:

- choosing food produced in certain ways,
- producing a part of the family-consumed food,
- selecting or discovering recipes and cookery methods,
- guaranteeing the home hygiene with the lowest toxic residua and water usage,
- saving energy in home heating and cleaning,
- reducing and selecting garbage,
- buying products from certain firms but not from others,

- keeping up to date on the relevant medical, economical and political information.

In this list I omitted whatever has to do with children education, or care for any disabled or old members of the family – needless to say, a very important component of home management.

Clearly to be a good home manager is a highly nontrivial task, and it should be economically supported, most conveniently by the introduction of a minimum guaranteed income.

On the other hand, it is all too easy to understand why this voluntary and “unpaid” activity has been and is being belittled and discouraged by the mainstream media – that is, ultimately, by those who own a business whose prosperity crucially depends on the mindlessness of their customers. Discrediting home management has been one of the main ideological targets of the big business, and a variety of “feminism” has been widely advertised by the mainstream media as a means to defame the traditional activity of the “housewife” as a silly and demeaning drudgery. One can only admire the ability of the mass-media ideology purveyors in emphasizing only the repetitive aspects of home management (particularly cleaning and washing), on one side, and – for instance – succeeding in making the work of an office clerk look glamorous, on the other. To appreciate this point it is useful to read a favourable description of what a clerk office is supposed to do each week in his or her best 40 waking hours:

Rather than performing a single specialized task, *general office clerks* have responsibilities that often change daily with the needs of the specific job and the employer. Some clerks spend their days filing or keyboarding. Others enter data at a computer terminal. They also operate photocopiers, fax machines, and other office equipment; prepare mailings; proofread documents; and answer telephones and deliver messages. [54]

While the conscientious performance of these tasks may give the satisfaction of a work well done to people with the right frame of mind, it is very hard to see in general the “liberating” nature of such an activity, which most of the times is done just «for money, [that is] for a thing which

has nothing whatsoever to do with the work itself», to repeat Engels's pithy remark quoted in section 7. Visiting any post office or bank branch is a sufficiently sobering experience for anyone having doubts on this.

The "modern" couple normally eats outside, which means that it implicitly defers to the judgement of others as far as food quality and preparation are concerned, and more generally relies on the false impression of acquaintance generated by frequent and unreflective exposure to advertisements to decide what should get into and over their bodies. The brainwashing has reached such an advanced stage that today most people when hearing the expression "home manager" think first of all of a computer program, not of a *person*. Of course nothing of the above is meant to imply that only or mainly women should take up home managing. By giving a suitable social recognition to this role, I would expect that many more men would *like* to play this role than it is common today.

In any case, it has certainly to be admitted that a society that has to consign children and old people into mercenary hands – very often, in Western Europe, the hands of immigrants from poor countries, the next big group enrolled in the labour reserve army – leaves much to be desired from the point of view of its level of civilization. That the emancipation of women had to be achieved by propagating an ideology which undermines family links, to the advantage of private entrepreneurship and GNP (Gross National Product), is proof enough of its having been engineered, to a considerable degree, to serve the interests of rampant capitalism.⁴³ True women's liberation is impossible without the liberation of all humans from the tyranny of the "profit for the few".⁴⁴

⁴³ «Seen from the perspective of capital investment, the reserve army of housewives constituted a source of cheap, docile labor that made the processing of information and people a profitable alternative to investment in factories devoted to goods production [...]» [23, p. 386].

⁴⁴ «The wrenching apart of the socialist and the feminist movement which occurred from 1914 onwards has meant that the dominant political emphases in the feminist movement became either to seek admission for an elite of middle-class women into the privileges of the

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Facets of Democracy: Integrating Energy, Ecology, and Economics

1. Introduction

Since the first papers by H. T. Odum ([41,42,43, 44], among others) using net energy concepts and systems thinking to explore alternatives to neoclassical economics and related monetary accounting systems, the mainstream disciplines of economics and ecology have dismissed the biophysical perspective under various critiques that rely on minor deficiencies, disregarding the big picture or – as Odum used to say – relying on the microscope instead of the macroscope. More important in this pioneering perspective is what Odum often pointed out... the fact that mainstream economics did not recognize nor understand the limitations (and opportunities) imposed by ecological realities on human economies [42].

He was not the only one, consider the writings of Schumacher [51] and Georgescu-Roegen [20]. What each of these thinkers were, in essence, contributing was not a fix to the existing market theories and monetary accounting methods, but instead a complete overhaul of economic theory that recognized and incorporated biophysical realities (i.e. what is now referred to by some as the “ecological economics” framework). Our experience in the academic and scientific arena was that even ecologically concerned economists have been somewhat reluctant to accept biophysical complements to monetary accounts or alternatives to willingness-to-pay valuing systems.

Neoclassical economics supports the vision that the complexities of the world’s market economies with their global integration and such things as collateralized debt obligations, derivatives, and so forth are not subject to thermodynamic limitations; and that the quantity of money can be increased indefinitely through the use of these economic instruments with little or no attention to biophysical realities. The resulting perspective is that growth is always possible, while instead, focusing on

ecological constraints and biophysical accounting of resources suggests that unlimited growth on a finite planet, endowed with finite resources is impossible and looking for unlimited growth is the express way to disaster.

It is quite evident from present actions of governments throughout the world who are displacing millions of people, degrading environments, waging wars and creating "economic instruments" for the continued control of countries and their resources, that the entire circulation of money and all the exotic human monetary inventions and ways of making more money, are ultimately driven by the very fundamental energetic principle that work cannot happen without an expenditure of energy. This energy comes in several forms, the non-renewable chemical energy of fuels and other mineral resources, and the renewable energies of the geobiosphere.

The G-20 Toronto Summit for International Economic Cooperation, June 2010, resulted in 48 resolutions on international economic cooperation. The second resolution was as follows:

Building on our achievements in addressing the global economic crisis, we have agreed on the next steps we should take to ensure a full return to growth with quality jobs, to reform and strengthen financial systems, and to create strong, sustainable and balanced global growth.

In the 27 pages of resolutions and annexes in support of those resolutions, the term "growth" was used 67 times and the terms "sustain", "sustainable", "sustainability", most often coupled to growth, were used 43 times. Even more telling, the terms "resource(s)" while used 17 times never once mentioned natural resources (only referring to *financial* resources), and the term "energy" was never mentioned at all. Of course we appreciate their effort on behalf of the people of the world as they try to "fix" the world economy. Yet, we are concerned that relying on the same old economic rhetoric and stimulus packages will not fix the problems, but could at this juncture create even more problems.

In light of the current global situation new perspectives on developing sound economic policy based on a biophysical

approach are urgently needed as suggested in the following paragraphs. A radical change in economic framework, one that is capable of quantifying direct and indirect unpaid contributions of nature to human economies, cannot be avoided. Economies rely on resources and services provided for free by the past and present work of the biosphere. Since such resources are not unlimited and since we cannot change the rate at which they are provided, economies are constrained in quantity and time and cannot grow without limits on a limited planet. Acknowledging the nature of these limits, and adjusting our expectations to them is a mandatory prerequisite for sound economic policy.

2. Methods

2.1 The Emergy Synthesis Perspective

In this paper we provide data in an accounting system, named *emergy synthesis* that incorporates both the monetary economy and the biophysical economy of the biosphere [44, 45, 5, 59]. We use *emergy*;¹ however, other biophysical accounting systems (e.g. Life Cycle Assessment, Exergy, Material Flow Accounting, Energy Return On Investment, Ecological Footprint etc.) would likely lead to similar conclusions about the environmental limits to growth.²

Emergy incorporates the environment by accounting for the work done by nature to generate resources (natural capital) and provide ecosystem services.

It expresses all resources on a common basis, in solar equivalents (abbreviated seJ, for solar emergy Joules), which makes the work of environmental systems and human systems comparable and analytical insights more comprehensive.

It recognizes that the economic system is a subsystem of the larger geobiosphere system that supports and at the same time constrains it by providing flows of energy and

¹ Originally from “embodied energy”, a term later on abandoned to also include environmental sources other than fossil energy.

² For analysis based on other systems and comparisons see [25, 26, 63].

material resources that often have no markets and cannot be valued using willingness-to pay.

The emergy approach has been criticized for being too complex, at times too general, at times uncertain, or not sufficiently developed, as was well elucidated by Hau and Bakshi [25] who also listed other well-known methods that shared similar weaknesses. In addition, Hau and Bakshi provided a well documented list of the strengths and promises of the emergy methodology and suggestions for improvement.

We feel however, we cannot wait until this method is “perfect” in the eyes of its critics to express our concern about the current monetary measures that are suggested as ways to boost growth again. Our analysis of global resources and economies includes measurements and metrics that other approaches do not. For this reason, it sheds light on directions for sound economic policy to face the current crisis and provides alternatives to the business-as-usual paradigm.³

2.2 The Biophysical Economy

The biophysical economic system is composed of flows of matter, energy, and information with counter-current flows of money as shown in Figure 1. The most striking difference between this depiction of the economy and standard textbook diagrams of economic systems is the driving energies and the environment that, in general, are completely ignored when one only looks at the economy as a circulation of money and goods and services between producers and consumers.

From a *biophysical* point of view, energy and other resources drive the circulation of money and no circulation of money is possible independent of resources. Thus in Figure 1 the circular economy is shown being driven by *flow-limited* renewable sources and *limited* storages of matter and fossil fuels.

Theories of the operation of the monetary economy hinge on the concepts of market, free agents who have

³ The readers interested in further details of the emergy method can refer to the above cited emergy literature as well as to [57, 58, 6].

preferences and are informed, and the concept of maximization of utility (consumers) and maximization of profits (producers). Often called *neoclassical economics*, the theories and concepts that explain the functioning of the monetary economy are concerned with prices and the “allocation of scarce resources among competing ends”. Within the confines of the monetary economy (i.e. the right hand side of Figure 1) these concepts and theories of how and why it works are accepted by many but also challenged by an increasing number of serious sceptics.⁴

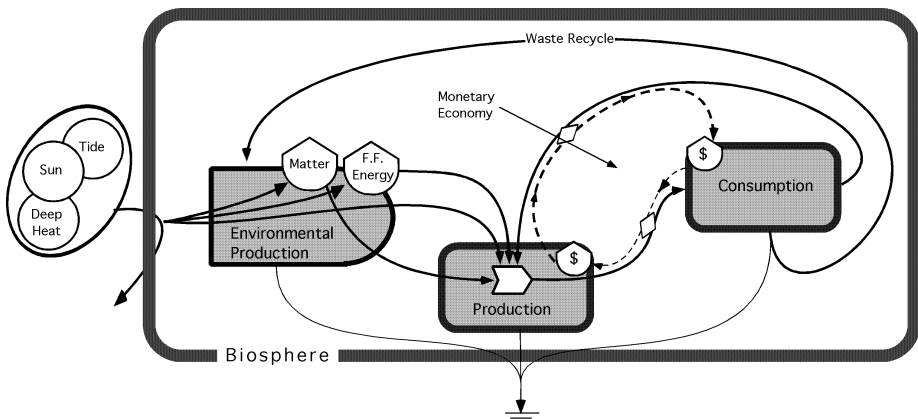


Figure 1. The biophysical economy. Economic production (center) is a function of renewable energy, materials and non-renewable energy from environmental production and an input of labor (information). The monetary economy represents about 84% of the total energy budget of the Earth (Table 1).

Whether neoclassical economics is right or wrong about markets and human behaviour, or whether it is incomplete or lacks good scientific underpinnings is not the issue; the fact of the matter is that it tries only to explain a portion of the overall economy... that portion that is dominated by human markets, and that it is independent of the other portions where resources are generated and cycled.

⁴ See for instance [8, 11, 24, 1, 23, 22,39, 40, 52].

3. Results

3.1 Evaluating the Biophysical Economy

The biophysical economy is composed of resource flows (in this paper, quantitative evaluation of resource flows in solar emergy equivalents) that are accompanied by monetary flows. Figure 2 is a simplified diagram showing the total emergy and money circulation in the global biophysical economy in 2008; data are given in Table 1. The left side of the diagram shows the environmental systems that provide life support and the biogeologic processes that produce storages of non-renewables and slow-renewables. Currently the renewable environmental portion of the global economy accounts for about 16% (15.2 E₂₄ seJ/yr) of the total emergy budget of the planet, with human released non-renewable resources accounting for about 84% (88.8 E₂₄ seJ/yr). Without continuous inflows of emergy in the form of matter, fossil fuels, and renewable energy, the monetary economy would come to a standstill.

While renewable emergy inflow to the planet has remained constant over the years, its share of the total emergy driving the geobiosphere has decreased markedly as a percent of the total (Figure 3). In 1900 the renewable emergy base of the world's economy was about 97% of the total use. By 1925 the renewable base had decreased to 87% of total use, and in 1950 it had comprised 48% of total use. Since mid-century, the emergy in non-renewable and slow-renewable sources released by humans has increased so that in 2008 non-renewable emergy use equaled 84% of total use and the renewable portion of the global biophysical economy equalled only 16%. Bear in mind, that the biosphere's renewable emergy has not shrunk, it has remained constant, the trend shown in Figure 3 is the result of the overwhelming increase in the use of non-renewable emergy within the human economy.

The monetary economy has increased in size since the industrial revolution and in the last 50 years has come to dominate the biophysical economy. The graph in Figure 4 shows the change in global emergy and Gross World Product (GWP) since 1900. In the early part of the 20th century non-renewable emergy released by humans was

small compared to the renewable flows of the geobiosphere (the horizontal line representing $15.2 \text{ E}24 \text{ seJ/yr}$). The "great depression" beginning in 1929 slowed the growth of non-renewable consumption for a few years, but World War II quickly made up for the slump. From the end of the war until about 1950 increases in non-renewable use rose at about 1% per year, but beginning in about 1952 until very recently the increase in use averaged about 3.7% per year, thus the doubling time was about 19 years. Beginning in 2003 the growth in consumption decreased to about 2% and in 2008, consumption of non-renewables actually decreased by nearly 1% as a result of contraction in the world economy.

GWP rose at the same rate as global energy use until the 1950s where it lagged a bit behind energy use. From the

Table 1. Emergy inputs to the geobiosphere including human released resources

Note	Inflow	Units	Quantity	UEV (seJ/unit)	Empower (E24 seJ/yr)
<i>Renewable Inputs</i>					
1	Solar energy absorbed	J/yr	3.59E+24	1	3.6
2	Crustal heat sources	J/yr	1.63E+20	20,300	3.3
3	Tidal energy absorbed	J/yr	1.15E+20	72,400	8.3
<i>Subtotal Renewables</i>					15.2
<i>Slowly-renewable Inputs</i>					
4	Soils	J/yr	2.05E+19	1.21E+04	0.2
5	Forest biomass	J/yr	7.50E+18	3.80E+04	0.3
6	Peat	J/yr	5.40E+17	5.70E+04	--
7	Fisheries	J/yr	9.36E+16	8.40E+06	0.8
<i>Subtotal Slowly-renewables</i>					1.3
<i>Non-renewable Inputs</i>					
8	Coal	J/yr	1.39E+20	9.09E+04	12.6
9	Petroleum	J/yr	1.98E+20	1.48E+05	29.3
10	Natural Gas	J/yr	1.17E+20	1.71E+05	19.9
11	Nuclear energy	J/yr	9.72E+18	5.40E+05	5.2
12	Calcium Carbonate	g/yr	1.28E+14	1.30E+10	1.7
13	Phosphate	g/yr	1.58E+14	1.28E+10	2.0
14	Selected Metals	g/yr	1.13E+15	1.59E+10	18.1
<i>Subtotal Non-renewables</i>					88.8
<i>Grand Total</i>					105.3

mid-1980s until the mid-1990s growth of GWP was roughly the same as increases in emergy use, about 3.5%. In the

first nine years of the 21st century, however, GWP has increased faster than global emergy use, at rates of about 5.6%.⁵

Since the emergy and monetary economies are linked, increases in money supply that are not accompanied by real increases in the supply of emergy result in inflation. Thus the difference between the rates of increase of emergy use and GWP represent inflation and since emergy use was increasing at about 3.7% during 2000-2007 and GWP was increasing at 5.6%, the difference of 1.9% represents inflation.

The continued increase in GWP in spite of the abrupt change and apparent decline in world use of non-renewable emergy in 2008 is an important sign of what we believe is driving the current world economic crises and should be cause for serious concern on the part of world leaders. Should non-renewable energy and resource consumption remain level or decline and world economic leaders continue to increase money supplies, under the false notion that priming the economic pump will restart global economic growth, the result will be large scale global inflation. It remains to be seen if inputs of non-renewable energy and resources can be increased to match growth expectations of global economies. Overall, the economic policy needed is to match money supplies to resource availability... if resources increase the money supply can be increased, if they decline, the money supply should be decreased. In this way we can avoid the inflation that results when money supplies increase faster than resource inputs and more money chases scarce resources.

⁵ Aggregating the 144 economies of the world into one world economy hides the fact that some economies were not growing in the first part of the 21st century (much of Europe) while others were actually growing at rates equal to or greater than 10% (India and China). This fact does not deny the validity of our concerns since most of the growth these countries experienced was in support of the high standard of well-being of the west (displaced western growth).

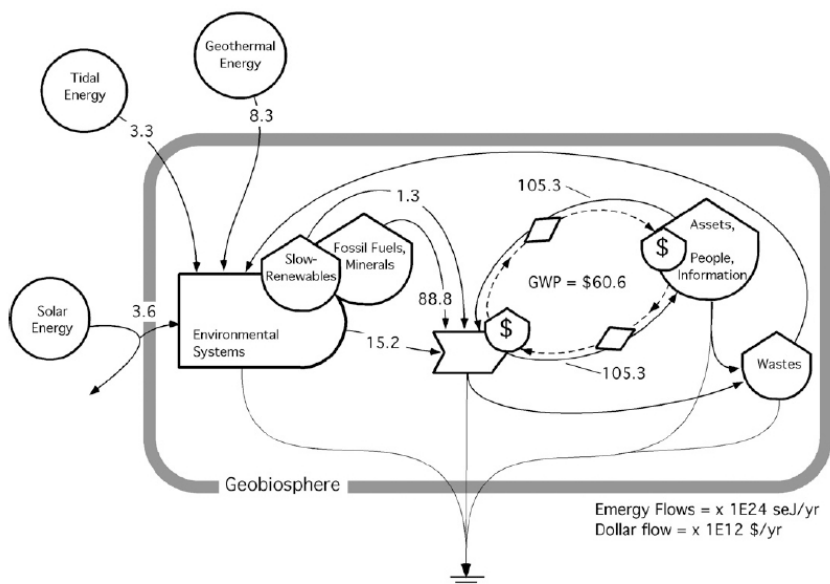


Figure 2. The global economy. The monetary economy (measured by the Gross World Product [GWP]) is driven by the environmental renewable, slow-renewable and non-renewable energy. In 2008, total energy flow supporting the monetary economy was 105.3 E24 seJ/yr and the GWP was \$60.6 trillion.

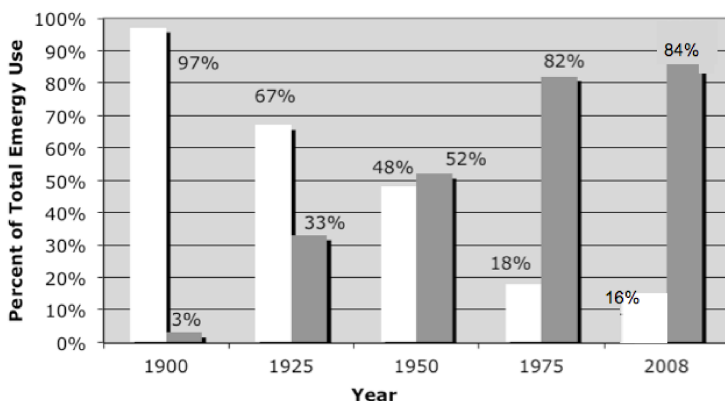


Figure 3. The changing percentage of total energy (em.) use from renewable and non-renewable sources beginning in 1900. White = renewable em., Gray = Non-renewable em. While 97% of global production was based on renewable em. flows in 1900, today approximately 16% of total em. use is from renewable em. sources.

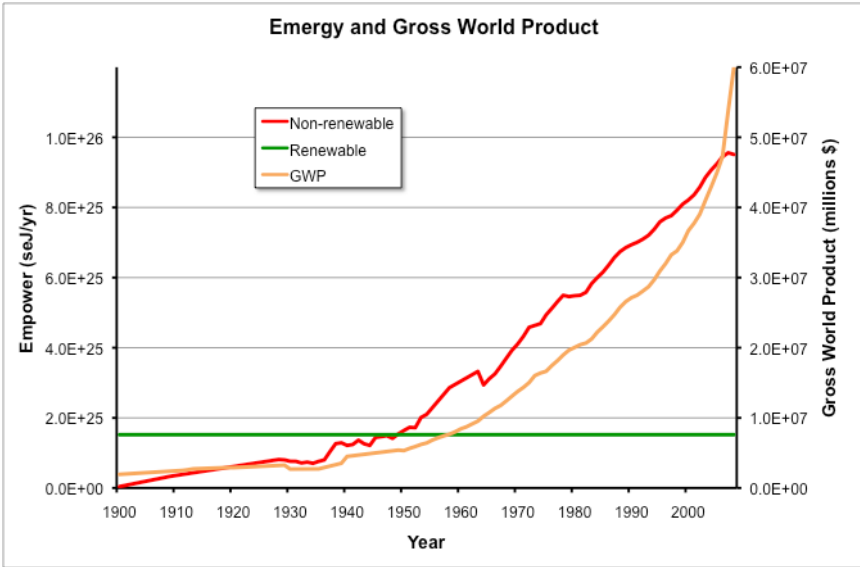


Figure 4. The growth of global nonrenewable energy use and Gross World Product (GWP) since 1900. The renewable input to the Earth is constant. GWP data are from [36]. Historical energy use obtained from [3], historical metals production from [60]. Metals data were to 1932, prior data generated as a constant percent increase from 1900 estimates.

3.2 Global Inflation

Figure 5 is a graph of the ratio of global energy use and GWP (expressed as dollars) from 1970 to 2008 showing the general decline in the energy /money ratio. The decline is the result of increases in the global money supply without a corresponding increase in the world energy supply. In essence it is inflation, however since the energy supply has been increasing, the reason for the inflation is that the countries of the world are increasing the money supply faster than the increase in the available energy. Countries do this by creating “artificial money” using such methods as deficit spending, revolving lines of credit, or just printing money to boost money circulation. The steep downturn of the nonrenewable energy in Figure 4 beginning in 2006 may be evidence that the energy supply has reached its

maximum availability as the economic recession did not occur until late 2007 or early 2008.

One conventional way of trying to control the economy when there is a slow-down is to increase the money supply in order to increase demand (Figure 2), which will theoretically increase the inflow of resources and energy that drive the system. In the past when resources and energy (i.e., the global energy resources) were plentiful, this strategy worked (i.e., the great depression, and several recessions since then), however it failed in the early 1970's following the oil crisis when the OPEC nations restricted oil production. In that case, the increase in money supply without a corresponding increase in energy resulted in double-digit inflation in many countries and what was termed "stagflation" by many economists in the USA. Having never occurred before, stagnant economic growth with high inflation can be easily explained from an energetic point of view, but baffled many as the increases in the money supply did not work to jump-start the economy as it had in the past.

If energy supplies are indeed limited and overall availability is declining, then attempts by national governments to grow by "stimulating" the economy with increases in the money supply, will only result in a re-occurrence of the stagflation of the early 1970s. It may be time to realize the resource constraints on economic growth and begin now to reorient economic theory to more fully recognize biophysical realities.

4. Discussion

4.1 Resources are Wealth

The wealth of a nation, as was well recognized in the past by Adam Smith and others, is its resource base. In the distant past when populations were small and the extent of human use of the environment was negligible compared to the size of the environment, wealth consisted of a nation's forests, soils, fisheries and the water and sunlight falling on its landscape.

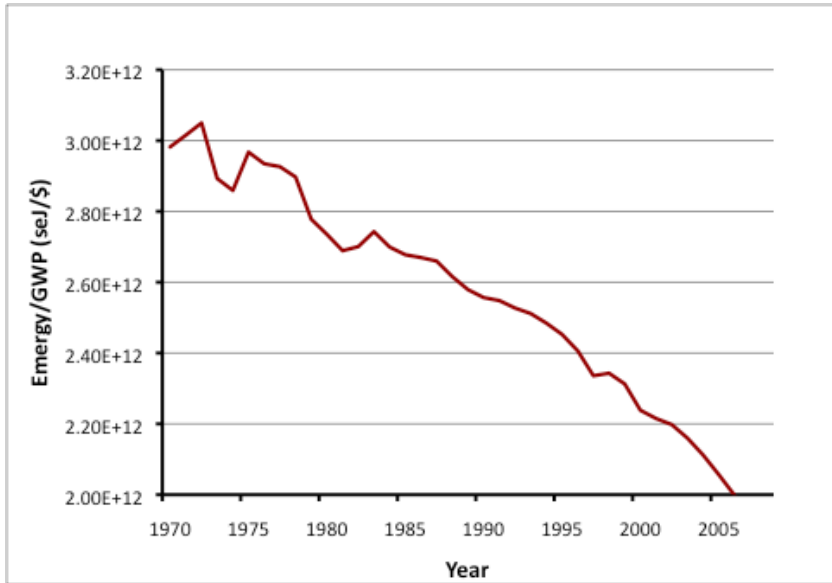


Figure 5. The change in Energy per dollar value of GWP since 1970. The "value" of a global dollar decreased from about 3 E12 seJ/\$ in 1970 to about 2.0 E12 seJ/\$ in 2006, or a decline of about 33%.

As the fossil fuels increased in amount and came to dominate the energetic base of economies, they allowed the exploitation of mineral resources, which synergistically increased the use of the fossil fuels and in the long run diminished the importance of renewable resources. They were replaced by the energy intense use of non-renewables and in the words of Odum [41] reflecting on the agricultural green revolution... our «potatoes are partly made of oil».

The wealthy nations have been, are, and likely will be, those that have the power and the ability to secure through various means and political influence, raw resources to drive their economies. History is full of examples beginning with the Roman Empire and continuing through the present, where lands were invaded for resources and strategic minerals (although other non-military wars, most often much more effective, keep being fought to control markets, investments and banking systems) [18]. Today the invasion of Iraq and the continued occupation there and in Afghanistan was driven by the rich resources that each

country possesses. We believe that strategic planners recognized the importance of resources, yet it seems to go unnoticed by economic planners.

Since money and energy/resource flow in opposite directions (Figure 1), the use of monetary flows to make public policy and decisions regarding the future of a country is in reality looking at the world backwards. Frequently, sound economic advice in resource rich nations recommends the selling of raw resources and the importation of finished products. Yet under such even monetary trades, the resource exporting country always loses, sending out far more wealth than they receive in finished products. Continuing uneven energy trades at the expense of the developing countries of the world is a recipe for global instability because it keeps the majority of the world's population in poverty while the west tries to live an unsustainable lifestyle.

Resource throughput is central to the welfare of human economies yet this is only true if the effort to get the resources is small compared to the return. The concept of net energy (equal to energy of resources delivered by a process minus the energy of resources invested) is central to understanding what can and what cannot be done with resources in relation to human development and sustainability. The ecological concept of "net production" is widely used as a measure of overall development potential in ecological systems. Key to identifying when growth diminishes and eventually stops is when costs of sustaining system processes increase and eventually equal those of productive processes. The same concepts apply to human dominated systems; when the resource costs of sustaining inflows of new resources (of any kind, not only energy) exceed the return from these new resources, growth stops. Societal infrastructure was built by, and its metabolism is still driven by, a high net yielding resource base that is unlikely to be available in the future.

A typical case is the oil and minerals that drive our economies. In the past decades their net contributions were large, reflecting the fact that they represented millions of years of concentration of biosphere energy. As the easiest and most abundant resources have been exploited, the net

yields are declining. Figure 6 shows the decline in the average Energy Yield Ratio [EYR= (emergy exploited + emergy invested)/emergy invested] of the USA energy sources since the mid-1900's. As the EYRs from these resources continue to decline, their net emergy yields, i.e. the resources actually exploitable, also decline (consider the costs of the recent BP oil disaster in the Gulf of Mexico and other similar events as further erosion of the net yield of oil) so that growth must slow and stop. Trying to grow the economy when the driving energies are declining will result in inflation equal to or worse than the inflation of the 1970's during and following the oil embargo.

4.2 The false promise of renewables

While there is much talk of "peak oil" lately, there is little analysis and review of the declining net yields from fossil fuel energy sources that drive our economy. As these limits are felt throughout modern economies, society looks to alternative sources; wind, waves, tides, solar, biomass, bio-ethanol, etc. Renewable energy sources, up to now, have lower net yields than fossil fuels and thus provide false promises to those who are looking for business as usual at the end of cheap oil. It is imperative that the net contributions of proposed new energy sources be evaluated and all costs included.

Many of the so-called renewable energy sources are actually consumers of fossil fuels. Take for instance the proposed bioethanol and biodiesel programs, where evaluations over the last decade continue to show net emergy yields of less than 2 to 1 (see for example: [21, 56, 49] among others) and confirm similar evaluations of energy return on investment (EROI) [47, 26].

The graph in Figure 6 is a weighted average of EYRs of the different energy sources in the USA, but it is confirmed by studies worldwide. Biofuels EYRs typically are less than 2 to 1 [56] and same applies to silicon photovoltaics⁶. Other

⁶ The energy-based EROI of photovoltaics was calculated in the range 3-10 with potential for improvement [17, 26], while EYR of photovoltaic is still close to 2:1. A low EYR does not deny that more energy can be obtained from PV modules than was invested in technology, but instead focuses on the global investment of resources

more traditional renewable energies show higher EYRs, for instance hydropower, geothermal and wind range up to 5 or 6 to 1 in other cases investigated [4].

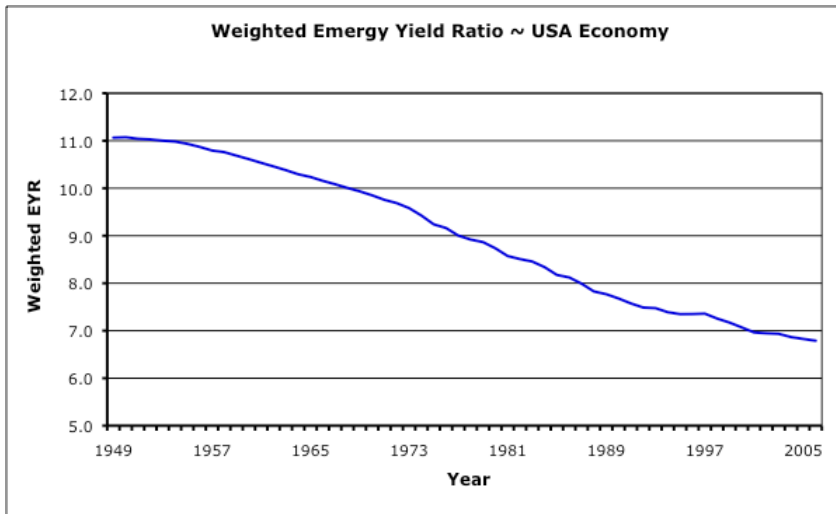


Figure 6. The change in the combined emergy yield ratio of non-renewable energy sources to the USA economy from 1949 to 2006. Assumptions to create the graph are as follows: emergy yield ratio of coal began at 18/1 and declined at a rate of 3.8% per year to end in 2006 at 7.8/1. The emergy yield ratio of natural gas began at 9/1 and declined at a rate of 5.1% per year to end in 2006 at 6.1/1. The emergy yield ratio of petroleum began at 18/1 and declined at a rate of 11% per year ending in 2006 at 7.73/1. The emergy yield ratio of nuclear has remained constant at 4.6/1. Hydroelectric emergy yield ratio has remained constant at 10/1. The emergy yield ratio for geothermal began in 1960 with a net emergy of 2.66/1 and increased at a rate of 6% per year. Solar PV systems began showing input to the US economy in 1990 with a emergy yield ratio of 1.0 and have increased by 3.0% per year since then up to about 2/1. Wind energy began inputs to the US economy in 1999 with a emergy yield ratio of 8.0/1 and increased at a rate of 8.0% per year from that time, ending in 2006 at 8.6/1. The emergy yield ratio of biomass in 1949 was estimated as 2.0/1 and has increased at a rate of 3.2% per year to end at 3.82/1 in 2006.

(emergy: water, minerals, fuels, environmental services, land, labour and information) that are also needed to reach the result and points out that such investment is not negligible. These resources are supplied by the society and must be accounted for as unavoidable investment costs, diverted from other potential processes.

The problem is that their large-scale implementation is offset by several constraints, the most significant of which is the fact that areas suitable for dams and wind farms are limited. The hydropower industry suggests that the maximum potential hydropower development worldwide will increase total hydroelectricity production only threefold [31]. The most optimistic projections for wind electricity suggest it will produce only 6.6% of total electric demand by 2050 [62].

The International Energy Agency (IEA)'s most optimistic projections for the year 2050 ([27]; so-called "Sustainable Development Vision") foresee a doubling of total energy consumption, of which fossil fuels comprise 54.1%, nuclear 11%, biomass 15.7% and other renewables including hydropower 18.9%. These correspond to growth rates of 480% for nuclear energy, roughly 150% percent increase in biomass use, and 370% growth of other renewables. There is a corresponding 34% decrease in fossil fuel use. The next IEA 2008 [28] baseline scenario confirms the more than double energy consumption, in support of the "expected growth in global economic activity in the next forty years". According to that scenario, not taking action would mean that coal would become the dominating fuel (37% of total primary energy use in 2050) and that the global 2050 CO₂ emissions would reach 62 Gt compared about 14 Gt released in 2005. Oil share would decline from 35% in 2005 to 27%, natural gas from 21% to 20%, nuclear from 6% in 2005 to 4%, and other renewables would decline from 11% to 10%, with hydro remaining constant at 2%. Innovative scenarios (ACT and BLUE) are suggested by IEA, with decreased reliance on fossil fuels (45-59% less than in baseline, although with 34% more natural gas) and increased reliance on nuclear (more than 100% increase, up to about 12% again as in IEA 2003 [27] scenario) and biomass (about 300% more than in 2005) and other renewables (also more than 300% of 2005). IEA (2008) also estimates that the additional investments needed in the energy sector would be about 2005 USD 17 trillion between now and 2050, «on average around 400 billion per year, roughly equivalent to the gross domestic product

(GDP) of the Netherlands, or 0.4% of global GDP each year between now and 2050» [28].

The scenario by the IEA (2003) was produced borrowing from a scenario at the International Institute of Applied Systems Analysis (IIASA) for the Intergovernmental Panel on Climate Change (IPCC) [32]. It assumed growth as essential and that it is possible to achieve simultaneously:

- energy security,
- climate mitigation,
- energy access,

with appropriate policy interventions. The IEA (2008) scenario confirmed the same basic assumptions. The major question here that begs to be answered is how can these impressive increases in the growth of nuclear, biomass, and renewables be sustained on declining net energy of fossil fuels and the low net yields of the renewables themselves. In addition, there is increasing concern and in some cases, outright rejection by populations regarding nuclear, large hydro-dams, large wind fields and the use of arable and forest land for biofuel production. While some may question these concerns, they are likely to have an effect on future energy policy, by slowing development or requiring additional expenditures of energy to offset environmental problems, thus lowering even further their net yield.

Overall, the entire installed power of renewable electric production systems is so small that it is hard to imagine the huge increases that are needed to meet the IEA's Sustainable Development Vision. Put in numbers, the current and projected contributions of wind, tidal, wave, geothermal and biomass energy are as follows:

- 1) Installed wind power is 0.16 TW worldwide translating into a total wind electricity production of 0.03% of world-wide energy consumption [62]
- 2) Total installed tidal power is 0.3 GW which translates into less than 0.002% of world energy use and the best estimates for future energy production are only 0.2% (a 100 fold increase) of current world energy use [34].
- 3) [37] estimates that a total wave power of 0.5 TW can be exploited with the existing technology, which, assuming a

37.5% capacity factor equals about 1.25% of current world demand for energy. However, at present there are no commercial wave power plants operating worldwide.

4) Present installed geothermal electricity production is 10.7 GW or 0.05% of world energy demand [2, 19], assuming a capacity factor of 75%. The potential geothermal production has been estimated between 2.3% and 13% of current world demand for energy.

5) [35] estimates that global biomass use in 2001 was 14% of total global energy use. This figure includes traditional fuel wood, electricity from wood and municipal waste combustion, and other miscellaneous uses. Their estimates for the future use of biomass decrease to 11% in 2020 due to increased recycling and increases in total energy uses.

In summary, the false promise of renewables actually has two related parts.

The first part is whether there is sufficient net yield from renewables to drive growth or even a steady state economy without fossil fuels.

The second is whether there is enough renewable energy on the planet to drive our complex techno-industrial society.

We have shown that most renewables have very low energy yield ratios [5], that those that have higher yields are limited by the availability of potential sites and by the quantity of energy that might be generated, and finally that growth always generates non-negligible environmental impacts. Thus, in reality, the concept of "sustainable growth" on renewable energy sources is a false promise that, if pursued, can only add to the economic and environmental catastrophes that are beginning to appear.

4.3 Beyond quantity

As long as the dominant economic paradigm is neoclassical economics, then the only course for human civilization is to grow its economy, to grow its population, to grow its consumption, as growth is the first, second, and third commandments of the current economic paradigm that insists that human well-being and happiness is linked to increasing income. No amount of tinkering with neoclassical economics can change it into a paradigm that can do

without growth. We need an economic paradigm shift, a new paradigm that can accept as a major tenet that *continued growth is undesirable and untenable*.

Having been taught that “more is beautiful” and “quantitative growth is good”, we are hardly able to conceive other values (community values, clean and healthy environment, democracy, shared goods, community care of the young and the elderly, satisfactory relations, and tasty food). The future can still be about growth, but according to other parameters and different measures of wealth. Such changes must be accompanied by appropriate policies that recognize new values as the basis for qualitative, not quantitative growth. We cannot achieve sustainability without redefining and redirecting human wants in ways that are less consuming of natural resources. Since not all wants are needs, it may even happen that in the transition some wants are not fulfilled.

As surprising as it may be, we do not have a word to specifically refer to qualitative growth. As a consequence, the previously proposed terms always bear some “negative” meaning as *de-growth* or *way-down* or *down-sizing*. We also need a semantic revolution to become aware that words are not neutral and have a built-in judgement of value according to the dominating paradigm. An effort is needed to find not only a new thermodynamics and a new economics of sustainability, but also a *sustainability discourse*, i.e. a new mode of organizing knowledge, ideas, experience and language around shared values based on qualitative growth.

4.4 Sustainability and equity

Finally, it must be pointed out that while quantitative growth is by definition only possible for a small fraction of humankind, qualitative growth is in principle achievable by all and its fulfillment by some is not an obstacle to others. However, in the transition from a quantity to a quality-based growth, we will also have to address the question of how to adjust the current consumptive way of life to make things more egalitarian between the haves and have-nots. Qualitative growth does not fully address this disparity. How do we address it in a way that is sustainable? We need a

sustainability discourse that questions the current supply side economic notion that by growing, affluent societies help the poor i.e. if we get richer, there will be more leftovers for the poor... the trickle-down theory of welfare economics.

While still growing, world economies keep consuming natural capital and ecosystem services. The growth of population, GNP, number of cars and roads, built environment, food production, number of cell phones, etc., worldwide involves increased extraction and burning of fossil fuels, increased mining, increased soil erosion, increased movement of sediments from land to oceans, increased deforestation, fishing, air and water pollution, decreased biodiversity,... and increased number of environmental refugees, increased political instability worldwide, and finally decreased democracy and respect of human rights in those countries where resources are extracted for export to wealthy countries. How long can this last?

5. Conclusion: growth is not the answer

We worry that the dominant economic paradigm, so fixed in the minds of world population, will result in a politics of "growth at any cost" which can easily translate into further escalations of world tensions. The prevailing world-view of many in the west seems to be that the only way to deal with the current global economic and environmental problems is to intensify the patterns of production and consumption that have produced them. Are we destined to blindly follow the path of many post-hunter-gatherer societies that experienced a period of rapid increase in resource exploitation and population growth followed by an equally rapid economic and ecological collapse [54, 10, 55]?

The problem is not just resource availability, nor is it finding another energy source. The problem is the "business-as-usual" perspective. The environmental, social, and economic consequences of unlimited cheap energy might be even worse than limited fossil fuels. Our fascination and addiction with continued growth may have unbelievable consequences in the long run. Faced with the possibility of unlimited growth, and its coupled consequences, one can

only hope that we fail in our attempts to solve this current crisis so that our focus will turn to living within the planet's carrying capacity. Some suggest that this will happen, no matter what, and thus the real issue is if we want to be part of the solution or continue to be the problem.

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Labels

BP: British Petroleum

EIA: Energy Information Administration, US department of Energy

FAO: Food and Agriculture Organization of the United Nations

IEA: International Energy Agency

IFG: International Forum on Globalization

IPCC: Intergovernmental Panel on Climate Change

WWEA: World Wind Energy Association

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3. Martin Walker

Global Corporatism: An Enemy of Choice and Democracy

I want to start with a quote from Alex Carey, an Australian academic, a lecturer in psychology and industrial relations at the University of New South Wales. Carey died in 1988 and since his death his writing and ideas have been supported by some leading radical academics, including Noam Chomsky who wrote the Foreword to his posthumously published book, *Taking the Risk out of Democracy – Corporate propaganda versus freedom and liberty*. Chomsky takes the following quote from Carey as being fundamental to his work:

The twentieth century, has been characterised by three developments of great political importance: the growth of democracy, the growth of corporate power, and the growth of corporate propaganda as a means of protecting corporate power against democracy.

This short essay is a rough guide to the growth of corporations, changes in marketing strategies and the growth of public relations (PR) companies.

The modern global corporation has developed over a century and a half and in this time, it has changed radically. Most of the changes have taken place in the area of what they call the defence of the competitiveness of corporations.

While you should keep clearly at the forefront of your minds the strategies of multinational pharmaceutical companies and their attacks on cheaper, more effective, less toxic “alternatives”, I want you to see the issue of competitive PR and marketing in relation to many other environmental phenomena such as the advent of mobile phones and mobile phone masts. Perhaps the guiding principle on our thoughts about these things is the fact that the modern capitalist economy can only continue with advancing science and technology, regardless of the safety and health of the individual.

In my work I have always tried to link the threats to health of allopathic medicine, with the threats to health of

corporately produced environmental toxins, principally because the same crisis PR strategies are used to promote both groups. However, there is a serious problem here with the unity of our side. While two erstwhile journalists like George Monbiot and Ben Goldacre both on the *Guardian* will argue about mobile phones, GM crops and global warming, neither will defend alternative medicine. For reasons that we shall probably never know, both refuse to use their investigative resources to defend complementary and alternative medicine (CAM). My guess is that they both think allopathic medicine is good science and they are against alternatives because they think there is no science there — in other words, they have bought the lobby position, a perspective on “corporate science” which is quite different from “science”.

We must be heavily opposed to the misinformation that stems from *all* corporatism — corporations survive on misinformation and we have to do our best to link misinformation about the environmental causes of cancer for instance, with the misinformation about alternative medicine. We have to understand it all as support for corporate competition in various markets.

The whole point of competitive PR, is while getting a product accepted as the gold standard for both efficacy and safety, you create a body of opinion, some would say a *ghetto* of opinion, that without any evidence makes the opposition out to be worthless, ultimately a fraud or even criminal.

In the early days of modern capitalism there were fair trade regulations which attempted to some extent to stop large companies from attacking the products of smaller and newer alternative companies. Of course all that has gone with the growth of corporations and cyclical economic crises, today's large multinational corporations have built in resistance to any kind of competition. In the beginning, or rather at its height of social “balance” in the 1950s there was a feeling that capitalism could be fair.¹

¹ In fact capitalism could never be fair, based as it is on surplus value. A circumstance where the labourer produces a product for a certain cost but is only given a percentage of that value as wages, while the surplus

Historically the same strategies have been used to defend both establishment views in medicine and toxic production. The war against homoeopathy began while Hahnemann was still alive in the first decades of the nineteenth century and the defence of toxic industry was well under way by the century's later decades.

Henrik Ibsen wrote his play, *An Enemy of the People*, in 1882. It presented a blueprint for industrial marketing strategies at that time and, to an extent, even today. The play is amazing in its modernity, Ibsen took an environmental crisis in a small town, where the water of a new and very profitable spa baths, had become polluted with waste from a nearby tannery. Even in his choice of a tannery, Ibsen had been remarkably prescient because tanneries crop up frequently in many modern public health crisis, their waste and the chemicals used in their process being highly carcinogenic.²

In Ibsen's drama, Dr Thomas Stockmann is the Medical Officer of Health in a coastal town in Southern Norway. His brother, Peter Stockmann, is the town's Mayor, Chief Constable and Chairman of the Municipal Baths' Committee.

The new health giving spa baths were the idea of the doctor, but it was Peter who sought the support of the business community in order to set them up. It is the hope of Peter that the Baths will raise the standing of the small community, attract tourists and make good profits for those in the business community who have supported the project.

A short time into the play we find that Dr Stockmann has studied the state of this water and its effect on health for some six months. His clinical-epidemiological-type study began after he had seen a number of patients suffering from stomach complaints during the last summer. However, Stockmann does not have the sophisticated equipment to analyse the water and has sent samples to a lab. The outside analysis proves what Dr Stockmann had suspected, that effluence from the tannery, one of the town's major commercial interests, had leached into the town's water

is marker up as profit to be paid to company, non-essential non-producing personnel.

² For just one example see [1].

supply making it a danger to drink or bath in.

In the first flush of reading the analysis, both Dr Stockmann and his friends feel very pleased that in compiling a report of the public health crisis he has struck a blow for public health. Ibsen lays on the naive irony with a trowel, the idealistic friends imagine that the discovery of a public health crisis will bring greatness rather than odium to its discoverer.

The majority of the play from then on details how Peter Stockmann schemes to diminish Dr Stockmann's science and create a body of opinion in the community which attacks Dr Stockmann. In one of the first scenes, Peter Stockmann uses all the wiles of ardent capitalists, with which we are so familiar in the 21st century, in an attempt to suppress the Doctor's report.

First he accuses his brother of using intemperate language in the report. He then expresses amazement at Stockmann's suggested solution – the building of a sewer in the toxic area followed by the relaying of all the water pipes. Peter Stockmann tells his brother that not only will the work cost between forty and fifty thousand pounds but it will take at least two years. He makes clear to the doctor how the Baths will have to shut while this work goes on and how consequently the town will inevitably lose money. He expresses the opinion that closing the Baths for this period would be a public relations disaster, no one – he maintains – will ever want to come near the town again.

Within a very short time, Peter Stockmann is accusing his doctor brother of wanting to ruin the town, he forcefully pursues the argument that the Baths' committee should wait for a period until they have the money to make some modifications to the water supply. Dr Stockmann responds angrily to this self-seeking and dilatory strategy. He accuses his brother and the committee of perpetrating «a fraud, a trick, a lie! An absolute crime! Not only against the public but against the whole notion of a civilized society». It becomes apparent later that Dr Stockmann is convinced that a civilized society can only be based upon truth and openness and that those who conceal evidence of a danger to public health are simply criminals.

After the two brothers have almost come to blows over the matter, Peter Stockmann, the "responsible civic authority", makes his position clear.

It's absolutely vital to me that your report shouldn't go before any committee. In the public interest, it's simply got to be withheld! Then later on, I shall tactfully bring the matter up for discussion, and we'll do the best we can – quietly. But not a whisper, not a hint of this unfortunate business must leak out to the public!

Dr Stockmann: But don't you understand? - the source is poisoned, man! Are you mad? We're a health-resort and we're selling dirt and disease! Why, the whole of our flourishing social life's founded on a lie!

Peter: Sheer imagination, or even worse! The man who can make such vile suggestions about his own town is nothing but an enemy of the people!

Peter Stockmann persuades the local newspaper not to publish the doctor's report. When Dr Stockmann tries to get the printer to publish his science as a pamphlet, the printer refuses. He tells them he will hire a hall and call a public meeting; he is told that no one will rent him a hall, and even if he did find one, no one would turn up. Finally he says he will march through the town and read his report out loud on every street corner; he is told that no one will march with him.

The play culminates with a mob, incensed by Peter Stockmann's message that Dr Stockman is a threat to the village, attacking Dr Stockman's house and stoning his surgery. In the morning as the Stockmann family is discussing the idea of leaving the country a letter arrives from their landlord evicting them from the house. Later that morning Dr Stockmann's daughter returns home early having been dismissed from her job as a teacher.

Ibsen's play is a superb piece of political analysis of an environmental health crisis and a threat to profit and competitive marketing "covered up by economic interests".³

³ If anyone wants to read my comparison between the campaign organised against Dr Stockmann and more recently Dr Andrew Wakefield who questioned the safety of the MMR vaccination they might want to read [3].

It stands as well today as it did at the end of the nineteenth century, however, if we want a thorough contemporary analysis, three factors have to be added: the Corporation, globalisation and the specific role of "crisis PR intervention".

I don't want to spend a long time analysing these three factors but really just want to make you aware of them. Because, in the case of globalisation, the attacks on homoeopathy and on those who oppose vaccination for instance are presently taking place all over the world. Globalisation was brought home to me forcible recently when I met with an environmental health scientist who told me about her work in India where she had been working on high levels of radioactivity in the water of two north Indian states. She said that corporate scientists had conjectured that the high levels of radioactivity in the water might have something to do with Radon, the "natural" radioactivity given off by rocks in some environments. This reminded me of one of the explanations given by Sir Richard Doll, the world's greatest dead epidemiologist, for the leukemia cohorts around nuclear power stations.

I told the scientist about my work on Doll and that I had exposed the fact that for ten or fifteen years, he had been receiving payments of £1,000 a day whenever he parroted pronouncements on behalf of Monsanto. My companion thought that this was an interesting story and then said, "Yes, Monsanto controls the livelihoods of these two northern Indian states I have been working in. They gained this control by the introduction of GM crops".

This is not to say that Monsanto and the radioactivity are connected, simply to make us aware of how common and how taken for granted are the international bonds in the globalisation of this period.

The element of crisis PR company has now added a whole new dimension to the cover-up of environmental toxic crises and the protection of pharmaceutical and chemical company competitiveness. In *An Enemy of the People* the major stockholder and the Chairman of the company, Peter Stockman, deals with the crisis on his own. This isn't just a dramatic mechanism, although it is true that to dramatise

something, you often have to make it personal. In reality however this was essentially the case up until the 1960s, when corporations and their boards that were getting into trouble, like the asbestos industry, set up Foundations and Institutes that carried out sympathetic research with sympathetic results to support those corporations.

In the Sixties, the work began to be handed over to PR companies and in the later part of the 20th century, a whole new industry of crisis PR grew up. This industry was solely concerned with the production of "good news stories" about dodgy products. Later, along with the good news stories grew the bad news stories about alternatives that threatened the competitive base of the industry. In medicine and public health, this growth began defending pharmaceuticals in the early Sixties with thalidomide and then began attacks on alternatives in the mid-1980s. It is almost solely concerned now with attacking alternatives – because 60,000 deaths from Vioxx⁴ and such like cannot be defended even by the best crisis PR.

The PR industry began to turn the corner between promoting ostensibly good products and defending products known to them to cause harm, after the productive drive following the 2nd World War. The novel, *Days of Wine and Roses* [6] by David Westheimer published in 1962, was later turned into a film starring Jack Lemmon and Lee Remick. The central story is about two lives ruined by alcoholism. Joe Clay, the leading male character, works in public relations and when he is introduced to his partner's father the following exchange takes place:

"What kind of work do you do, Joe?" Kirsten's father asked.

"Public Relations", Joe said.

"Public Relations?"

"Well, I suppose you'd say my job is to sort of help any client to produce a public image". Joe said earnestly. "In other words, let's say my client – X Corporation – does something good of benefit to the public, or which could conceivably be conceived as being of benefit to the public.

⁴ The arthritis drug Vioxx has been responsible, even by the most conservative estimates of 60,000 deaths by heart attack. Vioxx is not the only drug to effect this kind of mortality rate in the last two decades.

My job is to see that the public knows about it”.

Arnesen pondered Joe's explanation for a moment. “And what if this corporation does a bad thing?” he asked gravely.

Joe laughed uneasily and looked at Kirsten. “Well theoretically they don't. I mean, theoretically my job is to help them think of ways to operate so the public will... you know... approve”.

Arnesen turned to Joe. “Your X Corporation”, he said “what if it doesn't listen to you and does a bad thing?”

“If it did happen, I guess I'd have to try to make it look — well not so bad”.

Arnesen frowned slightly and Joe rushed on.

“I mean there is more to it than that”, he said.

“That's like telling a lie”, Arnesen said. “I don't understand that kind of work”.

“I think that you understand it too well, Mr Arnesen”, Joe said ruefully.

The crisis PR industry was stretched for the first time, after the 2nd World War with the publication of Rachel Carson's book *Silent Spring* in the 1960s. The producers of DDT organised a massive campaign that accused Rachel Carson's of many things — that she wasn't a scientist, which she was, “a natural scientist”; that she was helping the communists destroy the US economy; and while Carson became a household name, beneath the surface was a steady flow of propaganda about her sexuality.

The crisis PR industry has changed the nature of competitive marketing almost beyond recognition. Who would believe that the pharmaceutical companies would now have at their beck and call whole ghost armies – individuals, given a quick training and then paid by PR companies, to write ludicrous comments on the internet against everything from homoeopathy to Dr Andrew Wakefield and MMR vaccination.

Major toxic corporations have skewed the debates about toxicity and have skewed post-industrial democracy by creating a third force, third in the sense that it stands between those who organise and administer the production of drugs and chemicals and toxic agents and those citizens

and their organisations who have serious scientific objections to this production of toxicity. Unlike Ibsen's mob, which is clearly identifiable and out there in the public domain, these new progenitors of misinformation are hidden and camouflaged. This third force, is made up of lobby groups, disguised by both name and structure, such as "Sense About Science" (a bogus charity), and far from having anything to do with science they are entirely organised to attack alternatives. And it is made up of PR paid individuals, who spend their lives putting comments on blog sites, breaking up meetings and performing infantile demonstrations to disprove homoeopathy etc. [4].

Looked at with an unpracticed eye, these "campaigners", "commentators", and concerned people with a science background, appear to be a genuine part of society with serious intellectual arguments in favour of toxic chemicals, deadly allopathic treatments and against alternatives. In reality they are simply mercenary information outputers for large corporations. Of course there will never be any regulation of this form of marketing, in fact things are going in quite the other way, with those who write personally about adverse reactions and tell personal stories about medical catastrophes being censured in the press and with deep murmurings about them being censured on the internet [4].

The role and structure of the corporation has changed radically over the last hundred years. Most of us still have this image of the corporation as a tall building organised by floors, the power residing at the top and each floor filled with workers.⁵ At its base a steady stream of workers, sally forth into the city to sell the corporations goods. But today the contemporary corporation is like the parasitic mistletoe, weaving its poisonous tentacles into and around the tree. The contemporary corporation uses all available institutions

⁵ This type of organisation is well illustrated in the film from Kafka's book *The Trial*, with a screen play by Harold Pinter and directed by David Jones, which draws a critically analytical picture of all aspects of mass society in the first decades of the Twentieth century. These images are also in *The Apartment* and *Seconds*, two films that contain elements of the struggle between mass organisation and the individual.

and organisations, political, economic and regulatory to serve its own purposes.

Along with space and arms technology, pharmaceutical medicine represents the apotheosis of contemporary science, the pharmaceutical companies the apex of contemporary corporate organisation. Corporate organisation of the pharmaceutical industry are gradually joining into one multinational conglomerate. But perhaps more important than this is the lateral expansion of companies which vacuum-up experts and influential people in other areas of interest, in government and regulatory bodies. A corporation, like British company GlaxoSmithKline, one of the largest pharmaceutical company in the world, exerts extensive hidden influence through medical journals, media outlets, newspapers and television, education, government regulatory functions and the law. GSK is actually deeply involved, for want of a better world, in the corporate governance of society.

The case against Dr Wakefield showed this more clearly than any other contemporary case.⁶ The case was engineered by the *Sunday Times*, a paper under the management of James Murdoch. Editors of the newspaper employed Brian Deer to write on behalf of MMR and against those experts who raised questions about its safety. Deer was given the support of the government and the NHS and a private detective agency wholly owned by the pharmaceutical industry, in putting his case together and when the *Sunday Times* published his first story, in 2004, his research for this was passed to the General Medical Council, which tried Wakefield over a three year period. Towards the end of the trial in 2010, before Wakefield was found guilty on all charges, James Murdoch was given a place as a non-executive member on the Board of GlaxoSmithKline.

While these lobbyists and agents of corporations ostensibly exercise control through science, their influence grows considerably in the area of social and political organisation. Each new form of involvement leads to another support for the marketing of their products, but we have long past the

⁶ See chapter 12.

point where this is ostensibly a simple matter of marketing. For example, towards the end of the last New Labour government, the minister in charge of education and therefore the education watchdog Ofsted,⁷ selected an executive of GlaxoSmithKline (GSK) to a seat on their board of directors. This was at a time when GSK were having difficulty in introducing their HPV cervical cancer vaccine for young girls, through schools, by-passing parents.

The big pharmaceutical corporations are like the Mafia, they bend all common social institutions to their own purposes. Many of us have not only failed to recognise the scientific revolution in the means of production, we have completely missed the growing phenomena of decorporatisation which entails the organisation not of focused corporate entities but their devolution into social, economic and cultural *networks* through which they express their power — a kind of dark and hidden governance.

In Britain the extension of these networks has resulted in what appear to be the most peculiar liaisons and co-operations, such as the links forged between vehemently anti socialist liberal-democrat Lords and members of the now defunct Revolutionary Communist Party.

One of the most considerable question of the present period is 'How do we combat corporate networks and propaganda?' Although I have tried to deal with this question in my book, *Dirty Medicine: The Handbook* [5], I have to say that the only way I can see is to begin to develop our own alternative societies.

In saying this, of course I say nothing different from that which Ivan Illich and Michel Foucault and a number of others have said. For those of you practising alternative medicine, there is a great leap involved in this strategy, for while it is one thing to dispense alternative medicine, it is quite another not to read the corporate newspapers, not to watch the television news, to think twice about driving a car and to live within the frugality of a new moral code.

⁷ The Office for Standards in Education, Children's Services and Skills.

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N. B. The author's books are available from
<http://slingshotpublications.com>

How the Separation from Ethics is Harmful to Science Itself

The problem

Can scientific excellence and bad ethical principles co-exist? To this question a positive answer is frequently given, and examples are provided of eminent scientists who acted in ethically discreditable ways. Here are a few from the last century.

(1) Edward Teller (1908-2003) was an excellent physicist, but his engagement in the research on nuclear weapons indicates a bad ethical attitude, since he failed to consider the potential horror caused by such weapons. His ethical insensitivity and irresponsibility justly won him the ironic "IgNobel Prize of Peace" in 1991, as the father of the H Bomb and promoter of the Program "War in the Stars".

(2) Fritz Haber (1868-1934), a very able chemist, won the Nobel Prize for Chemistry in 1918. However, his participation in the development of poisonous gases during World War I (1914-1918) makes him an ethically reprehensible person [19].

(3) Luis Alvarez (1911-1988), a notable physicist, won the Nobel Prize of Physics in 1968. However he was one of the persons inside "Enola Gay" on August 6, 1945, when the atomic bomb was thrown on Hiroshima.¹ Despite his recognized scientific excellence, the direct participation in a crime against humanity cannot absolve him ethically [1].

I shall argue that, although scientific excellence and bad ethical principles *can* coexist, to accept this coexistence is counterproductive even from the point of view of scientific progress, since scientific activity in itself necessarily

¹ «The atomic bombs that ended World War II, Little Boy and Fat Man, were delivered to Hiroshima and Nagasaki from an airfield on Tinian, a small island in the Mariana chain, between Guam and Saipan. An American physicist, thirty-four years old in 1945, I was there at the time and flew the first of the two historic missions, the leader of a small group responsible for monitoring the energy of the explosion» (this is the first statement in the first chapter of [1]).

requires certain moral attitudes. In fact bad ethical attitudes make scientists prone to mistrust, fraud, and disregard of merit in favour of co-optation.

A necessary entanglement

Behind a positive answer to the co-existence issue there is usually the positivist thesis of the separation between values and facts. According to it, the scientific activity only has to do with working out natural laws, mathematical formulas, and experiments for or against a given theory; only observable quantities and the relations between them have to be taken into account. It follows that moral values have no important role to play in the scientific activity.

In this essay I will argue that the positivist thesis is wrong. Any activity, and scientific research is no exception, is entangled with moral attitudes.

Let us consider, side by side with the scientists listed earlier, the case of Albert Einstein (1879-1955).

On the excellence of Einstein's scientific work a very wide consensus exists [19, 23, 26]. The ethical dilemmas in Einstein's public and private lives have also been frequently discussed. More recently, in the context of the Einstein Papers Project [13], John Stachel discovered in 1986 – that is, three decades after Einstein's death – the existence of a daughter of Einstein with his first wife Mileva Maric, called Lieserl, born before they got married.

Lieserl was born in February 1902. Not much is known about her life and death; it has been conjectured that she may have died of scarlet fever in September 1903. At the time, Einstein was in the process of being accepted as an employee in the patent office in Bern, and in Switzerland, as in other European countries, a paternity outside marriage might have been detrimental to career. Mileva Maric travelled alone to Novi Sad, Serbia, to give birth to Lieserl. There is ample evidence that Einstein did not behave as a good father (or as a good partner, for that matter) in this episode. This case has obvious implications as regards Einstein's character.

Now we may agree that examples (1)-(3) are vastly more serious, from an ethical point of view, than Einstein's behaviour with respect to Lieserl. Nevertheless, even the latter is ethically relevant. In recent times a similar case occurred in the life of one of the most famous athletes in the world: Edson Arantes do Nascimento, commonly known as Pelé. Pelé choose not to recognize a daughter born outside his marriage, and was much criticized for this; when his daughter died of cancer, he did not attend her funeral. Pelé was born in 1940. He is considered by many commentators as the most skilful soccer player in this game's history, but such excellence is unfortunately compatible with his poor ethical performance in that circumstance.

Regardless of the severity of the individual case, the holders of the thesis of dichotomy between ethics and scientific excellence would have no trouble in conceiving of the coexistence of one Einstein, the sophisticated scientist and excellent epistemologist, with another Einstein, the careless and inattentive fiancé and husband. At the end of his life, in a letter of condolences to the family of Michele Angelo Besso (1873-1955), his lifelong friend, Einstein recognized that in both his marriages he had not been successful as a husband, contrary to Michele, who had lived happily with the same wife all his life [20].

Reports on Einstein's character as a father also show him to have been a very complex individual. He took pleasure in playing with his children – for instance a tale exists of him building a toy for his son Hans Albert (1904-1973) by using matches, as any traditionally good father might have done. On the other hand he estranged himself from his son Eduard (1910-1965), who was interned and died in a psychiatric hospital in Zurich.

As to his political attitudes, Einstein also had a complex and peculiar, not to say ambivalent, personality. In his Berlin period (1914-1932), the very same pacifist Einstein who had refused to sign the Fulda Manifesto coexisted with the Einstein contributing to research on gyroscopes and aeroplane wings, a kind of research of clear military relevance.

In his US period (1933-1955) the episode of the famous letter written by Einstein to Franklin Roosevelt in 1939, on suggestion by Leo Szilard, is praised by some authors and severely criticized by others. However, Einstein's statements against militarism, against McCarthyism, and his staunch pleading for international peace are also to be taken into account. The Russell-Einstein manifesto [31], the solidarity lent to personalities like Robert Oppenheimer, Charles Chaplin, Bertrand Russell and David Bohm, as well as to the Rosenbergs, to Sacco and Vanzetti and others who met tragic destinies, consistently corroborate Einstein's high ethical sensitivity and remarkable autonomy, both intellectual and political. This is reinforced by his prescient and shrewd criticism levelled repeatedly at the American way of life and politics during his American years.

Let us return to the problem of the radical dichotomy mentioned above. In order to pass judgement on the examples I have cited we must put them in their respective contexts. As for the Lieserl affair, it would be unfair to pass an ethical judgement on the whole work and life of Einstein based on any lapses committed in his private life, though some of them are of some severity. All human beings, even those we regard as the most virtuous, commit slips, which is unavoidable in view of human imperfection. On the other hand, we cannot conceive of the behaviour of Teller, Haber, and Alvarez as falling within the notion of a mere ethical slip, because what they did had vastly more harmful and, indeed, disastrous consequences for humankind. Rather, we must contextualize their choices as social and historical events, linked to the growth of a concept of scientific research as markedly instrumental, and enslaved to political, industrial, and military interests. Here, clearly, the ethical sphere and the cognitive sphere cannot be separated.

Big Science and its implications for the ethical and cognitive standards of the scientific activity

Relationships between scientists, war and militarism have always been present in the social history of science and technology. This was highlighted, for example, in 1931 by

Boris Hessen at the 2nd International Congress of the History of Science in London [12]. As further example, we can cite the extreme domination of official state ideology which led to the rejection of the Mendelian genetics in Soviet Union and to the notorious Lysenko affair.

Since the late 19th and early 20th century, a phenomenon appeared more systematically in the more scientifically and technologically developed countries: the confluence of science, industry, militarism – and war. It was fuelled, according to several authors, by the enormous effort to build the first atomic bombs, during the final years of World War II, i.e. by the Manhattan Project promoted by the US government, with some participation also by the British government.

Now the war efforts, and sometimes even those in times of so-called “peace” to conquer markets through unfair competition, are incompatible with the free exchange of ideas, open discussion, and pluralism which are often conceived as strictly associated with scientific research. In such conditions the scientists' autonomy in choosing their subjects of interest practically shrinks to insignificance. The scientific-military-industrial complex associated with “Big Science” creates a structure in which the scientists act under the dictates of the powers-that-be. Increased degradation of ethical standards, involving attitudes of venality, co-optation, and careerism, are all too evident. But there are, indeed, also cognitive consequences of great relevance.

It might be objected that even in such situations scientists have the opportunity to express their excellence *qua* scientists anyway. Fermi, Alvarez, Oppenheimer, Teller and the other scientists participating in the Manhattan Project were challenged to develop their scientific independence in admittedly hard circumstances, but they somewhat succeeded in doing just that. However, this does not mean, by itself, that political dirigisme in scientific research has no deleterious consequences for the scientific activity as a whole.

Due to the comprehensive meaning of the term “Big Science”, it would be incorrect to equate, from an ethical

point of view, all organizations of scientific endeavour falling under this label. Sure, all Big Science involves big teams of researchers, huge financial investments, complex equipments. But it must be conceded that the Manhattan Project was considerably different from, for instance, work in high energy physics such as that made at the LHC (Large Hadron Collider), in Geneva, Switzerland.² In the case of the Manhattan Project, military ends led to a militarization of the whole activity of researchers. In the case of the LHC, on the contrary, scientists from various countries come into a consortium to work on complicated problems which could not be investigated without a collaborative effort of this kind – and size. While in the first case secrecy prevented the circulation of ideas, in the second case a broad sharing of results is allowed and encouraged. Moreover the work for, e.g., the detection of the Higgs boson is made in a peaceful context, promoting human dignity and, at least to some extent, the expression of individual skills and intelligence. In the case of the Manhattan Project the end-result sought after was the development of mass destruction weapons, an aim that no display of human ingenuity could ever redeem from charges of indignity and crime.

Economics and ethics

Even in the case of economics, separation from ethics has been detrimental to the development of economic science

The standard current view of the relationship between ethics and economics is that they are totally separate fields. However, this view is by no means universally accepted, and a well-known dissenter is Amartya Sen [34], winner of the Nobel Prize in Economics in 1998.

In support of the economics/ethics dichotomy the father of modern economics, Adam Smith, is usually invoked. Sen argues that this interpretation of Smith's work and personality is both unflattering and textually unwarranted.³ Smith, who was Professor of Moral Philosophy at the University of Glasgow, Scotland, would have been a

² [For some qualifications, I refer to chapter 1, section 4. (*Editor's Note*)]

severely split personality had he defended such a dichotomy. Actually Smith thought that economy should be governed by ethical principles, including sympathetic attitudes and political rights, and that this was needed even for the flourishing of economy itself [34]. We may add that a virtuous combination between fair competition and synergistic cooperation is also needed for sustainable social and economic development [23, 2].

Sen's thesis is that the separation between ethics and economics has been and is detrimental to economic science itself. Less plausible, at least *prima facie*, is my claim that the separation between ethics and *physics* would be detrimental to the development of physics itself. In fact often the very opposite is stated, namely that, despite some major ethical violations in war times (e.g. concentration camps, slave labour, secrecy), great technological achievements nonetheless emerged (radar, more efficient air-plane models, rockets etc.). However, it can hardly be denied that the militarization and commodification of science has brought about careerism, co-optation, unfair competition and also various forms of misconduct, including fraudulent behaviour. For instance, certain kinds of irrational consensus in the scientific community, that the unwary may regard at worst as spontaneous fashions, are actually the effect of dirigisme – after all, only the powerful can dictate which fashion all should follow.

The degradation of ethical and cognitive standards

While it is conceivable that in a scientist professional excellence may be coupled to a despicable moral character, this does not mean that science as an institution, and much less society, is benefited by the occurrence of such a combination.

³ One source for the mistaken interpretation seems to have been the exaggerated attention given to a single passage in a famous quote from Smith: «It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from, their regard to their own interest. We address ourselves, not to their humanity but to their self-love, and never talk to them of our own necessities but of their advantages» [36, p. 7].

Less clear is that such a combination would negatively affect science itself. The fact/value dichotomy asserted by positivists proclaims the axiological neutrality of sciences. However this claim is untenable, because the scientific activity, as stressed above, necessarily requires ethical values and attitudes.

A well-known philosopher of science, Mario Bunge, has argued that the scientific practice is a moral school promoting *intellectual honesty, independence of judgement, intellectual courage, love of freedom, and intellectual sense of justice*. According to Bunge, «none of these five virtues can be exercised fully when the investigation is done for the benefit of destructive, privileged, or oppressive forces» [8, p. 42].

More basically, how can we reconcile the independence of judgement with venality? There is obviously an interest conflict here, necessarily leading to misconduct, for instance in the form of not displaying or manipulating any findings which fail to agree with the expectations of the financing groups.⁴ Right now, in face of the vast amount of misbehaviour in scientific research surfacing after decades of stubborn, shameless denial by authorities, it is important to stress that ethical attitudes are very much related to the cognitive quality of scientific research.

In the philosophy of science there was in the 1960s a debate between Thomas Kuhn [15] and Popper [25] turning around Kuhn's concept of "normal science". Popper criticized normal science as being a practice appropriate only to insufficiently competent and uncritical researchers.⁵ Now, normal science is not necessarily linked to Big Science, but there is certainly a strong correlation between them. Normal science is held by the straitjacket of the paradigmatic discipline, which is intolerant of any violation of the adopted paradigm; in the case of Big Science, there is also a straitjacket, a deeply political one, because the hierarchic structure enforces the co-optation of "well-

⁴ See, e. g., [17, 20].

⁵ For a detailed analysis, see [5,6,7] and for a connection with the criticism due to Freire against a dogmatic education known as «banking education», see [3].

behaved" scientists, i.e. those complying with industrial and military interests.

In both kinds of science the autonomy of scientists is undermined. In the case of normal science, the loss of autonomy is at the intellectual level. In the case of Big Science, although in many situations intellectual autonomy may be preserved, the loss of political autonomy – in the most basic sense of being able to set one's own research objectives – is self-evident.

Here again, we need to distinguish among various types of "Big Science" depending on the specific context. In particular Popper was right when criticizing the idea of a sharp divide between "normal science" and "extraordinary science" – in his view there is a gradation between them.

The example chosen by Popper to clarify this point was a great physicist, Ludwig Boltzmann (1844-1906). According to Popper, Boltzmann was not engaged in breaking paradigms, because, broadly speaking, he was a follower of Maxwell; nevertheless he was very far from being a "normal scientist". We can add, more generally, that the fact that some research results fall smoothly within an accepted paradigm does not rule out the possibility that they should be considered in other respects as extraordinary. For example, the detection of the Higgs boson at the LHC, if confirmed, would certainly be an extraordinary result in spite of its being expected in the context of the received theoretical framework of particle physics (the so-called standard model). Thus, besides epistemological ruptures *à la* Bachelard or, alternatively, extraordinary achievements in time of revolution *à la* Kuhn, there are also results consistent with a reigning paradigm which deserve to be qualified as extraordinary, in the spirit of the gradation argued for by Popper and Imre Lakatos.

In short, the scientific enterprise is more complex than any theoretical systematization about it can make it out, a fact which has been emphasized against orthodox epistemologists by Paul Feyerabend [4].

Healthy science

Healthy science, such as good education, stimulates both the intellectual and the political autonomy of its practitioners, in a virtuous synergy and in a spirit of fair competition. Evidently, the practitioners of healthy science are not all geniuses (in fact, very few are – by the very definition of “genius”!), which explains and justifies the fact that they engage in works at different levels of importance. However, they all have an obligation to adhere to high ethical and cognitive standards. This attitude can be considered an idealization of reality in face of internal and external pressures that encourage violations of the five virtues mentioned by Bunge. Indeed, the increasing degradation of the cognitive standards becomes evident when it severely restricts the circulation of ideas and damages the transparency of the scientific activity. Instrumental reason becomes the rule, which runs against the best public interests, including those referring to knowledge itself, and this in turn also brings about a deterioration of the democratic practice.

Excessive specialization is also dangerous. I do not question the depth that a given specific field of research requires from its practitioners, but the excessive polarization of individual researchers in a very narrow range of interests, accompanied by solemn contempt for everything outside. This attitude leads to enormous distortions and, again, they are distortions of both ethical and cognitive nature.

The Spanish philosopher José Ortega y Gasset ([23], cf. [21]) warned that, in 1890, there was something unmatched in all of history, a generation of scientists assuming the intellectual leadership in Europe in the spirit of specialization and instrumental science. Distinguished thinkers belonging to different schools of thought and epochs – Pascal, Kant, Einstein, Popper, Ortega, Bunge, Paulo Freire, Celso Furtado, Gandhi, Sen, among several others – converge as regards the connection between ethical and cognitive aspects of scientific research. I am not a follower of any of these thinkers in all points of their thought, but I agree with them that ethical aspects and the effort for cognitive autonomy form a very coherent intellectual core.

Let us consider Kant and Pascal. Kant [14] argued that, if the value of something does not fall under any kind of equivalence (financial, for example), then this something cannot be submitted to exchanges of any kind, that is, it has an intrinsic dignity. This condemns venality, especially when human dignity is at stake. Related to this deeply and rigorous ethical posture is the enlightenment commitment to intellectual and political autonomy, as represented by the Kantian “sapere aude” and, perhaps even more so, by a very eloquent passage in which Kant argues that the autonomous judgement of someone cannot be waived, even in the case in which God Himself appeared and introduced Himself to that person – since this person would necessarily judge by their own criteria and their own judgement whether to accept Him as God.

This is a good reply to Dostoevsky's dilemma, “If God does not exist, then anything is permitted”, in his novel, *The Brothers Karamazov*. If we accept this implication, then we should think that atheists are dispensed from any ethical principles. But on the other hand, if believers only do good from fear of punishment, their attitude is morally objectionable. Kant argued that an action is ethically valuable only when it is practised out of duty and not because of any interest whatsoever. In other words, an ethics of fear as well as an ethics founded on selfish interests is inauthentic. Both religious believers and atheists can perform ethically valuable actions if they elect duty, and not selfish interests and fears, as guide to their actions.

Pascal noted that the highest dignity of man lies in thought. It follows that restricting or misleading the exercise of thought is also a serious attack on human dignity. In particular the pharmaceutical corporations are notorious in their determination to corrupt researchers to serve their financial ambitions, rather than public health [31].

Scientists and philosophers against the current – with some inconsistencies

Einstein severely criticized the thesis of the “dissolution of reality”, which was so fashionable in the 1930s, and whose success he considered to be the effect of the brainwashing

effected by some authoritative quantum theorists (like Niels Bohr and Werner Heisenberg) on the physical community. In a famous letter to his friend of youth Maurice Solovine [9], Einstein criticized those who by decree had abolished objective reality. This opposition to overwhelming fashion reveals Einstein's autonomy of thought and strong ethical convictions. Einstein called "horses" (that is, individuals who are not accustomed to autonomous thinking) those who uncritically follow the fashions of the day.

In his *Pedagogy of Autonomy*, Freire [10] emphasized the importance of critical education and of the respectful postures of the persons involved in the education process, and the need to avoid the attitude based on a "banking education", implying inductive and repetitive processes, as if students were, as Popper would say, mere mental buckets.

Celso Furtado [11] provides us with a beautiful personal testimony of his struggle against Eugenio Gudim's dominant conception in the late 1940s and early 1950s. Gudim had held the view that Brazil should base its economy on merely exporting agricultural raw material. On the opposite side, Furtado emphasized the need for Latino-American economists to assume an approach stressing the importance of intellectual autonomy.

In an exquisite reflection, Mahatma Gandhi also asserted that we must be open to the influences of all the cultures. However, our own culture should not be subordinated to any others. In other words, we must not waiving our own culture.

Popper's thought has some admirable elements [27, 28, 29], for instance: (i) his criticism of positivism, which views mind as an empty bucket, (ii) his scathing criticism of obscurity in philosophy;⁶ (iii) his criticism of induction; (iv) his admiration of the Kantian interpretation of the Enlightenment, stressing intellectual autonomy; and (v) his criticism of the dangerous phenomenon of normal science.

However, there are also some deplorable aspects in Popper's thought. He failed to criticize the harmful effects of imperialism as detrimental to freedom, to environment, and

⁶ See Popper's preface written to the important [30].

to the legitimate interests of the peoples. Indeed, in one important instance, a 1992 interview with the German magazine *Der Spiegel*,⁷ Popper went so far as defending *preventive war* (that is, a crime according to international law),⁸ and argued that Third World peoples should be protected against themselves since, in his opinion, they had not reached the maturity of adulthood; according to Popper, they are as children left aimlessly in a kindergarten. Is there not a gross inconsistency between these pleas for colonial and imperialist tutelage and the endorsement of Kantian intellectual autonomy ("sapere aude")? Much more consistent is Gandhi's posture, reconciling autonomy with openness to cultural influences.

6. Concluding remarks

My goal was to examine the thesis that there is a dichotomy between scientific excellence and ethics. I argued that:

(A) although someone with an excellent scientific performance may act wrongly, in some circumstances, from an ethical point of view, it is indispensable to recognize that sound and healthy science, as a whole, is greatly impaired by a scientist's irresponsible behaviour, no matter how clever he or she is;

(B) bad ethical principles cause serious damage to the scientific community as a whole, in the form of the loss of intellectual and political autonomy of its members, and of the dependence on vested and harmful interests;

(C) everything seems to corroborate that, just as Sen argued that the separation of economics from ethics is harmful to economics itself, the separation of physics from ethics is also harmful to physics itself;

(D) the separation of science from ethics is also harmful to education, because instead of promoting high intellectual ideals, it instils the primacy of instrumental reason;

⁷ The original text is reproduced, with an Italian translation, in [29, pp. 502-25].

⁸ [Cf. chapter 15, footnote 3. (*Editor's Note*)]

(E) instrumental reason is detrimental to the solidarity among peoples because it tends to treat ethical concerns, and in particular environment protection, as externalities;

(F) instrumental reason is also detrimental to genuine democracy because a great amount of power gets concentrated in the hands of large corporations and hegemonic states, or in the hands of dictators of all kinds, or even in the hands of both;

(G) the dichotomy between scientific excellence and ethics must be fought.

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Experts and Participatory Democracy

Public Participation on New Sciences and Technologies as a Tool to Prevent Social Conflicts

Introduction

Scientific advances and subsequent technological applications achieved along the centuries have shaped the way we live in most of the world. Our daily life is heavily conditioned by, and dependant on, technologies, with information technologies playing the lion's share thanks to the overall positive impact they brought even in the less advanced countries and in remote areas.

All human activities are likely to have an impact on the environment at different levels and with different magnitudes; thus technological and scientific advances should be weighted against their possible drawbacks.

The possibility to predict negative effects of a technological advance in the medium and long term depends on several factors and is not always an easy task, nonetheless it is very important to pursue it.

If we want to be able to maximize and optimize the scientific knowledge we have to ensure that its negative impacts do not outweigh its benefits. The trust that the public confers to regulating and enforcing authorities has to be paid back by the highest possible protection level. Unfortunately, old and new technologies are introduced and promoted without offering such guarantees, and neither the scientific community nor the regulatory agencies can count on a sufficient public funding to this effect.

It is equally important that applied scientific research pursue general interest and ensure an equitable access and a fair benefit sharing. When private interests prevail over the public ones, social conflicts are most likely to develop – as they should.

What follows is the author's reflection on the social conflicts caused by old and new technologies, based on direct

experiences gathered during the last 20 years of public campaigning.

When problems arise

Most of the social conflicts about new technologies arise because of fear that human activities may negatively impact human and environmental health.

Such conflicts start mostly from a local concern (i.e. power plants, waste treatment plants, chemical factories, highways and motorways, bridges, tunnels, dams etc.), as certain activities present an higher and/or more immediate risk at a local level, a risk which public administrators often assess without a proper public participation.

In most, if not all, cases, contested activities are allowed by applying a top-down approach, where few people take decisions that may possibly affect the lives and the future of thousands, or millions, of individuals. This approach leads naturally to public outcries and to an opposition that is stronger according to the extent of the perceived risk.

Instead of changing this authoritarian attitude towards public concerns and taking them more seriously, public authorities, private enterprises and worker and industry unions use to dismiss the citizens' opposition as due to ignorance and technological obscurantism.

The "Not In My Back Yard" (NIMBY) syndrome is an overused, if not abused, label for dismissing opposing groups as if they were moved by narrow-minded aims to preserve local interests, oblivious of the supposed benefits that the object of the fighting may bring to society at large.

While the negative impact of infrastructures like motorways, bridges, tunnels, railways etc. is mainly restricted to their immediate surroundings (even if this might not be the case when groundwater plates or superficial watercourses are affected by heavy works), other activities may have a broader impact on the environment and human health.

This is the case for nuclear power stations, burning plants (i.e. thermoelectric plants, incinerators, refineries, foundries and all other plants characterized by heavily polluted stack emissions), or chemical facilities releasing persistent and

dangerous by-products through stack emissions and waste waters. In these cases, despite the social conflict may be sparked by concerns on their immediate, local risk, the arguments for concern can well include a larger picture of the overall impacts.

Part of the pollutants contained in stack emissions may fall within a restricted area causing local damages, but the rest may travel long distances and get into the food chain in remote areas, including the Poles, or get up in the atmosphere to contribute to the rising concentration of greenhouse gases causing climate change.

Even some of the chemicals discharged into rivers, lakes or sea waters in industrialized countries at lower latitude may reach the Poles. This is the case for the *persistent organic pollutants* (POPs), a large group of organic molecules present in waste waters and stack emissions of industries producing most of our daily consumables [1,2]. These compounds survive over a long time once released into the environment, as they are slowly degraded by bacteria and sunlight. Most of them are picked up by filtering organisms, thus starting their way up into the food chain and eventually interesting also pelagic species (i.e. tuna, swordfish, sharks, cetaceans, and other marine mammals).

Depending on the saturation degree and on temperatures, POPs tend to evaporate into the lower atmosphere and to blow toward higher latitudes where they condense with water falling down and accumulate even in formerly pristine areas.

Several evaporation-condensation cycles lead to the accumulation of POPs at the Poles in a process that has been described as "Global distillation" or "Grasshopper effect" [3,4]. Since all living beings at the Poles rely for their feeding on sea products, their POP body concentration turn out to be the highest in the world. Species like humans, marine mammals and polar bears, being at the top of food chain, are more at risk of being exposed to quantities that may be dangerous for their health, in different ways.

Thus, the “greening” of productions in the industrialized countries is of primary importance even for the preservation of remote ecosystems and living beings.

That is the reason why the movements fighting all over the world against industrial installations have responded to the NIMBY accusation coining the new term of NYABY (“Not in Anybody's Back Yard”) in order to stress the influence of the geographical location as a reason for direct action, not as the main reason for concern [5].

Some technologies, such as nuclear power and, more recently, genetic engineering in agriculture, are fought worldwide because of the magnitude, the irreversibility, the persistence, and the high number of people and generations that might suffer from possible negative impacts if anything goes wrong.

While anti-nuke activism has been alive all around the world since decades, the introduction of *genetically engineered* (GE) plants into food market went smooth and almost unchallenged in such countries as USA, Canada and Argentina, where they were first introduced. On the other hand the European Union passed the first directive on the deliberate release of *genetically modified organisms* (GMOs) into the environment in 1990 [6], at the same time they were beginning to be marketed in USA.

Up to now, EU has developed the world most comprehensive legislation on GMOs, that encompasses the consumer's right to know, rules for import and cultivation, labelling, guidelines on coexistence of GMOs and traditional varieties and more. This legislative production is the result of the wide European opposition movement that includes farmer unions, consumers, international aid, cooperation and environmental *non-governmental organizations* (NGOs), criticizing the safety assessment received by GMOs from food and environmental authorities.

Despite the campaigning against GMOs in agriculture has taken place mainly in Europe, in India it has been equally crucial to promote a public debate that sometimes led the government to take restricting measures as it was the case with GE eggplants [7].

In Africa, where GMOs have been approved in some countries, and more are expected to follow suit, farmers and *civil society organisations* (CSOs) are keeping high the public attention and organizing the opposition.

Movements are equally active in South America, and even in the USA, where the debate on GMOs seems to gather increasing attention from a public that has been so far largely uninterested in it.

Learning from the past

But what is it that leads people to start worrying in the first place? Why do they not trust entrepreneurs and those in charge of regulating, enforcing and controlling the implementation of the protection measures?

First of all, in the author's experience, there is a lesson to be learned from the past.

In almost every place where there has been a potentially dangerous human activity, from a heavy industry to a simple landfill, authorities have too often failed to preserve the environmental integrity and/or the human health.

It is by no means unusual to find industrial enterprises carrying out dangerous activities while neglecting basic prevention measures to save money, and systematically lying to the workers and the neighbouring residents about the safety of their activities. Too often, for the sake of creating and preserving jobs, public authorities and unions have looked away from troubles and have become spokespersons of private interests.

With that burden, and considering that the problem still persists, the reaction from CSOs is more understandable and looks less irrational than it is depicted.

Regaining public confidence should thus be a priority for both the private industrial sector and the public regulatory agencies.

On the contrary, technologies and products are still being imposed through a top-down approach and despite public concerns.

As said above, chemical compounds may persist into the environment for decades after their release and even the

products of their degradation may still pose a risk for living organisms, as is the case for DDT. It will take a long time for natural degrading mechanisms to break down those compounds to harmless molecular arrangements.

The persistence of the risk is even more evident for nuclear wastes as they remain dangerously active for thousands of years.

GMOs, lies and censorship

However, after the advent of GE plants in agriculture the very concept of “persistence of the risk” needs to be re-evaluated.

This is because, contrary to chemicals and nuclear products, GMOs are living beings and, as such, capable of self-replicating and interbreeding. Transgenic plants can cross-breed with plants belonging to the same species, or even with those sexually compatible and existing within distances that pollen, carried by wind or insects, may be able to cover. This cross-pollination may cause the passage of the transgene (i.e. the package of genes added to the host genome) into the DNA of non-GE plants, conferring them the same characteristics as the ones expressed in the transgenic plants.

Cross-breeding of GE plants

If a transgene passes to wild relatives or landraces in countries where the species originated, it may irreversibly alter the very genome the species evolved from. According to some field researches this is what happened to teosinte (an ancestral wild parent of the corn) in the Mexican region of Oaxaca, despite the fact that it is still controversial whether the contamination was followed by further reproduction and which consequences should be expected [8,9]. In particular, the transgene involved in the cross breeding between GE corn and the wild relative expresses the information written in a gene coming from the common soil bacteria *Bacillus thuringiensis* (whence the acronym Bt of the GE corn is taken). As a result, Bt corn is able to self-produce a toxic protein that kills insects (in fact different genes may produce quasi selective proteins active on specific insect families damaging corn cultivations) preven-

ting them from laying their eggs inside the plants. Whether or not this may represent a competitive character over other varieties is still to be determined, but if so the new variety could progressively replace the old ones with unknown consequences for the ecosystems.

Despite some GMOs supporters claim that the cross-breeding of GE plants with their ancestors does not pose any particular risk as it simply increases the agrobiodiversity, the need to avoid, or at least to limit, the genetic contamination has been recognized by the UN Convention on Biodiversity [10].

In the EU, guidelines for the coexistence of GE plants with traditional and organic farming have been released in the hope to ensure a freedom of choice to farmers [11].

As a matter of fact, several examples are now available that show how difficult, if not impossible, is to keep cross-pollination at bay. This risk is worsened by orphan seeds falling on the ground at harvesting time and able to sprout the following year, to mature and then to contribute to pass the transgene through pollination.

It does not take too much to understand that once the contamination begins, it is virtually impossible to stop it; this makes the GMOs an entirely new class of possible "pollutants".

The industrial patents granted to GE plants, and more recently to varieties selected by marker-assisted breeding, are also posing other new problems.

If a farmer is found to raise GE plants without the license from the company holding the patent, in fact, he or she can be sued for breaching the patent laws. The seeds' ownership is also undermining the freedom and the independence of research, leaving in the hands of patent holders the power to direct the scientific literature on GMOs. For most GE seeds, it is in fact necessary to get a formal permission from the patent's owner, that can forbid some researches on specific aspects about GMO's performance and undesired side effects.

This has led a group of entomologists to write a letter to the US Environmental Protection Agency (EPA) complaining about the lack of freedom on the research on GMOs [12].

As a matter of fact the letter has been signed only by one researcher while the rest wished to remain anonymous for fear of losing their contracts with the scientific institutions they belong to [13, 14]. This fear is not at all unjustified as several Universities, especially in USA, get research grants from big corporations. Entire research departments depend on the money they get from donors that, officially, should not interfere with which researches are performed and how results are disseminated. In fact, not a single corporate donor could accept that its money be spent on researches whose results can undermine its own businesses! If an agrochemical company producing GE seeds sponsors a University it would be a very unlikely occurrence indeed for any of the resulting published reports to expose problem with GMOs.

Since the advent of GMOs in the market, several researchers have publicly denounced to have seen their contracts terminated because their work stressed some problematic aspects of GE food. That's why the caution of the addressees of the letter to the US EPA is understandable. But when it comes to GMOs, even scientific publication on renowned journals can fall under a severe and sometimes offending attack.

The case of Dr Ignacio Chapela's article published on *Nature* [8] has probably marked a new era on the scientific debate. Instead of asking for clarification on methods and results, which should be the normal approach to debating scientific research, the opponents gave birth to a sort of fighting group asking, successfully, the Editor to admit the article was not so good as it was supposed to be. This was a sad accomplishment not only because the first observations by Chapela have been confirmed by other studies [9], but even because many publications that should supposedly show the safety of GMOs are often widely flawed and/or their empirical results entirely misinterpreted or misrepresented.

Golden rice

There is plenty of examples of different attempts to get GMOs accepted by the public by using pretence instead of scientifically proven facts.

Golden rice is just an example of how GMOs supporters have tried, and are still trying, to smuggle a promise as a generous and ready-to-use solution to tackle severe human health problems. It is almost 12 years now that the GE rice variety with higher levels of beta-carotene was presented as the cleverest solution to fight *vitamin A deficiency* (VAD), a cause for blindness and of some 2 million deaths per year in developing countries [15]. There have been articles all over the world describing the magnificent opportunities offered by this product and depicting its opponents as a bunch of heartless obscurantists who did not care for the wellbeing of people. But, by doing a simple calculation, the required daily dose of pro-vitamin A for a child would have been guaranteed by eating *over a kilo per day* of the first kind of the engineered rice! Despite new rice strains contain considerable higher provitamin A concentration [16], the original expectancies were watered down for the golden rice to be a useful tool for a more complex strategy that should include diet diversification [17].

The reason why a fortified rice cannot do the work alone, is vitamin A requires the presence of other oligoelements as well as lipids in the receiving organism for it to be properly metabolised, otherwise it is simply excreted. Those conditions are very difficult to be met among subject suffering from a scarce vitamin A diet, which seriously undermines the utility of GE rice [18,19]. Further, some 20 patents cover products and processes used to manipulate the rice, and it isn't clear yet who and to which extent should pay royalties in case the golden rice could reach the market, something that it failed up to now.

Despite the existence of all these objective obstacles, still golden rice proponents blame opponents to have created an hostile climate that led to useless and counterproductive tests and cumbersome legislative requirements which have delayed the marketing of golden rice. But the false promises went even further. A well-known Italian oncologist, professor Umberto Veronesi, during one of his speeches depicting the idyllic results of genetic engineering claimed that golden rice had *already* saved the lives of thousands of children in China – quite a miracle considering that this rice is still well locked within the labs [20].

Scientific, lay magazines and newspapers are full of claims that can hardly be defined scientifically correct, often presenting the GMOs like a panacea for almost any kind of problem. These misrepresentations have never been challenged by those scientists who, on the other side, do not wait for a second before vilifying colleagues who dare to question GMOs by arguments or experiences.

"Substantial equivalence"

The scientific community should have reacted with the same vehemence when GE plants were in the first place allowed to benefit of a simplified scrutiny process based on the scientifically flawed concept of "substantial equivalence". This concept was coined by OECD experts (OECD stands for Organisation for Economic Co-operation and Development: surely not a scientific institution!), called to give guidance on how to tackle such innovative products like GE plants for food and animal feed. They proposed to apply the principle that, because the transgenic plant had just one or a few genes more than the non-GE counterpart, they could not be substantially different [20]. Since it is assumed that new GE varieties are the result of manipulation of existing ones, if the latter are deemed safe so should be their transgenic counterparts.

Substantial equivalence is a political tool masked as science, and in fact overruling any really scientific assessment. It is in fact well known that genes interfere with each other, indeed, this is what the *largest* portion of DNA does: despite not playing any role in protein synthesis, it might regulate the way the genes are expressed.

Formal genetics recognizes that each gene is highly influenced by its position along the DNA molecules, that some characters are regulated by more than one gene, and that the same gene can influence more than a single character.

Considering that GE plant are randomly changed without even knowing in advance the position of the transgene, it's very hard to see the connection between the knowledge of genetics and "substantial equivalence".

Nonetheless the principle has been applied to smooth the path to the market approval of GE plants without a further

specific investigation on their peculiarities. What is worse is that, because of the industrial patenting system applied to GE plants, independent research is hindered and made particularly difficult.

Often pro-GMO scientists have used inappropriate arguments, scientifically unjustified and incorrect, in a transparent attempt to baffle public fear on GE food. But it is clear that, as long as they are caught to lie or to misrepresent scientific data, they will only generate more fear and leave up the suspicion that an attempt is made to hide something wrong.

Public authorities and conflicts of interest

Unfortunately, other than applying the “substantial equivalence” criterion, the behaviour of the public authorities in charge of GMOs evaluation and market approval, either in USA or in EU, is not much more reassuring. A monograph published by *The Ecologist* in 1998 revealed in detail the strict interrelationship existing between Monsanto consultants and the US FDA (Food and Drug Administration), the federal agency in charge of evaluating the impact of GMOs on human health.

A similar conflict of interest has been exposed the same year with regard to the composition of the Committee appointed by the UK Government to do the evaluation of GMOs. As denounced by Friends of the Earth, 8 of its 13 members had in fact direct economic interests with the same companies filing request of GMOs authorization [21]. It is not a secret that UK has always backed the USA policies and strategy on almost any issue, thus representing a sort of a “back door” for USA to influence European affairs.

The European Food Safety Agency (EFSA) was set up after the BSE outbreak¹ and the cases of food contamination with dioxins of late 90s in order to ensure a unique, proper and independent safety evaluation for human food and animal feed. A dedicated panel of experts is in charge for the

¹ BSE stands for “Bovine Spongiform Encephalopathy”, more commonly known as the “mad cow disease”.

evaluation of GMOs, releasing its advice to the European Commission that, in turn, submits the final decision on approval requests to the European Council for the Member States to express their own opinion and take the decision.

EFSA adopts a "case by case" review and, as foreseen by the existing EU legislation, the public is invited to send commentaries that the Agency is supposed to consider before the release of its final opinion.

Up to now, EFSA has always released positive advises on GMOs that have undergone its scrutiny. This is not a surprise when considering that the Agency's experts are called to simply review the scientific literature attached to each dossier and provided by the same companies applying for the GMO approval. Such a procedure is not a novelty, as it has been applied, unfortunately, to the authorization of chemical compounds for decades, but the EFSA's panel apparently failed even in the minimal task of verifying the soundness of the scientific literature upon which the authorization request was based.

In 2006, in fact, EFSA released its first favourable opinion on a GE potato rich in amylopectin, a starch component used by pulp and paper industry, even if this kind of starch was equally approved for use in animal feed [22]. EFSA decided to issue a positive advise notwithstanding the presence of two genes conferring to the GE potatoes a resistance to antibiotics kanamycin and neomycin, in blatant conflict with existing legislation. Directive 2001/18, in fact, unambiguously prevents, from 2004 on, the release of any GMOs containing genes conferring resistance to antibiotics deemed important for human or veterinary use.

What was the ground for the EFSA's decision? EFSA based its positive opinion on the assumption that the genes conferring such resistance are already widespread among soil bacteria, that horizontal flow is very unlikely, and that those two antibiotics were scarcely used in human and animal prophylaxis. This latter assumption contradicts the WHO and the European Medicines Agency (EMA), that both classify the two antibiotics as important anti-bacteria agents for human and animal treatments. Furthermore, experts from EMA failed even to track back one of the article

quoted by EFSA, thus being unable to read the entire documentation supporting the positive decision [23, 24].

Despite EFSA acknowledged the correctness of the EMEA classification [25], in 2008 it reiterated its positive evaluation on the use of antibiotics markers for GE plants.

The EFSA's stubbornness in its positive attitude concerning GMOs has raised several concerns and outcries, especially in the light of proven conflicts of interests for some of the Agency's members. In 2010 it was the turn of the chair of the EFSA's management board, Diana Banati, who was discovered to simultaneously hold a position at the European Board of Directors of the International Life Science Institute (ILSI), a private organization representing the interests of the biggest agro-food multinationals, including Sygenta, Dupont and Monsanto. Despite a large number of politicians and CSOs have asked Mrs. Banati's to resign from EFSA, she resigned instead... from the board of ILSI [26, 27].

At the beginning of 2011, the NGO Corporate Europe Observatory denounced the clear conflict of interests of 4 members of EFSA's management board, employed with organizations representing agro-food industries, including the executive director of ILSI [28].

As recently as December 2011, the European Ombudsman replied to a complaint issued by German NGO TestBiotech regarding the case of Dr Suzy Renckens. After she had served 5 years as Scientific Coordinator and Head of the EFSA's GMO unit, she took office as Head of Biotech Regulatory Affairs for Europe, Asia, Africa and Middle East with the Swiss agro-biotech firm Sygenta – just two months after her leaving EFSA. According to the European Ombudsman, EFSA has failed to apply the rules set up to avoid conflicts of interest by employing former officials with private enterprises, whose business is pertinent to the role played by the official within the public Agency. Further, it asked EFSA to reinforce the legal instruments that may prevent a "revolving doors" attitude by its officials [29].

Obscurantism or caution?

Similarly to what happened with the promotion of nuclear power, scientists supporting GMOs in agriculture are blaming themselves for not being able to properly communicate the benefits to the general public, while those opposing GE plants are supposedly able to manipulate public perception and create unjustified fears about GE plants.

But, as shown by our short, and not exhaustive, excursus within the GMOs labyrinth, the path that led to their market approvals is rife with grey areas that are worsened by the ambiguous attitude shown by pro-GMO scientists and by regulatory public authorities in charge. That GMOs represent something more than a simple technological application is well evidenced by documents from WikiLeaks disclosing the pressure of USA Ambassadors on Ministers of countries hostile to embrace genetic engineering in agriculture [31].

The wide, and growing, movement opposing GE plants around the world shows the need that scientific and technological advances be achieved with transparency and public participation.

A participatory approach has been adopted by some public funded research programs in Canada (*Community-University Research Alliance* – CURA) [32] and the French Region Île-de-France (*Partenariat Institutions Citoyens pour la Recherche et l'Innovation* – PICRI) [33] to which a specific budget is reserved, destined to fund projects carried out by partnership among scientific institutions and CSOs.

One of the projects most recently funded under the PICRI initiative aims at re-evaluating the concept of substantial equivalence applied to GMO; this project will involve the University of South Paris and the MDRGF (*Mouvement pour les Droits et le Respect des Générations Futures*), a national, not-for-profit Foundation [34]. Although this project came after some 15 years after the massive market introduction of GMOs, its results might be very interesting. Not only they might contribute to renew the scientific debate on the overall impact assessment process applied to

GMOs, but might even highlight the conceptual strengths and faults of such a definition.

Nanotechnologies

“Substantial equivalence” is in fact being proposed also for the evaluation of other new products, like those resulting from the application of nanotechnologies. This term encompasses a broad range of research categories sharing the peculiarity of working at *nanometric scale* (that is, 1 to 100 nm, where nm stands for *nanometer*, and $1\text{ nm} = 10^{-9}\text{ m}$), which corresponds to the atomic or molecular level.

Nanotechnologies have huge potentialities for the future of materials productions, medicine, surgery, informatics, chemistry, physics, and almost any other sciences affecting our daily life.

We are just at the dawn of the nanotech era, but some nanoproducts are already in the market, even though most, if not all, consumers are unaware of this fact. Nanoparticles are added to tyres to improve their performance, to tennis balls, to toothpastes, to cosmetic creams and more. Nanofibers have found their way into such common objects as pants, jackets, gloves, socks and much else. According to Project for Emerging Nanotechnologies there are at least 150 clothing items on the market containing nanofibres used to confer water and stain repellence or antimicrobial properties. As of March 2011, the total of goods containing nanomaterials did amount to 1317, a striking +521% from the 212 goods reported for the year 2006 [35].

Because of their very high performances, application of nanomaterials will continue to increase at a very high speed despite their production and release has been left unregulated so far. Up to now, in fact, nanomaterials have been produced and marketed by applying the principle of the substantial equivalence according to which they do not need any different scrutiny process than that reserved to the same material, used in macroscopic arrangements [36]. Thus, for example, titanium or silver dioxide, among the most common components of nanoparticles, undergo a unique risk assessment process regardless whether they are

used to produce nanoparticles or foils and the same applies to carbon used to produce nanotubes. But in fact there *is* a difference, which lies in the tiny dimension of nanomaterials that can easily penetrate through a damaged skin, can be ingested, or inhaled reaching the depth of organs and tissues impenetrable to larger molecules. Nanotubes are extremely light and tend to float in the air unnoticed. When breathed they can reach the depths of the lungs, and their behaviour can be compared with that of asbestos fibres.

It is well known that fine particles like PM_{10} and $PM_{2.5}$ released by stack emissions and exhausts from vehicles may pose problems to human respiratory system; that is why their air concentration is monitored and emission limits have been established. It is equally known that the smaller the particles are, the higher is the risk that they may be dangerous, which explains why attention on the release of PM_1 is increasing.

Taking into account that nanoparticles can be 10-100 times smaller than PM_1 , would it not be worthwhile to know the release rate and quantity of those lost during the friction of tyres? Knowing that after just 50 washing cycles, waterproof and stainproof clothes lose their particular properties, would it not be worth knowing their fate into the environment? Considering that such tiny particles can easily penetrate any invisible tissue damage, is the fate of the nanoparticles being added to cosmetic creams or toothpastes well understood and proven to be safe? Applying "substantial equivalence" may be utterly inadequate to assess the possible risks posed by these pioneering applications and to properly answer to these questions.

What we know for sure is that the use of nanomaterials is still restricted to commercial goods with poor added social value.

On the other hand, in the near future products of nanotechnologies could be crucial to solve the problem of producing limitless renewable and clean energy, to improve drugs delivering, to ensure surgery in inaccessible part of our body, to fight cancer and possibly much more.

It is, then, of the utmost importance to reassure the public by taking in very serious consideration the possible risks

that nanomaterials, and nanotechnologies in general, pose to the environment and human health.

The urgency to step up an international effort on the safety evaluation of nanoproducts has been recently recognized by the US National Research Council of the National Academies [37]. But, for it to happen, it would be wise to postpone applications where nanomaterials may be released free into the environment, adsorbed or ingested without a proper long-term evaluation and before regulatory and controlling agencies are fully equipped, and their personnel trained, to monitor their release rate and fate.

Making money by offering new products and occupying new market niches is not wrong *per se*, but in order to ask the public to accept innovations with trust, the benefits for the society need to be tangible and largely outweigh the risks. The fact that the public is ready to accept innovations even if they bring some risks is showed by several examples, from the acceptance of nuclear medicine to the use of portable phones and wireless systems, even though these devices create unhealthy electromagnetic fields – a fact not much advertised by the mainstream media, it must be added.

So far, nanotechnologies have been poorly covered by media and the public knowledge is scarce even because of the complexity of the issue. Nonetheless, it is urgent to fill the gap and to pass on to the public the basic notions for them to understand what is at stake and to more actively participate in shaping the research by fixing priorities and safety levels.

A wider public involvement could help to uncover crucial problems before huge investments are made and also could lead to more creative innovation because of a broader range of experience to draw upon.

Conclusion

Ensuring a closer relationship of citizens with science and technological innovation would facilitate responsible action and build a mutual trust among those who collaborate to bring these products to life in a more sustainable way.

The Genetic Rights Foundation led a EU funded project under the 6th Framework Research Program (PSx2) aimed at identifying key principles to ensure a broader public participation in public funded research. Despite the project, that involved CSOs, scientific institutions and universities, was focused on agro-biotechnologies, the results are generally applicable to any innovations.

The main indications that can be drawn by the project could be summarized as follows:

- Funding for scientific research should be allocated according to “public interest” and the needs of the final users.
- Early participation of civil society, at a meta-level, should be guaranteed when the terms of the innovation process are non-technical.
- Everyone could, and should, be able to participate at some level and in some capacity, and CSOs have to be considered as “stakeholders”.
- Participation must be on an equal footing to address unequal power relations.
- Two-way exchange of information, open-mindedness and genuine engagement, by the scientific institutions, between themselves and the citizens need to be ensured.
- Debates about science should involve different opinions/viewpoints and a plurality of expertise recognizing the importance to take into account minority opinions, in the spirit of the Precautionary Principle.
- Openness and transparency need to be guaranteed in the development and practice of publicly funded scientific research and its regulation.
- Easily accessible and non-technical information is required. The public needs to be given the opportunity to acquire a good understanding of the technical issues.
- Public participation in science requires evidence that public concerns have been listened to and taken into account.

As it can be seen, the general request turns around basic principles, like transparency, accountability to the public opinion, and the social utility of the innovations.

Despite the fact that both agro-biotechnologies and nanotechnologies are already part of our daily life, it is not too late to reverse the ways they have been so far used and pushed into the market. A different, inclusive approach to public involvement in science could, then, help the scientists to focus their work on applications which respond to real public demands and needs, avoiding the rise of social conflicts.

This could provide not only a renewed form of democracy, but also it would ensure that economic investments will not end up into products refused by the lay public, thus ensuring a proper remuneration to the research effort.

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6. Simon Maurano

Environmental Risk, Science, Democracy, Economic Interests: The Case of the Waste Crisis in Campania, Italy*

1. Environmental risk and political ecology

Contemporary society seems to have reached a point of discontinuity with the past: technology and democracy, in fact, appear as alternative powers ordering the world [33, pp.viii-ix], while the political power on a global scale is often dominated by the market and inspired by liberist institutions from which a progressive renewal of democracy cannot be expected. Technocracy thus becomes a form of power in which technology and science bypass politics in key decisions for social communities (local, national, or global).

In this framework, two ongoing processes are driving the conflictual relationship between technology and politics [19, pp.128ff].

One is «the methodical elimination of all restrictions to the technical production that are considered not rational», the rationality of any production being guaranteed by the rule of the market: anything is possible if the market requires it, and no external authority can stop it.

The second process is the increasing specialization in the scientific professionalism, producing a «high rigidity, comparable to traditional and dogmatic knowledge» [19, p. 130].

Consider as an example the Vajont disaster in Northern Italy, when over 1,900 people died. A dam for a hydroelectric complex had been built in a technically irreproachable way, as shown by the fact that it resisted to a landslide detached on October 9, 1963, from Mount Toc.

* Much of my knowledge in the environmental conflict field has been gained from participation in associations and citizen initiatives as an activist, from 2006, and then while researching for a Ph. D. in Geography of Development at the University Orientale of Naples, Italy. All translations from Italian texts are mine.

This landslide, however, caused a flood that destroyed the downstream villages. Although from an engineer's standpoint the power plant was perfectly built, nonetheless the project failed to take into account either the traditional local knowledge, who knew the crumbliness of the Toc (in Venetian dialect "Toc" means "rotten"), and the warnings by some geologists. Hierarchically, in fact, knowledge based on engineering is considered superior to that of other disciplines [19, p. 131], let alone that of some mountaineers. Moreover, big economic interests were at stake: in the 1960s the energy supply was vital to support the economic boom, and economic concerns were (and still are) often considered more important than social and environmental costs.

Similar stories can be told about many other places in the world, where, even if no disasters occur, subtle effects develop in the medium and long term. Examples are the extraction of precious metals or oil, the disposal of toxic or radioactive waste, the use of river basins in excess of their ability to reload. On a planetary scale global warming is probably right now the most embarrassing and hard to manage environmental problem. Its effects will be certainly distributed in an uneven way.

The first versions of environmentalism were born in a time when there was a growing perception of the negative consequences of technological progress and of the gap between technological development and democracy. In particular a current of thought, *political ecology*, was at the origin of the early criticisms to modernization. Environmentalists, scientists, political activists shared the view that growing environmental risks are not simply a result of errors in the assessment of technological risk, but, primarily, a result of wrong political choices. They stressed the possibility of pursuing alternative political choices based on a different view of the goals of the progress ([19, p. 125], [33]). The movements related to political ecology asked for citizen participation in decisions concerning production and consumption, and emphasized not only environmental impacts, but also their unequal distribution on the territory and on the population (at both the local and the global scale).

Political ecology criticizes the new form of modernization that, according to Ulrich Beck, was born at the end of the 20th century, when, thanks to developments in science and technology, it became possible to enjoy the benefits of progress, but only at the cost of living with increasing environmental risks [9]. The new economic activities, in fact, follow a «more technological logic of economic exchange, [which] [...] can make cows more productive, but also mad» [33, p. vii]. Some effects can be severe and even fatal – just think of disasters like those of Hiroshima or Chernobyl, Seveso, Bhopal [14]... and Fukushima.

Some say that today we are living longer and better thanks to technological progress, others miss an idealized pre-modern past. Probably this alternative is misplaced: every epoch must face its own difficulties. In pre-modern times humans had to defend themselves from the dangers posed by an often hostile environment, and those dangers were by their very nature hardly predictable;¹ they had to fight for survival in a nature which was both a mother and a stepmother. Today science and technology, subjecting nature to some degree of human control, have permitted a rapid, unprecedented population growth, but they have also generated unimaginable threats of annihilation of most forms of life (just think of nuclear war, which has been for decades, during the so-called Cold War, a concrete possibility), and thrown a shadow on the future quality of life (cf. global warming).

A comparison of the modern epoch with the pre-modern one is therefore a difficult task, and its outcome depends on subjective beliefs and desires concerning lifestyles and quality of life. However, the point I want to stress is another: in the current “new modernization”, the risks generated by technology are largely known, apart from synergies of the negative externalities of economic growth (think again of the possible future scenarios of climate change), however the decision-makers/technocrats prefer

¹ Although some risk was caused by humans already at that time, e. g. see [10] on floods and malaria in Italy, which were endemic, but also caused by the cutting of forests in the mountains.

to take the risk... on behalf of everybody else. This happens because:

- technological and environmental risks are evaluated according to a cost/benefit evaluation, which overestimates the importance of economic profit and minimizes the loss of social values and natural environments;
- the negative externalities of technological and the environmental risks often fall unfairly on the territory and on the population.

As mentioned above, a fundamental problem of the cost/benefit calculations is that a few technicians decide for everyone else, rarely discussing and sharing their evaluation criteria. Usually they impose the logic of monetary cost and profit of a project, reducing all values to an economic evaluation. This reductionism obstructs other kinds of assessments, based on other value systems. And those who are able to impose their own values and methods for simplifying complexity, are the same people who take the decisions that affect all [25, pp. 219-21].

In the analysis of contemporary society there is a new social division that tends to replace the classical Marxist view opposing the holders of the means of production to the work force. Today, in fact, the problem of equitable distribution of risks is increasingly important. It is a mutation of the classic problem of equitable distribution of resources. In this framework we can distinguish the simple *stakeholders* from the *shareholders*, who can impose «significant decisions about the composition of a common world, through the creation and distribution of value» [33, p.61], thanks to their economic power. The stakeholders fight for the issues at stake, and are subject to the risks following from the decisions taken by the shareholders (see again [33, pp.60-5]).

2. The case of the waste crisis in Campania: denying participation to the involved people

In Campania, the institutions and the private firms of the waste sector represent the shareholders who have imposed their own interpretation of reality. Their simplification of complexity has created a management system which, taken

together with the low efficiency of the local administration, the persistence of criminal organizations, and the links between criminal and legal economy, has caused the well-known disaster that had world media coverage, with images of the mountains of garbage in the city's streets of Naples. Until now, this situation has been largely handled by palliative means, both at the national and the local government level, such as the reuse of already closed landfills, waste transfer abroad or in other regions, and so on.

Hidden by the daily flood of news on the hills of waste in Naples, the illegal disposal of hazardous waste in the suburbs goes on, generating huge profits for criminal organizations and big savings for the more polluting industries, and causing environmental disasters in various areas of the region, which were once an agricultural paradise. Yet the institutions responsible for the emergency management, acting under special, less restrictive laws, have therewith contributed to damage the environment: the garbage surplus, often undifferentiated, has been dangerously crammed into landfills already saturated, or poorly designed, or containing dangerous pollutants. The construction of the Acerra incinerator not only has failed to solve the existing problems, but rather has added new ones, as will be mentioned later.

Therefore, the waste affair has fuelled a bitter environmental conflict with local populations affected by the designed locations of disposal facilities. In many cases local communities have gone beyond the single local issue, getting over the NIMBY (i.e. "not in my back yard") approach, and have succeeded in creating a regional movement. This movement, on the one hand, is critical of institutions, on the other hand is advancing plenty of alternative proposals for a sustainable waste management. The activists do not believe in the solutions proposed by the institutions and companies involved, which they blame for exploiting the emergency regime in order to obtain benefits and profits, while at the same time downloading the costs onto the citizens' shoulders.

Managing the environment (natural resources, disasters, energy...) is obviously rife with economic interests, particul-

arly because significant policy decisions are backed by state funding. Just think of the scandals in Italy concerning the huge amounts of money squandered in inefficient post-earthquake reconstructions, or the recent battles over the privatization of the water sector and nuclear energy – in all these areas multi-utility companies have strong interests, as in waste disposal. In particular, the waste incineration sector attracted investors to Italy, before the European Union sanctioned state funding bestowed to the incinerators for each ton of burned waste – waste having been perversely treated by the authorities as equivalent to a renewable source of energy.²

Several public prosecutions, in Abruzzo and in Campania, have brought home what was obvious from the start, namely that the interests of the incineration firms conflict with the environmental law requiring an increase of the amounts of separate collection of differentiated rubbish. In fact, if we consider the disposal of waste as a service, reduction of waste processed through virtuous environmental policies becomes a *problem* for the investors in that service.³

As a matter of fact, in the Abruzzo region the public prosecution has uncovered the lobbying activities of politicians and business men, whose goal was to allocate a significant share of garbage to its disposal and not to its recovery. In this way only it would have been convenient to invest in an incinerator plant.⁴

In the waste management, therefore, the stakes are very high, scientific uncertainty is a battleground between

² This refers to the notorious norm “CIP6” of the Interministerial Prices Committee (CIP), often quoted in the documents of the Campanian activists. This funding is derived from a share of 7% added to electricity bills and in fact addressed to renewable sources of energy. Waste was “assimilated” to renewable sources.

³ To know more, beyond the strict legal truth, a good starting point is [30], which gives an account of the interests leading to the accumulation of more than six million tons of illegal waste, theoretically useful to incineration as dried part of domestic garbage, packaged and stored in the countryside of Giugliano and other places in the region.

⁴ See on this subject [22, 13].

differently oriented experts, while the need for urgent decisions hinders the search for objective and shared assessments of acceptable environmental risks, and for which groups [23]. Thus, in an area where the Camorra⁵ had sniffed out the convenience to infiltrate all the administrative and technical steps of waste disposal, the return to a normal management, conceived as a service for the citizens, has been made increasingly difficult.

Moreover, for the region it applies what has already been denounced by the Environmental Justice movement in the United States in the 1980s and 1990s: often it is the most vulnerable local communities that experience the highest environmental impacts. There are many reasons for this: low land costs, willingness to accept polluting plants in exchange for job opportunities, opportunistic preference for locating polluting facilities where a milder reaction is expected, or where the local legislation is less stringent on environmental protection etc.

In this context, the environmental risk assessment imposed by the institutions responsible for the emergency management has tended, in public communication, to minimize the problems raised by residents and independent experts. This behaviour can probably be seen as an attempt by the institutions to minimize the effects of *nimby* struggles and to regain public confidence, but it is the inefficient management of environmental crises and conflicts that often irreparably undermines the trust relationship between institutions and citizens.

In the Seveso case [14, pp. 84-85], for instance, the authorities were well aware of the definite effects of dioxin as a harmful pollutant, but they did not alert the population in time to avert the catastrophe. Similarly, in Campania, alarms that had been coming from the places hit hardest by the crisis of waste did not prompt an adequate institutional reaction, although the international scientific literature had already shown that the waste disposal has significant environmental and health impacts, particularly in cases where law is infringed, but also in the usual, legal disposal practices permitted by the regulations of most European

⁵ I.e. Campania's mafia.

countries. Today, the most recent European legislation is geared toward replacing the mere disposal of municipal or industrial waste with practices for the recovery of waste materials, avoiding what are recognized to be the worst disposal options: landfill and incineration.

In risk assessment the communication between the different actors involved plays a very important role. Here I would like to give three concrete examples of how, in Campania, the institutional communication of risk has been based on an assessment which minimizes the negative effects of poor management of waste in Campania, on the one hand, and justifies solutions not shared by citizens and maximizing the profits for the shareholders, on the other.

2.1 Illegal disposal of toxic waste

There has been much debate about the problem of illegal disposal of hazardous, toxic and dangerous waste, the most profitable business for Camorra. The environmental movement denounced the lack of institutional interventions, fuelled by collusion of members of government with the criminal economy, a collusion which has been suspected or even demonstrated in numerous investigations. In particular that movement has been highlighting the abundance of incongruous deployments of police and military to defend unpopular disposal facilities *from the citizens*, compared to the virtual non-existence of the state, which has left the control of territories such as in Naples, Caserta, and the bordering hinterland to the Camorra clans.

In this territory the local health authorities have reported an increase in cancer cases and neonatal malformations, while numerous studies, including one by the WHO (2007), have shown a clear geographical correlation between illegal disposal of hazardous waste, the presence of illegal landfills, and the disease incidence in some areas, although they cannot accurately establish the degree of causation involved. On this point there has been a strong scientific debate, especially animated by scholar of associations such as "Physicians for the Environment - ISDE Italy" (International Society of Doctors for the Environment), which stressed the need to act on the basis of the precautionary principle: while it takes several years and extensive

research to determine how relevant a source of pollution is compared to others, there is nonetheless absolute certainty concerning the harmfulness of illegal waste disposal practices, and this should be more than enough to influence the policies of the territory.

On reading the government studies, however, one gets the impression that they want to underplay the possibility of a causal relationship, in order to avoid spreading fears in the population. Needless to say, this has the effect, ultimately, of leaving things the way they are. To act seriously against the incoming traffic of toxic waste in the Campania region and reclaim the devastated areas would constitute a political commitment to take control of the planning and management of natural resources of the territory, and this probably goes beyond the current possibilities of the government.

We can read in the conclusions of a study of the national Commissioner for the waste emergency [16, pp. 123-4]:

The so-called "epidemic illness from waste", therefore, finds no support in these data: none of the elements described supports the formulation of associations between waste and disease. Of course, this report does not provide answers to questions concerning the causes of particular health problems of the provinces of Naples and Caserta. However, the consistency and plausibility of the information coincides with the consensus of the international literature, which denies an association between treatment of municipal solid waste and disease. [...] Known causes explain most of the pathologies observed: the excess of mortality from cardiovascular disease coincides with an excess of smoking, obesity, poor diet and lack of exercise, the excess of mortality from lung cancer corresponds well to the high proportion of smokers, and the excess of liver cancer is linked to the endemic hepatitis B and C viruses. [...] There is a strong socio-economic plausibility: the crowded areas and socially deprived have higher rates of ill health than others. The economic, social, and cultural deprivation remains, throughout the world, the prime determinant of ill health.

Actually it can be argued that «the justifications put forward by the governing bodies are too focused on the elimination

of risk perception, rather than on the prevention of the risk itself» [26, p. 313]. In a climate of mutual suspicion and distrust of institutions, the appeals to avoiding alarmism, launched *by the very actors found guilty of environmental disaster*, cannot be taken very seriously, and they only feed the resignation of some citizens, on one hand, and intensify the activism of others, on the other (in many forms, including, of course, counter-information).

2.2 Incinerators

The incineration of waste has often been presented as a rapid, technologically advanced, and sustainable solution to the problem of disposing of household waste masses that put at risk the health and the decorum of a city. But this solution in the case of Campania probably hides significant economic interests, which have obstructed the adoption of more sustainable practices for the recovery of waste, such as the reuse and recycling, hierarchically preferred by European norms [30].

Without going into the legal proceedings involving the government Commissioners and the Impregilo-Fibe firm, we will focus on an episode of environmental communication that has contributed to the debate among scholars and movements in Campania.

On January 15, 2008, before the Acerra's incinerator had been built, and during the waste crisis, the Faculty of Engineering, University of Naples Federico II, invited Professor Paul H. Brunner, a chemical scientist from Vienna, expert in systems of disposal and incineration of waste, to deliver a lecture on "The big city and its waste". Since some scholars of technical faculties had been involved in the planning of the waste management system, to invite Brunner was in itself an apology of the policy of the government Commissioner of the waste.

In his talk Brunner, after speaking of the need to create an integrated system for the disposal of municipal waste, extolled the virtues of modern incinerators, highlighting how modern waste combustion, through systems of filtration of the gases, is able to break down many more pollutants compared to the incinerators of the 1960s and 1970s. His praise for the technology of the Vienna plant,

built at the centre of the city, annoyed some members of the movements, which pressed him with questions about the residual risks of pollution and about the problems of the Acerra plant in particular.

While premising that he did not know well the situation in Campania and its many legal, political and technical problems, Brunner admitted that in general it is not possible to eliminate all pollutants. He said that, given the huge increase in the social metabolism, there is a need to find a remedy that protects people and natural resources from the increase of waste, and the remedy lies, in his opinion, in the most advanced technology, embodied into the integrated system of waste disposal.⁶

This point of view differs from that of the environmentalists, and is at variance even with the European legislation on the supply chain of materials. Brunner added that if we want progress, we must put on the balance both costs and benefits, and choose between a 100% pure environment and the daily benefits of the technological progress. The choice, he noted, is implicit in the preferences of consumers for new and advanced technologies.

Brunner's view fell within the dominant thought placing technology before democracy: the choices ahead are taken for granted, there is no mention of the issue of induced needs and the excesses of consumerism, nor of the possibility of changing the consumption habits, as contemplated already in the last European Union's environmental programs – although only at the level of statements of principle, which are rarely applied, especially

⁶ The integrated system involves the use of various technical means to manage waste from landfill to recycling and incineration: with an assessment based on cost/benefits, usually in purely economic terms, a decision is taken on which share each of these means should have. Against this system, used in most countries with advanced economies, the European Union has been developing laws that indicate a hierarchy of more sustainable solutions to be respected (see, for instance, [18]). Many Campanian movements on waste are claiming these kinds of solution such as “total recycling of matter” and “zero burning” (see the internet site of Co.Re.Ri at www.rifiutacampania.org).

when inconsistent with taking economic growth as a top priority.

So, for scientists like Brunner, the cost/benefit assessment, made under the assumption of rationality of the consumers' choices, justify solutions such as incineration, which are costly both in economic terms (since plants must be engineered so that emissions are reduced according to regulations) and environmentally.⁷ But combustion, while reducing quickly the volume of waste of a senseless consumption, allows to make room for a new incoming waste flow, thus sustaining economic growth, as Bauman points out. In fact, to make room for ever new items, a consumerist society must necessarily find places where worn or simply discarded objects can be disposed of, in a faster and faster obsolescence process driven by advertising and fashion ([8], [15]).

Brunner might be placed, following the scheme worked out by Shrader-Frechette, in one of the three groups that are, largely, prejudicially adverse to risk avoidance attitudes: industry spokesmen, risk analysts (who are often paid by the same industry), or social scientists unfavourable to participation [32, pp. 39ff]. Often these experts, especially engineers, are well integrated into the planning process of industrial systems such as those for the disposal of waste, so it is unlikely that they declare the waste combustion to be unsuitable and, as a result, their area of expertise to be useless.

Brunner's opposition to participation was based on some hypotheses which were not scientifically tested: he accepts as a fact that people prefer to take the risks associated with waste incineration in order to enjoy the benefits of technology. There is not a national survey on the satisfaction of waste burning practices, but while there may be a consumers' preference for new products, there is also a conspicuous mass opposition to constructing or expanding incinerators. It stems from several factors: mismanagement

⁷ This approach, before being widely criticized at the end of last century, has generated methods of environmental protection of mere repair or of emission limitation, known as *end-of-pipe*, or *business-as-usual plus a treatment plan* [31, p. 97].

and consequent increase in risk perception (see the recent cases of Acerra and Colleferro, near Rome); shrinking of spaces usable for the waste disposal, and therefore need to plan new facilities; the dissemination of information on health risks and alternatives to incineration that are environmentally more sustainable, more affordable, and more fit to increase employment.

Of course, to implement more sustainable practices, a good institutional arrangement is needed, based on the honest and heartfelt cooperation of citizens – a fact by no means impossible: it is occurring in many municipalities of the same Campania region, not only the smallest ones and least urbanized (think about the high rates of differentiated collection of Portici and Salerno, or those of some sections of Naples).

In conclusion, technicians like Brunner refuse to put democratic choice before technocracy,⁸ in order, probably, to protect a *status quo* that favours the investors' interests.

2.3 Plans for the waste management

The future of waste management faces a path not very democratic and participated. The waste plan of the Campania Region, that the new Regional Council is preparing, does not improve the chances for the population to participate in technical decisions of administrative bodies. The Council has adopted the same decision procedures of the government Commissioners, without involvement of the population. It also entrusted the development of the regional plan to Umberto Arena, Professor of Plant Engineering at the Second University of Naples, and expert of systems for energy recovery from waste, a former consultant of the Commissioner: a choice of a scholar with preconceived ideas about how to handle the question, and to whom at least the same criticisms made in the previous paragraph to Brunner apply.

The plan that in recent months the Campania region sent to the European Union to receive funds, frozen as a result of lack of compliance with the European regulations concerning waste management, seems biased in favour of

⁸ That includes a comparison of the parties involved and informed, perhaps through a participatory choice process.

incineration, which contrasts with the European priorities in waste management. The plans aimed at 50% of separated collection, to be compared with 65% required by law: so they would once again favour industrial groups involved in the construction and operation of incinerators, producing little energy and, worse, funded by the Italian contributors... as a renewable source.

Cases like those described are examples of actions undertaken to reduce the opportunities for participation from below, under the standard DAD model ("Decision, Announcement, Defence" – or, in humbler terms, "do not wake up a sleeping dog"), consisting of top-down decision, public announcement, defence from objections, often used by decision makers facing strong environmental conflicts [21]. This model turns out to be counterproductive, since it generates no shared territoriality, distrust of institutions, and intensification of territorial conflicts. Yet during the waste war in Campania, citizen groups have developed a complex organization and developed ideas for a more careful, sustainable, and participated waste management – a waste management which could be part of the solution, not part of the problem.

3. "Naive positivism" or economic interests?

In the context outlined above, the chances for a constructive participation of citizens are very low. Policy makers and technicians have denied participation from below, by adopting attitudes ranging from "naive positivism" to favouritism for business and industrial groups, in order to cater for their own political and bureaucratic survival.

By "naive positivism" Shrader-Frechette means an extreme attitude of defence of traditional views of science, which assumes «that a single evaluation criterion, or a single paradigm of rationality, exists and is applicable» [28, p. 14] – which curiously happens to agree with some kind of economic rationality. The governmental and regional Commissioners in Campania have considered to be a rational and scientifically unique choice to rely on technological solutions for waste disposal.

As shown in the case of the tender won by FIBE and aimed at developing an integrated system of waste disposal, this trust was misplaced for two main reasons:

- because the pretend “scientific rationality” of the company led to the adoption of an integrated waste management system which, though theoretically appropriate,⁹ was certainly not advanced in terms of sustainability;¹⁰

- because this system did not work according to promises: some actors (public prosecutors, experts, technicians) suspect that it has been systematically sabotaged,¹¹ creating disadvantages to citizens and benefits to those who, for various reasons, were involved in the management system – the Camorra groups that have always profited from emergency situations where additional funds are dished out, and where controls are less strict; industrial groups that failed to provide the agreed service; customers and service providers of illegal disposal of toxic wastes, which have drawn enormous benefits from chaos and lack of controls; and even workers employed by a patronage

⁹ Although with several technical inconsistencies such as those underlined in [30].

¹⁰ It was developed based on a model for disposal already adopted by other regions, based on separation plants to produce fuel from waste (called CDR) for use in waste incineration, and a stabilized organic fraction, theoretically useful to refill exhaust quarries. Then it was found out that FIBE's project was inconsistent and infeasible: the calculations on the output of the plants were incorrect, and even special landfills for the ashes coming from the incinerator were not provided (see again [30] for technical details).

¹¹ The former Councilor for the environment of Campania, Walter Ganapini (2008-2010), who was appointed in the last phase of the Bassolino government, in some interviews has advanced disturbing suspicions about the handling of the waste, highlighting how the failures were not caused by a lack of plants, but by their inactivity due to bad politics and sinister interests (see the interview with Matteo Incerti made in 2008 and available at www.youtube.com/watch?v=syJzVR9uzzU). His words, in other contexts, probably would have provoked political and legal “earthquakes”, while in Campania they had nearly no consequences.

system, which only got the crumbs from this great deal, and that in return, however, have fuelled the political consensus to the power groups that have managed chaos.

The same Commissioners, appointed in Campania by the central Government since 1994, and their technical staffs, are now facing charges by the public procurement and the Court of Auditors that suspect a huge embezzlement of public funds, environmentally destructive operations, and makeshift solutions to the crisis that allowed for an emergency management to become a normal form of government.

In short, positivism and illegal economic interests created an explosive mixture in Campania.

On one hand, positivism and faith in progress created policies that were aimed not so much at rethinking our approach to the exploitation of natural resources, but only at limiting emissions into the environment – the priorities of the establishment having always been not to stop the economic growth, under the ideological assumption that technological progress would have found the solutions to its own negative externalities.¹²

On the other hand, when the “business as usual” approach to the exploitation of the environment is mixed with illegal purposes, the negative effects of growth will not be limited but amplified, with the institutions themselves approving them. In fact, in order to save the current economic approach, in areas like Campania region the worst violations of environmental law have been justified under the emergency regime, and in the process the participation of citizens in key decisions for their territory has been systematically denied. The positivist approach to economic growth needs lawless areas to go on, and these are the economically weaker countries and regions of the world.

In this connection, the regional movements are convinced that the garbage crisis is not a technical problem, but it is totally a political one (they call it a “democratic crisis”), and they affirm that it is provoked on purpose, in order to going on exploiting parasitically public funds with no respect for the rights of citizens. If this suspicion is true, the positivist

¹² [Cf. chapter 1, section 3. (*Editor's Note*)]

justification of that crisis is an ideological tool for the power system to silence the request of participation by citizens.

4. Post-normal science, civic participation: answers to imposed environmental hazards

Today the debate on how the public actors must face situations of uncertainty is looking for tools making possible a dialogue between experts and lay people, recognizing that even the latter bring legitimate ways of knowing [14, pp. 85-6]. The experience of people should have a weight in the decisions that affect them, especially when two conditions hold:

1 – There is scientific uncertainty about the solutions to be adopted.

Ecosystems are a «non-trivial machine» [34], whose reactions to certain actions affecting their overall balance no one can fully predict. The positivist ideology has proved to be inadequate both in the management of ecosystems, and in the control of the technological system. The relevant level of complexity is so high that neither the risk of serious accidents, nor unforeseen negative externalities, which frequently occur because of the synergistic action of different environmental impacts on a given territory, can be effectively prevented.

2 – Stakes are high, in face of conflicting economic interests.

In this situation a shared environmental risk assessment is hard to reach, and when economic power is able to prevail upon rights (human rights, right to health, right to a healthy environment etc.) the result is that higher and higher risks are distributed to the more vulnerable groups.

Funtowicz and Ravetz [23] have discussed the failure of the methods of the "normal" science, based on specialized knowledge and on reductionism. Therefore they have developed a new epistemological proposal, called "post-normal science": experts and local communities must work together to form a shared knowledge and to reach shared decisions. Communities have to be regarded as repositories of an experience of the territory that "normal" science does

not possess, and that should be exploited to prevent failures due to the one-sidedness of the professional, external approach.

The complexity of the waste problem of Campania and the strong interests at stake, therefore, would have required an intense exchange with the inhabitants, while, as pointed out in [17], the decision-making process adopted by the government, through exemptions from environmental legislation and the tightening of repressive measures against activists, has tended to simplify a complex crisis and to ignore the alternative views of the grassroots movements.

The monopoly of risk assessment and the territorial policy has been given to technical experts associated with the political and economic power [3], but it is only by looking at the waste crisis through the eyes of activists [5] that the political implications can emerge ([3], [26, pp. 285ff]):¹³ the environmental risks are not evenly distributed, there is a strong link between environmental struggles and struggles for the health, there is a demand for justice that goes beyond the principle of compensation, and the final objective is not to counter the institutional choices, but to obtain the self-determination of local communities in decisions affecting their own area [2].

Many researchers consider useful to involve the population before and along with the controversial territorial policies, and preferable to the aforementioned DAD method [21]. Potentiality and limits of participatory methods have been identified by various researchers; however, an imperfect democracy resulting from discussion and negotiation is to be preferred to actions and policies for the territory that are *a priori* not shared [12]. Moreover it is often in the interest of the promoters of a public work to try to enter into a dialogue with the affected communities rather than to face an institutional impasse and a longer decision process.

¹³ Environmental justice mainly defines the equitable distribution of environmental costs of economic growth among social groups and/or geographic areas. The definition comes from the experience of the Environmental Justice Movement, born in the early 1980s in the United States [6].

International agreements such as Agenda 21 and the European Charter of Aalborg recommend, or in some cases (like the Åhrus Convention: *Access to information, public participation and access to Justice in Environmental Matters*) provide the standards for an informed participation of citizens, but in cases where the challenge is harder it is rare to find that institutions are open-minded enough to accept a real citizen participation.

The cases in which the conflict is irreconcilable are not those in which there is a discussion on the usefulness of a single public work, or on guarantees and compensations to give to the residents that will suffer the negative effects, but are those in which these forms of protest are combined with more significant disputes on territorial policies (like in the case of the Italian movements No TAV, No Ponte, No Dal Molin, those opposed to the privatization of water, those against the use of nuclear energy, and also those with an alternative idea for waste management in Campania). In these cases the institutional actor does not want, typically, to use participatory methods, but rather will seek the approval of some stakeholders through compensation or other forms of co-optation.

How to get a solution then? What conclusions can we draw?

Waste management, within the various models of participatory democracy (involvement processes, public consultation, negotiation), could become a kind of experimental laboratory not only to develop an approach for a more economical and rational use of resources on our planet, but also to develop a new approach to the problems of democracy in a world dominated by the globalization of economic and social processes. On the contrary, when participation is denied to protect certain interests, citizens can only protest. To put it in Viale's terms, the crisis of political representation has displaced popular sovereignty by voting power to veto power, which becomes the only feasible form of action by those local people who feel their rights to be trampled [35, pp. 114-6].

Where economic interests appear to abuse citizens' rights, as in the long years of "emergency regime" in the Campania region, the many forms of protest and the various proposals

that come from below should not be considered to be part of the problem, but may instead be considered as a part of the solution of the problem.

In other words, social and environmental conflict in this case can be seen as a possible solution to a deadlock of the institutions, which for years have been unable to offer long-term solutions, or non-discriminatory and environmentally acceptable policies in the region.¹⁴

Finally, we can say that NIMBY is not (only) a syndrome, but it can be an opportunity to encourage a cooperative attitude towards a political awareness and a more democratic and sustainable idea of the territory: in such cases the local struggles often build networks for the defence of common interests or also, at a higher level of awareness, for the promotion of common goods, and turns into regional, national and global struggles, from NIMBY to NIABY (not in anyone's backyard) and up to NOPE (not on planet Earth). The NIMBY, therefore, is no longer the syndrome described for instance in the following typical citation [7, p.171]:

We agree that the construction of an incinerator or a landfill for industrial waste is a benefit to everyone, but because of fear of hardships and dangers, people insist that nothing should be built in *their* territory [...] So they tend to defend their own territory and to leave to others the costs of the common good.

In fact an agreement on the usefulness of some public works, and more generally on the very idea of economic development behind them, and on the associated environmental costs of inequality, does not exist.

The defence of our own backyard becomes the last possibility in extreme situations such as those described in this article, but it can be also a first step to a new awareness of human and citizen rights, tending to the common good, beyond exclusively economic or self-centred evaluations.

¹⁴ [2]; for the remarks above I acknowledge exchanges with Stefania Barca, Marco Armiero and Marino Ruzzenenti.

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Environmental, Economic and Financial Uncertainties of Nuclear Energy: A Closer Look Worldwide and in Italy

1. Introduction. The Nuclear Renaissance

The first years of the new millennium were characterized by a renewed interest in nuclear energy [2], the so-called “nuclear revival” [42]. In developing countries thirty plants are in construction against the five in OECD countries (two in Europe: France and Finland) [3, 59]. The Italian energy policy was also influenced by this interest wave, after the nuclear phase-out decided in 1987. This resurgence of interest was mainly based on claims that nuclear energy is cheaper, has lower price volatility compared to fossil fuels, it is secure in supply [33] and does not contribute to climate change. The Fukushima accident in 2011 put an abrupt stop to nuclear industry expectations, forcing Governments to rethink their choices and energy plans.

1.1 The search for carbon free energy

Low nuclear *greenhouse gas* (GHG) emissions is perhaps the most emphasized, studied and debated aspect. According to Sovacool [49], advocates of nuclear power consider it «the only non-greenhouse gas emitting energy source that can effectively replace fossil fuels and satisfy global demand». A 1000 MW_{el} coal power plant releases about 6 millions tons of CO₂ per year, while nuclear is claimed by its supporters to be quite CO₂ free. According to the international Nuclear Energy Agency (NEA) [39] in the last 40 years nuclear has contributed to avoid 1,200 million tons per year of carbon dioxide.

Opponents have objected that «nuclear plants are poor substitutes to other less intensive greenhouse gas generators»: wind and hydroelectricity have respectively one-third and one-fourth less CO₂-equivalent emissions than nuclear power. The Oxford Research Group [49] predicts that, assuming constant nuclear capacity, by 2050 nuclear CO₂ emissions per kWh would equal those from gas fired power plants due to decreasing uranium ore grade.

1.2 Radioactive waste

The contribution to climate change is only a part of the story. Other relevant aspects include «high capital cost, proliferation of dangerous materials, nuclear terrorism, operation safety and radioactive waste disposal» [53, 43, 22, 32]. Large amounts of nuclear waste have been accumulated in USA [34, 32] and worldwide and there is no easy solution for radioactive waste disposal or destruction [35]. No country has yet adopted a successful disposal after fifty years of nuclear civil programs. The first commercial geological repository is expected to open in Sweden by 2018 [3]; the solution to the nuclear waste issue (short-term and long-term nuclear waste management and spent fuel processing) is a prerequisite for further expansion of nuclear industry [1].

1.3 Market uncertainty

The actual competitiveness of nuclear must be analysed in a wider perspective. It cannot only rely on the analysis of greenhouse gas emissions, since nuclear is a very complex and expensive technology and many more aspects come into play.

The liberalization of electricity markets shows that the fate of nuclear is strongly affected by energy market structure. The loss of some main favourable conditions (governmental support, certainty of demand, a price regime based on recovering the production cost increase by charging higher prices to consumers, etc.) led to a drop of the number of nuclear plants built from 1990 to 2005 to only 1.7 nuclear plants per year (mainly in developing countries) compared to 17 nuclear plants per year built in the period 1970-1990 [3]. In liberalized electricity markets decisions about energy technologies are driven by the expected returns, taking into account the risks (afforded by the company, rather than by consumers as in a monopoly regime) linked to costs and revenues [21].

Moreover, nuclear energy has to face new competitors such as renewable source technologies, characterized by a lower carbon content, better environmental footprint, increased

population acceptance and higher growth rates favoured by cost reduction driven by technological innovation.

1.4 The Fukushima accident

The earthquake in Japan (March 11, 2011) and the consequent ongoing melting of the Fukushima nuclear power plant reactors (6 reactors for a total power of 4,200 MW) have raised new questions on the fragility of the nuclear industry. Japan is no doubt one of the countries worldwide where the safety of urban and industrial buildings and plants was pursued with the strictest normative requirements and highest technical quality. The accident showed very clearly to the eyes of the world that even such high performance was not a sufficient guarantee against the risks of human errors and natural disasters. The claimed low probability of a nuclear accident does not mean that it cannot happen (as it has always been suggested), and must be read differently: the disaster *can* happen, although not frequently. That the failure could be attributed to the conventional part of the plant (cooling pumps, emergency electric supply) makes the picture even worse, not better, since this makes it apparent that the safety of a highly risky technology depends on very conventional devices, designed for “normal” emergencies and therefore even more likely to collapse when huge natural disasters and crucial human errors occur.

The high Japanese standards of life demanded huge energy (mainly electricity) supply, in a country that has no local energy resources. The Japanese way of living will have to be re-designed towards a lower energy intensity of production and consumption patterns, with huge consequences on its national and worldwide economic systems.

If nuclear energy becomes difficult or impossible to implement, then fossil fuels may become once again the main choice of industrialized and developing economies (with coal as the cheapest option). The likely increase of fossil fuels prices, hard competition for their supply as well as related environmental concerns, call for urgent, worldwide rethinking of standards of life, de-growth

policies, and larger reliance on energy conservation and renewables. This is the major challenge that the whole planet is facing and nobody can predict at present if and to what extent this is likely to happen in the short or medium run.

2. Nuclear energy: a world overview

About 435 reactors are presently in operation in 31 countries with a total installed capacity of 368 GW_{el} [12]. Compared to fossil fuels, used in power generation in the residential, commercial, industrial, and transport sectors, nuclear energy is *only used for electricity generation*.

Electricity from all sources has a market share of about 17.1% worldwide and 21.1% in OECD countries, in terms of final energy consumption.

The nuclear share of world electricity supply during the period 1973-2008 increased from 3,3% (1973) to about 18% (1990), then decreased to 13.5% (2008) [6, 26].

Oil powered electricity declined its share from 24.7% (1973) to 5.5% (2008). Natural gas and to a lesser extent coal expanded their share in the same period [26].

Nuclear energy supplies about 34% of the total electricity produced in the European Union. Italy does not have nuclear plants in operation but imports about 15% of its electricity mainly from France, where 77% of electricity comes instead from nuclear [11]. The global nuclear electricity generation (except for China and India) was projected – even before the Japanese accident – to increase at rates lower than the overall electricity generation by 2030 [32]. IEA [25] foresees an installed capacity increase to 415-519 GW_{el} in 2030, EIA [10] predicts an increase to 481 GW_{el}, and OECD-NEA projections predict up to 600 GW_{el} [32]. Such a lower growth rate can be attributed to public concerns about safety, proliferation risks, restrictions in supply chains due to skilled labor shortage and insufficient enrichment capacity, lack of experienced contractors, lack of solutions for spent fuel disposal.

According to Lenzen [32] promises of performance improvement (higher resources sustainability, inherent

safety, substantial reductions in radioactive waste volumes and lifetime) rely on the new generation-IV reactor and fuel cycle technology, foreseen by 2030. How these forecasts of nuclear development will be affected by the Fukushima accident and the need for increased safety devices and strategies is still to be seen, thus adding uncertainty to uncertainty.

Some countries (e.g., Germany, Switzerland) are planning a slow phase out of the nuclear power, while others seem oriented to keep their nuclear route, due to their heavy dependence on such energy modality. For instance, although nuclear plants in Japan have been closed for inspections, economic reasons push for restarting; in France concerns about nuclear energy are slowly emerging.

Italy decided to exit nuclear power, after a referendum held in June 2011.

2.1 The uranium market: a gap between demand and supply

The annual world uranium production has been around 50,772 t_U in 2009, covering about the 77.5% of annual demand (that is around 65,500 t_U) [60]. The gap between demand and production has been (and still is) met by secondary sources such as low enriched uranium (LEU) from the dismantling of nuclear warheads, re-enrichment of depleted uranium tails and spent fuel reprocessing [40]. Two main periods of high uranium exploration can be identified.

The first one, in the 1950s, was driven by the demand of weapon industry while the second one, in the 1970s, was due to the fast development of nuclear civil programs as a reaction to the 1973 oil embargo [44].

Prices have been recently rising after about twenty years of decreasing trend [59], thus stimulating new exploration activities and leading to an increased resource supply [32]. World uranium Reasonably Assured Resources (RAR) and inferred resources were 3.2 Mt_U in 2003, increasing to 4.7 Mt_U in 2005, 5.5 Mt_U in 2007 [32], 6.3 Mt_U in 2009 [9] and finally 7.1 Mt_U as of January 2011 [41]. RAR and inferred resources should provide uranium for the next 100 years at current production rates [32]. Mudd and Diesendorf [36]

highlight that, despite perceived resource scarcity, the last two nuclear programs (nuclear weapon race in the 1940s and civil nuclear development in the 1960s) have been followed by new resource discovery. As with all fossil fuels, it is expected that the new deposits explored in the future will be deeper compared to most of the presently exploited deposits. The average ore grade mined is also expected to be lower as far as the best deposits are exploited, although Canadian newly discovered deposits show an increasing trend [38, 22].

A summary of world uranium producers is provided in Figure 1. It clearly appears that the uranium market is dominated by very few countries, similarly to the market of fossil fuels (and maybe even more).

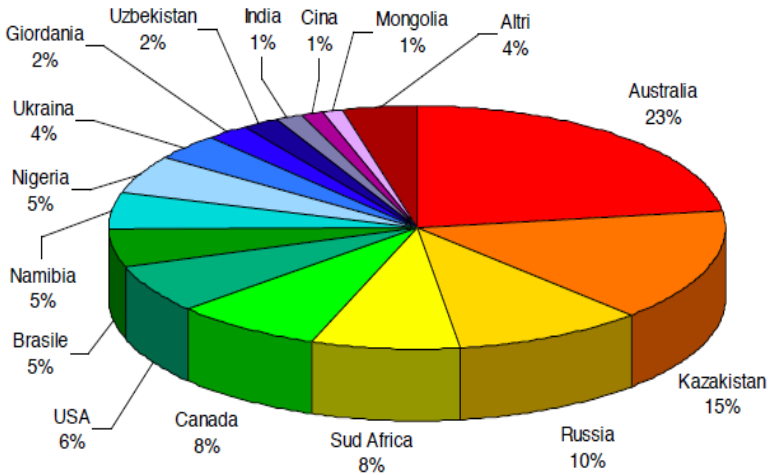


Figure 1. Overview of world uranium producers [58].

2.2 A "peak" for uranium?

The gap between demand and supply of uranium raises concerns for a possible peak of world uranium (Figure 2). Compared to oil, uranium is relatively abundant but difficult to find at economically attractive concentration grades. The trend of production and the increase in price are signals of the gradual depletion of the best deposits and the need for exploiting new deposits that could require higher investments and extraction costs. Uranium is having the

same trend as oil, where scarcity and increasing extraction costs are causing the so-called “oil peak”.

Some authors suggest that uranium is also near to or has already passed its peak [4, 22], although this trend is not easy to be confirmed because of the irregular production activities. The future of nuclear power will be heavily affected by either the scarcity of uranium resources and the increase of extraction costs, so that it might be very difficult to keep the promises of cheap nuclear energy, even without taking into account the cost increase determined by the demand for better technologies.

3. The nuclear fuel cycle

Nuclear electricity is the final product of several upstream activities from mining to processing and finally converting the nuclear fuel. These activities, together with downstream disposal and processing of used fuel, constitute the *nuclear fuel cycle* [61].

A fuel cycle can, in turn, be classified into two types: *once-through* (open) and *closed*. The latter types «reuse the nuclear materials extracted from irradiated fuel» [24] while the former ones do not reuse nuclear materials and discharge them directly into disposal sites [49].

The choice between “open” or “closed” cycles is an important national policy decision [24]. At present most of the nuclear reactors operate adopting the “once-through” cycle [42, 49]. Reactors operating with closed cycles, separate waste products from the still fissionable material, that is reprocessed and re-used. The reprocessing activity has the double advantage to reduce both the upstream demand for natural uranium and the downstream waste that must be disposed of [31, 49]. Closed-cycle reactors have however disadvantages linked to the reprocessing costs, proliferation risks and problems with fuel cycle safety [49].

3.1 The five steps of nuclear cycle

The two nuclear cycle types share at least five interconnected stages (Figure 3):

- (1) upstream or “front-end” activities, in which uranium is extracted from ore (open pit, underground mining or in situ leaching), milled, converted to uranium hexafluoride, enriched and finally used to make the fuel element;
 - (2) power plant construction;
 - (3) plant operation and maintenance;
 - (4) downstream or “back-end” activities, in which the spent fuel is conditioned, reprocessed and disposed in final repositories (if any);
 - (5) plant decommissioning and mine site reclamation [49].
- Other related activities (heavy water and zirconium alloy production) and transport of the materials among the different steps must also be taken into account [42, 24].

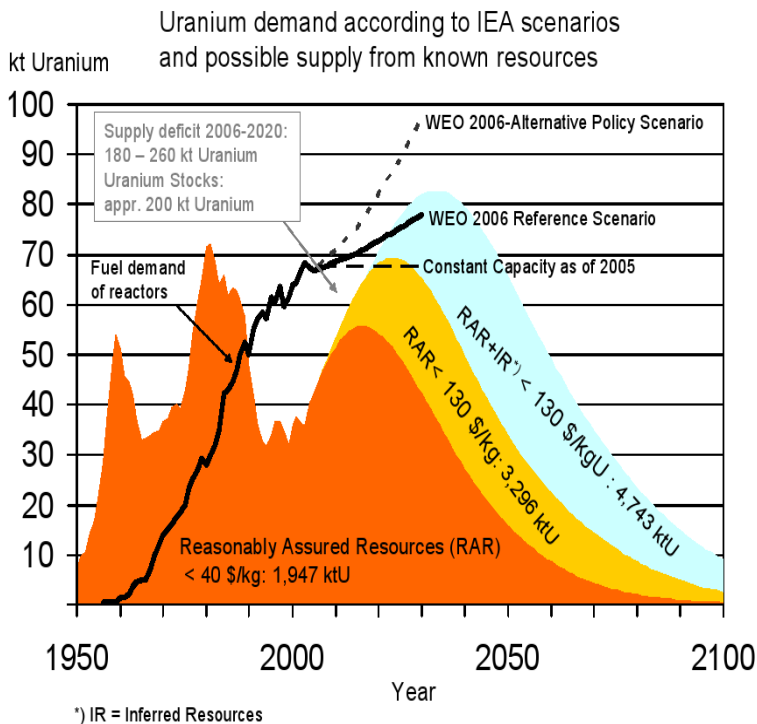


Figure 2. Estimates of available uranium stocks at different price compared to the present uranium demand for existing reactors [15].

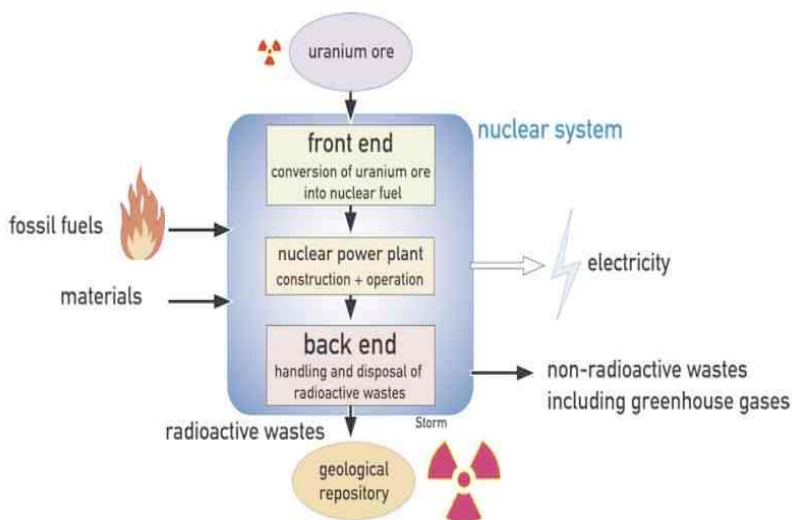


Figure 3. The nuclear fuel cycle [54].

4. Environmental analysis of nuclear fuel cycle

The present review is based on 9 *life-cycle assessment* (LCA) studies published since 2000, dealing with the nuclear fuel cycle at different levels of detail and scope. Four of them are actual LCAs of specific cycles [29, 30, 8, 57], while the other five are in turn reviews of the existing literature [19, 16, 49, 31, 17], making up for more than one hundred cases compared and summarized.

4.1 Main focus on greenhouse gases

Most of the reviewed studies are focused on greenhouse gas emissions over the nuclear fuel cycle [31, 49] or on the comparison with other fossil or renewable energy cycles [19, 8, 16]. The latter also include indicators different than greenhouse gas emission, such as radioactive emissions (noble gases, H_3 , C^{14} , aerosols, Actinides [8]; SO_2 , and NO_x emissions, direct land requirements [19, 17], indirect land requirements [17], energy payback ratio [19, 31], and energy requirements [31].

Table 1. CO ₂ emissions from different typologies of power plant		
Technology/fuel	Power/typology	Emissions range (gCO ₂ /kWh _e)
Wind	2.5 MW, offshore - 1.5 MW onshore	9-10
Hydroelectric	3.1 MW, reservoir - 85 MW reservoir	10-12
Solar thermal	80 MW, parabolic	13
Biomass (short rotation, forest and waste wood)	Co-combustion with hard coal- steam turbine-reciprocating engine	14-41
Solar PV		
Geothermal	CdTe-Polycrystalline silicon-CIS	19-70
Nuclear	80 MW, hot dry rock	38
Natural gas	300/1600 MW/Various reactor types	1-290
Geothermal	300-700 MW/Various combined cycle turbines	398-450
Hydrogen from nat gas reforming	20 MW, hot water/wet steam field	380-650
Diesel and Heavy oil	Fuel cells (stand alone or hybrid with gas turbine)	493-664
Coal	320 to 1280 MW/Various generators and turbine types	778-923
	320 to 1280 MW/Various generators and turbine types	960-1100

Source: after Brown and Ugliati, 2002; Dones et al, 2005; Fthenakis and Kim, 2007; Lenzen, 2008; Wissel and Spohn, 2008; Sovacool, 2008a; Ugliati et al, 2010.

4.2 Comparing CO₂ emissions from nuclear with other electricity generation processes

A comparison of the average CO₂ emissions from different types of power plants powered by either renewable and nonrenewable sources (Table 1) shows a very large range of options, with nuclear ranking low compared to fossil fuels

and still high compared with wind, hydro and other renewables. The most surprising aspect in the reviewed studies is the large spread of estimates of CO₂ emissions from nuclear. Sovacool [49] calculates an average emission of 66 g CO₂/kWh_{el}, but due to the spread based on very different assumptions the real meaning of such an average is questionable and therefore scarcely useful for nuclear policy planning.

4.3 Dealing with uncertainty

Some authors [17, 49, 31] investigated the causes that contribute to the uncertainty of LCA estimates about nuclear GHG emissions in the literature. For Sovacool [49] the main reasons are:

- scope (e.g. some studies do not include all the stages of fuel cycle);
- assumptions about the quality of uranium ore (decreasing uranium grade in ore increases GHG emissions, as the lower the grade of uranium ore the higher the quantity of rock to be extracted and handled, and therefore the higher the energy needed and the GHG released);
- type of mining (methods of extraction and source of energy used for the extraction; for example uranium extracted closer to industrial centers releases less GHG emissions than the one extracted from mines in remote areas that rely on less efficient sources of energy);
- enrichment method (diffusion method is an older technology that requires much more energy than the centrifuge one);
- spatial focus (some studies assess emissions from specific reactors while others assess national and global average emissions based on industry data; individual cases in general provide a variety of estimates, while an average emissions approach always provides higher estimates);
- measurement of historical or marginal/future emissions (some of the studies refer to historical emissions while others look at future emissions for some type of plants, e.g. [8]);

- reactor type (the different design of reactor affects the GHG emissions: CANDU is considered by many as one the most GHG efficient commercial reactors);
- site selection (the location is a factor that in many ways affects a reactor's GHG performance; for example Canadian nuclear life cycles are associated to less GHGs than Chinese ones);
- operational lifetime (lifetimes and capacity factors vary in the reviewed studies yielding different estimates);
- the LCA applied (economic input-output based LCA, process-based LCA, and hybrid LCA have been applied, generating different GHG emission estimates; according to Fthenakis and Kim [16], the first method gives emissions 10-20 times higher than the process-based one).

Lenzen [31] identifies ore grade and enrichment method as the main factors that affect the energy and GHG performances in *light water reactors* (LWRs), also depending on the energy mix of the country, while only the ore grade affects *heavy water reactors* (HWRs), since the latter do not require enriched uranium. Fthenakis and Kim [16] highlight enrichment, production and operation stages.

4.4 Looking out of the "global warming" boundaries

The potentialities of an LCA are related to the possibility of identifying the most environmentally significant stages as well as the process contribution to more than one impact category. Providing a global picture of the environmental impacts, not only GHG emissions, is very important for transparent information to the society. In particular, out of the 9 studies reviewed, only [29, 30] carried out an LCA purposefully with these objectives as well as «to solve the problem when LCA is applied to facility releasing the radioactive wastes» [29]. Their results show that the nuclear fuel cycle causes important environmental impacts also in other impact categories; [29] included in the study the upstream activities, the nuclear power plant, the waste treatment (once-through cycle) and all transportation steps. The functional unit was the delivery of 1 GWh of electricity from 11 *pressurized water reactors* (PWRs) in commercial operation in 1998 in Korea. The authors found that the main environmental impacts caused by nuclear fuel cycle

were abiotic depletion (73.3 g/yr), human toxicity through air (40.9 g-body Wt/yr) and global warming (27.7 g-CO₂/yr). They also identified mining and milling as the dominant stages in the cycle. These steps contribute to the largest depletion of abiotic resources (96%), ecotoxicity through aquatic pattern (98%) and human ecotoxicity through water (78%).

Lee and Koh [30] applied LCA to three different nuclear cycle alternatives (once-through fuel cycle, with direct use of PWR spent fuel in CANDU reactor (DUPIC process) and recycling with plutonium and uranium recovery (PUREX process). The latter option resulted to be the less environmental loading. Internal exposure was identified as the most radiologically significant step.

Fthenakis and Kim [17] focused on the life-cycle direct and indirect land use, measured as land transformation and land occupation, respectively for conventional and renewable sources. According to these authors, the electricity generation pattern that is less demanding in terms of land is nuclear (120-150 m²/GWh_{el}), followed by coal (depending on the typology of mining: 100-900 m²/GWh_{el}), photovoltaics (land demand 164-600 m²/GWh_{el}, with potential of much better values in case of rooftop PV), natural gas (260 m²/GWh_{el}), wind electricity (1000-2000 m²/GWh_{el}), and finally biomass (12500 m²/GWh_{el}).

Gagnon and collaborators [19] estimated direct land use for renewables (hydro with reservoir, hydro run-of-river, biomass plantation, sawmill wastes, solar photovoltaic, wind power), coal cycles, and nuclear. For nuclear they presented two values: without/with the land needed for the long-term waste. In the first case they estimated a value of 5000 m²/GWh_{el}, a much higher value compared to other sources. In the second case the direct land requirement for nuclear increased to 100,000 m²/GWh_{el} (assuming that «0.1 km²/Wh_{el} is required for waste disposal, multiplied by 30,000 years, applied to 30 years of generation»).

4.5 Lack of standardized procedures, lack of consensus

It clearly appears that the different assumptions, authors' perceptions, and evaluation methods heavily affect the final

results in many ways, by providing different estimates or by disregarding some steps or impact categories. In spite of the standardized LCA procedure called for by ISO 14040/2006 and ISO 14044/2006 norms, with clear standardization requirements about boundaries, procedures, and impact categories, a large uncertainty is introduced into the set of results by a kind of reluctance to compare on the same basis. In so doing, in spite of the large number of studies performed and reviewed, consensus about impacts is far from being achieved. Instead of providing a picture for informed decision making, lack of consensus adds up to the uncertainty, raising an ethical question about the actual possibility to make a decision about nuclear, in the presence of uncertainty about costs and benefits.

As the Three Mile Island (1979), Chernobyl (1986) and Fukushima accidents have clearly shown, the potential consequences of an even unlikely accident are so catastrophic that they offset all the benefits to the economy and welfare that they might have provided before the accident. In business-as-usual times, the main benefits go to the investor, while the environmental burden and the risk is most likely transferred to the general public (radioactive waste repository, consequences of accidents on health and global economy, etc.).

5. Economic and financial risks of nuclear power

Within the context of liberalization of the global electricity market the evaluation of investments plays a central role to complement the scientific debate [45, 2, 33]. Two economic and financial methodologies are adopted to this purpose: the consolidated Net Present Value [47, 48, 20] and the Real Option Value, considered more suitable for decision making in high and dynamic uncertainty contexts [43, 7, 23]. In both cases, risk analysis is one of the key tools to judge nuclear competitiveness as an investment option.

From a strictly economic point of view three main risk factors are considered: (a) construction time, (b) investment costs and (c) variability of operating costs. Most of the existing plants have been built under a monopolistic

regime, with governmental guarantees and controlled market prices, low capital costs and low investment risk [42]. The investment risk, and the capital cost increased with the deregulation of energy markets and were charged to electrical companies, penalizing capital-intensive investment projects with long-time return on investment and low technological flexibility [46]. Instead, investments in alternative power sources, be they combined cycle gas turbine plants and smaller renewable plants, have been favoured [62].

In such a context, investments on the nuclear sector became uncertain and very variable. Considering a medium-size nuclear plant (1000-1600 MW), construction costs are up to 10 or 15 times higher than those required for the construction of a natural gas plant (100-700 MW) per MW installed [5]. The projected costs also tend to increase due to the extension of construction time (cost overruns) [33]. Finally, costs for nuclear plants decommissioning are estimated as about 25% of the original investment costs. The total costs of a nuclear plant can be split into about 60-75% *fixed* costs (capital repayments, interest allowed, decommissioning costs) and 25-40% *variable* costs (for instance, the cost of uranium and labor) [42].

Unlike gas and carbon plants, the share of nuclear fuel cost on total production costs is relatively small [42, 31]. This is due to two factors: 1) the amount of uranium still available, capable to satisfy the present nuclear industry requirements (demand); 2) the nuclear reactor capability to store the uranium for a long time [42]. As the fuel cost is low, companies in OECD countries are trying to capitalize this advantage extending the reactors' working life.

While the cost of electricity obtained from nuclear energy is not particularly affected by fluctuations of raw material price, other uncertainty factors related to security aspects, licensing, escalation of decommissioning costs [6], radioactive wastes disposal, might contribute to increase the financial risk perceived from private investors and, consequently, the level of expected return [32]. The risks associated to the construction of a new nuclear plant reduce the international rating of the companies involved. Moody's

suggests that after beginning the construction the downgrade risk increases sensitively [37]. Therefore if a company is on category "A" before the plant construction, it could be downgraded to the "Baa" category (neither highly protected nor poorly secured) during the following 5-10 years, when the construction costs reach the peak and the main credit parameters are (lower or) negative.

In this situation, within an inefficient credit market, it could be more difficult for the company to obtain further credit, while instead the interest rate and, consequently, the cost per kWh_{el} are likely to increase. Some authors [50, 28, 36] calculated the levelized cost of nuclear electricity production, which is an international indicator of the average costs of electricity produced by a plant in one year. Linares and Conchado [33] provide details of the shortcomings of this indicator in deregulated markets. Such a methodological approach takes into account both *internal* costs (implementation, maintenance, fuel and operating costs) and *external* costs, both being rather uncertain [6].

According to a recent study [36] the levelized cost of nuclear electricity is 8.4 \$ cent/kWh_{el}, higher than the costs of coal (6.2 \$ cent/kWh_{el}) and gas powered electricity (6.5 \$ cent/kWh_{el}). Lazard [28] provides higher estimates:

- nuclear electricity between 9.8-12.6 \$ cent/kWh_{el},
 - coal electricity between 7.4-13.5\$ cent/kWh_{el},
 - solar termal power between 9-10.4 \$ cent/kWh_{el}
 - photovoltaics between 10 and 15 cent/kWh_{el},
 - wild electricity between 4 and 9 cent/kWh_{el},
- and finally efficiency and energy conservation between 0 and 5 cent/kWh_{el}.

Rogner and Langlois [45] highlight that the future of nuclear power depends on the competitiveness strategies that industries, supported by technological innovation, will adopt to guarantee the economic and financial sustainability and reduce the safety risks. Such targets require strong political support to the nuclear industry. For instance, the problems related to waste disposal and safety involve suitable technological solutions and communication, able to achieve social consensus. Therefore, an energy policy which

includes the use of nuclear power among its energy sources will have to handle three problems: overcoming the scarcity of public funds, choosing the best nuclear technology available, and finally conducting a cost-benefit analysis to compare nuclear with others renewable sources [33].

5.1 The failure of statistics in risk assessment

All the conservative figures provided above as well as economic and financial estimates carried out up-to-date can be highly questioned and made even worse by the consequences of the Fukushima accident on the Japanese and world economies. In spite of the claims that some accidents are highly unlikely, it cannot be denied that if they happen the consequences are very heavy. According to Stiglitz [51],

[the] wizards of finance [...] didn't understand the intricacies of risk, let alone the danger posed by "fatal distributions" – a statistical term for rare events with huge consequences, sometimes called "black swans". Events that were supposed to happen once in a century – or even once in the lifetime of the universe – seemed to happen every ten years. Worse, not only was the frequency of these events vastly underestimated; so was the astronomical damage they would cause – something like the meltdowns that keep dogging the nuclear industry.

The precautionary principle [55], dismissed and discredited by some as formalizing an emotional behaviour, must become the guideline when making decisions with huge potential consequences, i.e. when dealing with the «emergence of increasingly unpredictable, uncertain, and unquantifiable but possibly catastrophic risks».

6. Nuclear electricity in Italy

6.1 First steps

Italy moved its first steps towards nuclear electricity in 1963, with the operation of a small gas-graphite nuclear reactor in Latina (160 MW) followed by two BWR – Boiling Water Reactors (Garigliano, 150 MW; Caorso, 860 MW), and a PWR (Trino, 260 MW).

In 1988, as a result of the popular referendum held in 1987, after Chernobyl accident, the Italian Government decided to stop the nuclear energy generation. Moreover it blocked the construction of two new reactors in Montalto di Castro (2 x 1000 MWe BWR) and Trino (2 x 1000 MWe PWR), whose operation were planned to start in 1990. As a consequence of such decision, the four Italian reactors were stopped and the decommissioning procedure started (although slowly and still in progress). Only one small research reactor (1 MW) is still operative in the ENEA headquarters, Anguillara, Rome.

6.2 A nuclear-free country

The governmental decision following the 1987 referendum made Italy a country without nuclear energy, although surrounded by European nations which heavily rely on nuclear (France, Germany, Switzerland) and from which Italy imports electricity (Figure 4).

A common claim of nuclear energy supporters is that Italy would not be safe anyway in case of major accidents in these countries. While this is certainly true, it should be rather read as a proof that decisions about nuclear must be jointly taken by all the interested countries, not just by each country individually. This awareness calls for new forms of international laws and enforced control by international agencies, instead of advocating the dismissal of any form of control while spreading sophisticated technologies in spite of population density, seismic hazard, and unlikely economic return.

6.3 Nuclear "revival" in Italy

The first official step to re-introduce nuclear energy in Italy after the phase out was the approval by Italian Parliament of the Enabling Act No. 99 of July 23, 2009. This Act, under the neutral title "Development and internationalization of enterprises, as well as miscellaneous energy issues" assigned to the Government the power to decide all the further steps for the reintroduction of nuclear energy, localization of power plants, the localization of the nuclear waste repository, and the choice of power plant typologies.



Figure 4. Nuclear power plants in Europe (Google Maps, 2011).

The article 25 stated that the activities related to nuclear energy must be considered activities of pre-eminent public interest and, as such, the final decisions will be made by the Ministry of Economic Development in agreement with the Ministry of Environment and the Ministry of Infrastructures, without any involvement of local communities and administrations. The same article foresees a campaign to inform the population «about nuclear energy, with special reference to its safety and economic benefits» (!). Finally, likely due to uncertainty about how populations may react to these «benefits», the article 39 allows the possibility that some energy related plants be left under the direct control of the National Army or built within military areas.

After the Fukushima event, the Italian government decided a one-year moratorium, in order to concede a pause for thought, while continuing to implement all the other actions and decisions needed, at the end of the moratorium period, to proceed speedily toward plant constructions. In fact, the moratorium only applied to procedures related to the construction of new nuclear power plants in Italy, not affecting the ongoing procedures for the disposal of radioactive waste, including the construction of a national

repository. The decision was criticized by the opponents to nuclear energy as a time-wasting move, only aimed at weakening the anti-nuclear referendum scheduled for June 2011.

In response to these Governmental decisions, the national referendum held on June 12-13, 2011, cancelled, with a 95% majority of voters, most articles of the Enabling Act 99/2009 and previous related laws on the same topic, thus banning nuclear again within the Italian boundaries.

6.4 Electricity demand and installed power

According to official data by TERNA, the society in charge for the electricity distribution in Italy (see its 2009 report, "Statistical data about electricity production in Italy"), the total installed power in Italy is about 105 GW. The peak demand of power was 57 GW in the summer 2007, and 52 GW in the summer 2009. As a consequence, it is not the installed power the energy problem of the country. The country would certainly benefit from a decrease of imported fossil energy sources. Uranium, according to Figure 1, is also imported and therefore its use would not solve any dependence on foreign sources.

The total consumption of energy in Italy has been 320.3 TWh in the year 2009, about 5.7% less than in the previous year. About 86% of such electricity was generated inside the country, mainly from thermoelectric power plants. The reason the remaining 14% was imported nuclear electricity is that it was cheaper to purchase it, at low cost, mainly from France, than generating further fossil power internally. In fact, since nuclear plants cannot be switched off overnight, it is profitable for France to sell the surplus (for less), in order to optimize its costs.

Had the Italian Government completed the construction of the planned four nuclear power plants (no longer allowed, after the new referendum...), they would have provided a maximum electricity production of 56 TWh, i.e. about 17% of total yearly electricity demand. The latter would require about 12 MTOE to be produced in Italian power stations,¹

¹ In terms of heat content, 1 MTOE = 11.63 TWh. However, considering thermodynamic conversion losses in power plants, 1 MTOE only produces about 4.9 TWh of electricity (42% average conversion

which is only about 6% of the total national energy use (amounting to 180.343 MTOE for 2009).

6.5 Seismic hazard and population density

Italy is characterized by a higher seismic hazard than most European countries. Figure 5 compares the situation of Italy and the Balcanic area with the rest of Europe. It can be clearly seen that Italy – especially over the Appennini mountain chain – is among the countries where the construction of nuclear power plants should absolutely be discouraged. Moreover, there are active volcanoes in the Tyrrhenian sea, some of which under the sea and still active (e.g. Marsili, which is the Europe's largest undersea volcano). If eruptions were to occur in this area, nobody could rule out the possibility of large and destructive tsunamis, events that already occurred in the Tyrrhenian area [14].

The potential consequences of a nuclear accident in Italy are made even worse by the fact that Italy is a high population-density country compared to the rest of Europe. Figure 6 shows that most of the areas potentially candidate to host a nuclear power plant (Northern Italy, Tyrrhenian coast, Puglia region, among others) are very densely populated compared to all other regions of Europe that already host nuclear plants. In case of accidents, much more people would be affected and it would be very difficult to evacuate them to safer areas.

6.6 The potential for renewable energy

Finally, Italy is a country with a huge renewable energy potential, especially solar insolation that could be used to develop photovoltaic electricity. Figure 7 shows the solar irradiation in kWh/m^2 , much higher than in most parts of Europe. According to Figure 7, 1 kWp of photovoltaic power installed generates between 1200 and 1400 kWh, requiring in central-southern Italy 0.7-0.8 m^2 of installed module. The photovoltaic potential is already being exploited thanks to the feed-in tariffs of the so-called "Conto energia". Installed photovoltaic electricity was 0.7 GWp in 2009 and more than 2 GWp at the end of 2010 (and keeps growing). Wind

efficiency in Italy), while the remaining fraction is converted into waste heat.

power plants increased from 1.1 GW in 2004 to 4.9 GW in 2009.

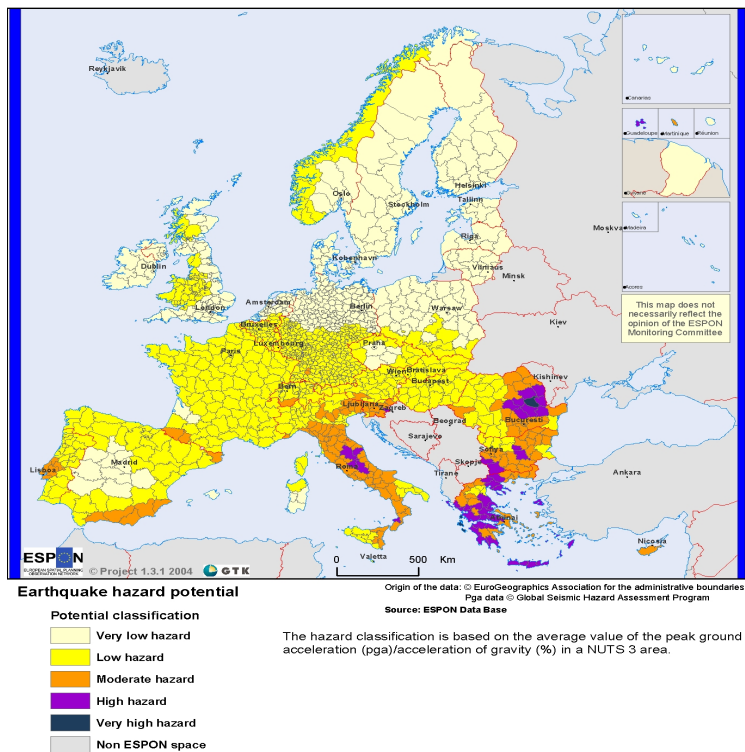


Figure 5. *Seismic hazard potential of Italy compared to Europe [13].*

8. Conclusion

The picture that results from our review of more than one hundred studies worldwide as well as of the Italian situation concerning planned nuclear energy is a rather uncertain scenario about the majority of aspects of nuclear energy development, made day-by-day even worse by the news from the Fukushima power plant, and the classification of the accident at the level 7, the highest possible risk level according to the International Nuclear and radiological Event Scale (INES).

The future availability of suitable grade uranium is uncertain. Nuclear development scenarios seem to be associated to higher costs and prices than in the past. Shortages in the nuclear supply chain as well as the

indefinite state of spent fuel worldwide could create additional barriers.

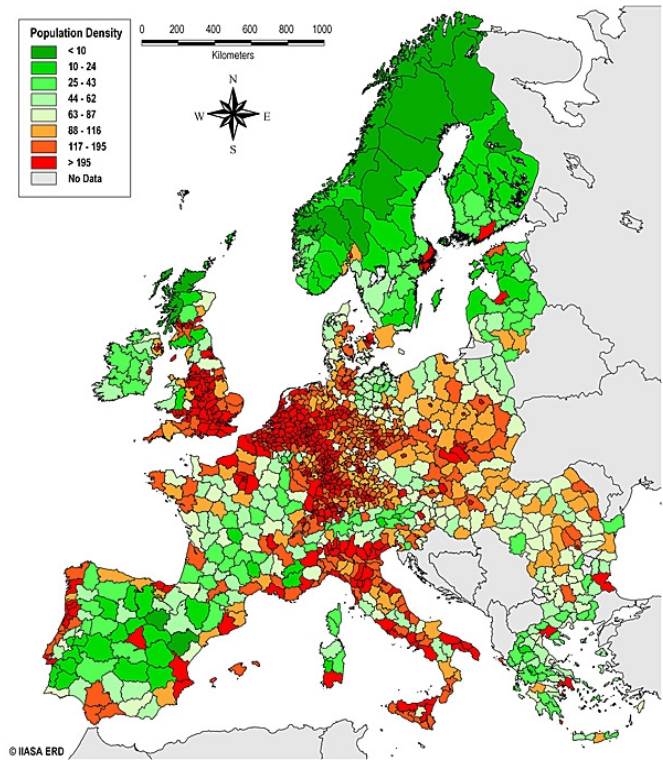


Figure 6. *Population density of Italy compared to Europe [27].*

Significant *uncertainties* are also linked to environmental impacts during normal operation (uncertain GHG emission estimates, scarce knowledge of the contribution to other impact categories), not to talk about the catastrophic consequences of accidents such as the meltdown in the Fukushima reactors; other uncertainties are associated to financial analysis (nuclear investment in competitive market is penalized compared to renewable sources and gas-fired generation, as it is characterized by high capital costs, long time return on investment and low flexibility; these factors

contribute to increasing the financial and economic risk for investors) as well as to macroeconomic analysis.²

Photovoltaic Solar Electricity Potential in European Countries

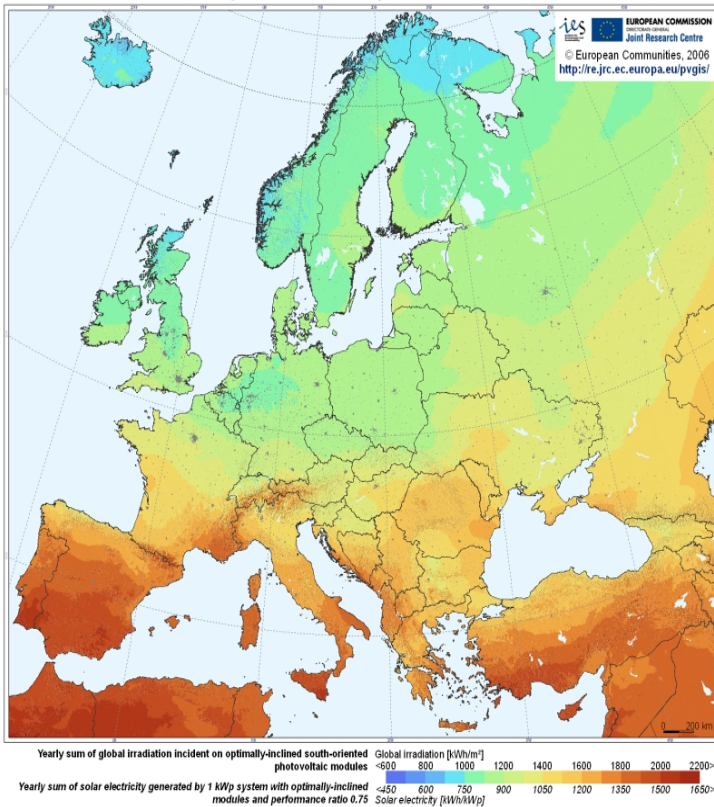


Figure 7. *Solar insolation and photovoltaic electricity generation potential of Italy compared to Europe [52]*

The Fukushima accident made the uncertainty scenarios even worse, by adding the awareness of the catastrophic potential of “claimed unlikely” events. Although some Italian nuclear supporters still suggest nuclear energy as the unavoidable solution to future energy shortages, in spite of the popular referendum results, a careful evaluation

² It is uncertain which role nuclear could have in addressing energy security. Since gas-fired generation is the major competitor of nuclear in a cost-benefit perspective, the potential benefit of new nuclear is strongly affected by gas prices, carbon prices and nuclear costs.

of the Italian situation concerning energy policy, seismic hazard, population density, and solar insolation potential, makes a nuclear revival in Italy very unlikely. Moreover, the environmental, economic and technical considerations made in this paper, suggest nuclear to be *an unsafe and uneconomic solution not only for Italy, but also for the rest of the world*.

In the presence of so large and diverse uncertainties (the only certainty being that of infrequent but potentially disastrous events), a wise policy is not just "learning by doing", nor even relying on expected "innovation" or new "science results". Choices call for participatory decision-making and planning. Once further and more reliable information is made available, the usual top-down decision-making process must be converted into a participatory procedure that involves all the stake-holders and the affected communities. In particular, when «facts are uncertain, values in dispute, stakes high and decisions urgent» [18], the concept itself of "feasibility" must be converted from "technical and economical feasibility" into a more complex framework that includes aspects of "post-normal" science, namely the shift from the expert community to an "extended peer community" consisting of all those affected by an impact who are ready to enter into dialogue on it. They bring in alternate points of view, that include local knowledge and expertise not generally accounted for in normal scientific reports as the ones reviewed in this paper. It is not a "to-do" or a "to-do-not" list that should emerge out of such studies, but a call for multicriteria strategies and the awareness of the need for more complex evaluation tools and participatory planning.

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Labels

ARPA: Agenzia Regionale Prevenzione ambiente

EIA: US Energy Information Administration

ENEA: Ente per le Nuove Tecnologie, l'Energia e l'Ambiente

ENS: European Nuclear Society

ESPON: European Spatial Planning Observation Network

EWG: Energy Watch Group

IAEA: International Atomic Energy Agency
IEA: International Energy Agency
IIASA: International Institute for Applied Systems Analysis
MIT: Massachusetts Institute of Technology
TERNA: Trasmissione Elettrica Rete Nazionale
WNA: World Nuclear Association

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8. Sergio Siminovich

In the Beginning was... the Delight!

Amateurs and Professionals in Music

and other fields

Can it be democratic for specialists in science and the arts to behave as though they belonged to a caste system, relegating the greater part of the population to the role of consumers, or victims, of their specialisation?

I first tackled this question in the context of my artistic activity by carrying out musical experiments. As a second step I asked myself whether such experiments could be transferred from the artistic to the scientific arena.

The etymology of "dilettante"

The word "dilettante" derives from a powerful concept: delight, or pleasure; also implicit in the words "amateur" (lover) or "aficionado" (affection) etc.

Unlike the concept of the professional or specialist, which defines individuals who devote themselves to a specific field, the term "dilettante" not only suggests activity, but also introduces the fundamental Freudian "pleasure principle".

The term "specialist" concentrates all its descriptive energy on the activity involved, whereas the term "dilettante" emphasizes the libido component.

A musical laboratory

As founder and artistic director of the CIMA choir (CIMA = *Centro Italiano di Musica Antica*, i.e. Italian Center for Ancient Music) in Rome, I have worked with dilettantes for many years (1979-2013), during which the main objective of my project has been reached: dilettante choir members have more than satisfactorily sung the most important and difficult pieces of the Baroque repertoire.

The method of teaching the language of music (note reading) that I adopted was the global, synthetic method as

opposed to the analytical approach that passes through the lengthy and laborious phases of musical theory and solfeggio.

I would supply each member of the choir with two recordings: one of his or her melody (soprano, alto, tenor, bass) and another of the remaining three voices ("minus one" version), leaving out in the second only the voice that was recorded in the first.

In this way the polyphonic CIMA choir (150 singers aged between 14 and 83) learned pieces of music (for example the *St. Matthew Passion* by J.S. Bach) that are generally tackled by big professional choirs. For example, in order to study Haendel's demanding oratorio, *Judas Maccabaeus*, in 1985, I took twelve rehearsals with the RAI (Italian television and radio) choir, and only fourteen with CIMA!

How should the results of the two groups be assessed? The vocal performance of the RAI professional choir was, as might be expected, both more eloquent and more robust, but it is also true that as choristers they were less flexible and more "stereotyped" than the dilettantes.

The conclusion drawn from this first experiment is that 40 good professional singers, with years of study behind them and regular salaries, are more or less equivalent to 130 dilettantes with good will and dedication. Enthusiasm and relish for the novelty in exercising an activity not linked with career or wages compensated for many technical limits.

This experiment is still ongoing and concludes every season with concerts performed for the public in the centre of Rome. A professional orchestra playing epoch musical instruments accompanies the choir of dilettantes, and the reviews of these performances have always been excellent. For example [2]:

The Musical Association of Rome's Harpsichord Festival [...] closed with *Brockes Passion* for solo, choir and orchestra by G. F. Haendel, [...] performed by the CIMA choir and orchestra directed by Sergio Siminovich [...]. The high standard of this non-professional choir illustrates their great commitment despite involvement in quite other activities in daily life.

Experimentation reached a high point in 2001 with the project *VerdInCanto*. It was a programme undertaken with RAI Educational, run by Renato Parascandolo, with the participation of the Ministry of Education. Every week, for ten weeks, I taught Verdi and Haendel's choral music by recording from a studio with a pilot choir: the prestigious National Academy of St. Cecilia choir. At the end of the ten instalments, the young people that had followed the broadcasts with their teachers participated in a concert with the symphonic orchestra at PalaEur in Rome. They came from all over Italy, and numbered... 8,500 (a Guinness world record!).

This multimedia experiment (which included television and Internet thanks to the Ministry of Education providing ad hoc equipment in numerous schools) demonstrated that with adequate help dilettantes are well able to produce artistic results. After all, the 8,500 participants were not singing a straightforward popular melody, but four-voice polyphony!

Dilettantes as conductors

A further musical experiment resulted from the question: can a dilettante *conduct* a choir? In other words, would a dilettante be able to creatively and constructively execute a performance of "cultured music"?

In my capacity as Director of the Department of Choral Music in the Faculty of Arts at the University of La Plata, Buenos Aires, I carried out the following five-year experiment.

A group of people with no musical experience were selected by some of my upper-year university students. These "test students" were given the minimum instruction on how to conduct a choir (conventional conducting gestures, tempo, intensity and character of a piece...).

The topic of gestures is particularly important – and two-pronged: on the one hand it serves as an objective code of universal communication (that is, it permits a conductor to make himself or herself understood in any country, even if he or she is unable to speak the local language); while on

the other hand it constitutes the subjective arsenal that expresses the peculiarities of his or her inner self.

For this reason I avoided teaching the conventions of conducting gestures the way I do with my regular university students. Instead, I took a different approach. I showed the test students various videos of professional conductors, but *without* the sound, so that they would have to “deduce and imagine”... the expressive content of each gesture.

I also showed the test students how one might conduct spoken texts, such as newspaper articles, in an attempt to generate a wide spectrum of expressive gestures.

In addition, with the help of various Renaissance recordings they tried to conduct a first performance from the period. The test student, introduced to the choir as a “guest conductor” with a certain experience (placebo effect...), tried out the piece, using gestures and words to indicate how he or she would like it to be performed. We watched the video of each student’s session together in class, judging and comparing them with the questionnaires filled by each choir.

In the majority of cases (72%), the result was that there was no significant difference between the performance, control, ability to communicate, and artistic taste of our test students and the upper-year students. Conclusion: either our university course is second rate... or many dilettantes can carry out artistic musical conducting tasks, thus refuting our academic prejudices.

How did my colleagues react to these experiments? I found that they were divided into two camps.

One group, which I would call “conservative”, accused us of being unscientific. They argued that our test students had probably, in fact “most certainly”, aped gestures that they had seen used in real concerts, or they had simply “intuited” or correctly guessed the value of some gestures, but without a valid theoretical support.

On the contrary, the other group was enthusiastic at what they saw, and which they considered as a demonstration that artistic language is not the exclusive patrimony of the professionals.

I should add that after presenting our results to the Academic Council of the University of La Plata, the experiment was extended to our colleagues in the Department of Theatre and Film, who got similar results on the role of the dilettante.

Reasons behind this attempt at democratisation

They were principally twofold:

- The intention to desecrate the instruments of power. In days gone by, power was delegated to the sorcerer, the priest, or the literate (as opposed to the illiterate). The chasm between experts and “populace”, if exaggerated, shows a lack of humility in the first and precludes the pleasure of many intellectual adventures for the second.

- I did not so much care for the correctness of the “answers” that might emerge in the process, as for the fecundity of the “further questions” that might be asked.

So, my appetite being whetted by the semantic resonance of a word of such power as “discovery”, I found myself speculating over an even more reckless proposal.

Is the extension to the scientific field legitimate?

Scientists often confess to being short of enthusiasm, thirsty for new ideas, asphyxiated by the encyclopaedism (“bibliographical gigantism”), and by the blinkers that result from over-specialisation. Because of both training and motivation, scientists should be willing to try and change their methodological approach.

However, if the same people who are capable of modelling, say, the subatomic particles cannot get round this impasse, the reason must lie, presumably, in narrow-mindedness. *Active* contact with other disciplines and/or involvement with scientifically “virgin” minds might counter it.

From a utopian point of view, what might be the role of a lay person alongside a professional scientist?

As a modest “listener”, I would oblige the scientist to reformulate his or her knowledge in a spirit of collaboration

rather than of unidirectional instruction. I might become to some degree a sparring partner for the scientist.

What's more, one fine day the dilettante might even come out with... a brilliant discovery!

And what would be the "side effects" of such a mixing of tongues? I think it would lead to a greater, more passionate and engaged, diffusion of science; to some sporadic (and welcome) "contributions"; and not least, to "secularizing" science. Furthermore, scientists, by opening their Competency to lay people would lose just a little of their Competitiveness. Finally, dilettante citizens of science would have the possibility of keeping themselves culturally up-to-date whilst feeling "useful" rather than merely "users".

I hope that these suggestions will provide an opportunity for a social experiment to be performed in an open and unprejudiced manner.

To conclude, a supporting quotation:

There is something irresistible about the idea that everyone does the job he is "cut out for". I reject this idea, and with it the division of labour: what is crucially important [...] is that everyone does lots of things for which he is not cut out.

The division of labour chimes perfectly with the concept of human life as instrumental to something else: something that is not this life. [...] But the human being is an end and not a means; he is an end in himself, and if "himself" means richness and diversity, contrast and dialogue, then he will also realise his end by learning things that do not come naturally to him, and that for all the effort he puts into them will never go beyond the level of an embarrassed stutter. [...] I've always learnt more from the things I do badly. [1, pp. 52-3]

Before that, the same author had written [1, p.27]:

Whereas in a society that places free time at the centre of interest and sees production as instrumental to its valid and creative use (and not vice versa), the pensioner would not be an outsider or a source of embarrassment; everyone would, in fact (and here's the paradox!) everyone should think like a pensioner all their life, to learn to think like that.

Post scriptum

Considering the warm welcome of my minor participation at the Naples 2nd Science and Democracy conference in 2003, I meant to continue along this path, encouraged by the comments and criticisms that I have received. I would like to set up various alliances, convincing a physicist, a biologist, a mathematician and a philosopher to collaborate regularly with a dilettante, and with a view to publishing the results of their collaboration.

Anyone interested in taking part in this initiative (as either scientist or dilettante) is invited to e-mail me: I will be happy to serve as *trait d'union* by putting complementary people into contact with one another, in the hope that some collaborations will take off.

Should there be encouraging results, the dilettantes will appear in their respective papers under the letters A.A. (Associate Amateur), a role that I intend to institute in scientific practice.

If, on the other hand, the results should be poor or null, this would also be an interesting fact to record...

Until the appearance of a version of this article in a book of proceedings of the Science and Democracy conference [3], my only "meddling" in the scientific world had a resemblance with the paradoxes described by Bertrand Russell (barber, library...), in that it consisted of just an article on dilettantism at a conference for scientists... However, fortunately, a further (inevitably dilettantish) article of mine [4] appeared in March 2013.

I hope this humble example will serve as a stimulus to others, whose talent is greater than mine, to become "splendid dilettantes" and fruitfully "ruffle the waters of knowledge".

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Corporate Medicine

9. Domenico Mastrangelo, Cosimo Loré,
Giovanni Grasso

Medicine and Democracy

If it is true that democracy, in its broadest sense, has to be conceived as the sovereignty of the people, it is equally true, and easily verifiable by anyone, that this right is rarely exercised and most often violated, in the daily life of Western Democracies, especially when it conflicts with the interests of lobbies or even institutions whose declared intention is to protect the individual. For instance, the article 32 of the Constitution of the Italian Republic states:

The Republic safeguards health as a fundamental right of the individual and as a collective interest, and guarantees free medical care to the indigent. No one may be obliged to undergo any given health treatment except under the provisions of the law. The law cannot under any circumstances violate the limits imposed by respect for the human person.¹

Although the text above represents one of the highest expression of the sovereignty of the people, ensuring the right to a good health and the freedom of choice in medical treatment, it seems to be systematically violated altogether in those same countries where it should be safeguarded.

Modern (Western) Medicine is a self-proclaimed "Scientific Medicine" [1] as opposed to "Non-Conventional Medicine", which, on the opposite, is more commonly regarded (by the Modern Medicine itself) as "pseudoscience" or quackery [2]. Remarkably enough, Sir William Osler, who is considered the father of Modern Medicine, used to describe his profession as «the science of uncertainty and art of probability», thus outlining the substantial uncertainty and extraordinary complexity underlying the medical art. Nevertheless, Modern Medicine, on the basis of its presumed as well as unproven scientific nature, has ultimately proclaimed its supremacy among the medical arts of the world. The question is: *why?*

¹ Translation taken from: www.comune.fi.it/costituzione/inglese.pdf

Modern Medicine

In the book, *Il tradimento di Ippocrate. La Medicina degli affari*² [3], there is a chapter entitled: "What is Medicine?", in which Medicine is viewed as basically dependent on the way we look at and interpret "reality". In other words, for those who believe that a living organism is only a conglomerate of "matter" (cells, molecules, atoms, etc.), the principles of its functioning can be extrapolated from the analysis of its single material components: this represents the so called "reductionist"³ approach [4].

On the opposite, for those who believe that living organisms, in general, and man in particular, are made of both matter and energy (no matter how this energy is defined, i.e. life force, "Chi", soul, etc.), the correct functioning of the "material" body depends on the influences of these immaterial energies, whose manipulation represents the basis and the very essence of any therapeutic (and preventive) approach.

Being the consequence of a certain philosophical worldview, Medicine is not a single discipline and every Medicine should be considered of equal dignity, even though, in the case of energy-based approaches, the real nature of the non-material forces operating within the material body is basically unknown. A clear example of this situation is represented by Acupuncture, which consists of the manipulation of the "Chi" streaming in body channels which do not have anatomic correspondence to any known material part of the body. Nonetheless, Acupuncture is currently practised and accepted by the western medical establishment [5, 6]. In the same spirit, every medicine based on the manipulation of "subtle" energies, including, among others, Homoeopathy, should be accepted and used in the current medical practice. But this is not the case, since, as we have seen, Modern Medicine considers itself as

² "Hippocrates' Betrayal: Medicine as Business".

³ Reductionism is the theory according to which every complex phenomenon, especially in biology or psychology, can be explained by analysing the simplest, most basic physical mechanisms, that are in operation during the phenomenon itself.

the only one having a sound scientific foundation; therefore, the question remains: *why* is this happening?

Modern Medicine is an essentially drug-based medicine, and selling drugs has become, in the last century, the most lucrative of human activities [7-9]; as a consequence, any non drug-based therapeutic approach, as the ones proposed by Non-Conventional Medical Practices, is perceived as a threat to such a multi-billion dollar business.

The influence of pharmaceutical industry

The pharmaceutical industry, thanks to the extraordinary economic power gained by selling drugs, is presently able to condition and manipulate every aspect of medical research and profession, even though the need to move from industry's self-regulation to an independently monitored code of practice for pharmaceutical marketing is widely considered of primary importance [10-11]. Nevertheless, according to Marcia Angell, M.D., former Editor-in-Chief of the *New England Journal of Medicine*, and presently Senior Lecturer in the Department of Social Medicine at Harvard Medical School: «[...] pharmaceutical industries have become vast marketing machines with unprecedented control over their own fortunes [...]» and have gained «nearly limitless influence over medical research, education, and how doctors do their jobs [...]» [12].

In an article entitled: "Big Pharma, Bad Medicine: How corporate dollars corrupt research and education" Dr Angell also notes:

The profound difference in the mission of Academic Centers and pharmaceutical companies, is often deliberately obscured by drug companies because it's good public relations to portray themselves as research and educational institutions, and by academics because it means they don't have to face up to what's really going on.

As a consequence:

1. Medical centers increasingly act as though meeting industry's needs is a legitimate purpose of an academic institution;
2. The pharmaceutical industry devotes much, if not most, of its vast marketing budget to what it calls the "education" of doctors;
3. Drugs licensed from academic

institutions are supposed to be made “available on reasonable terms” to the public, but that legal requirement has been ignored [...] [13].

Moreover, regarding the influence of the pharmaceutical industry on the medical profession, Dr Angell [13] declares:

The medical profession has largely abdicated its responsibility to educate medical students and doctors in the use of prescription drugs. Drug companies now support most continuing medical education, medical conferences and meetings of professional associations. Although they call it education, the billions of dollars they put into it come out of their marketing budgets. The industry also provides students, house officers and physicians in practice with meals, trips to exotic locations and many other blandishments. Although medical and industry associations have issued guidelines that would limit these gifts, codes of conduct are entirely voluntary and full of loopholes.

Finally, Dr Angell concludes her report by remarking that the pharmaceutical industry has the largest lobby in Washington, DC («there are more pharmaceutical lobbyists there than members of Congress») and it gives copiously to political campaigns [14, 15]; as a result, the prescription drug legislation and policies that come out of Washington are usually made to order for the industry. All this would be more than enough to explain why prescription drug expenditures in the US are so high and so central to the struggle for containing health costs which, for the only part concerning outpatients prescription, were still increasing, in 2002, at the unsustainable rate of 15% per year! [16]

If this were not enough, in the summary of a report of the British Parliament, printed in March 2005 [17], we read:

About 650 million prescriptions are written each year by GPs [general practitioners] alone. Medicines cost the NHS in England over £7 billion every year, 80% of which is spent on branded (patented) products. The industry which has produced these drugs has understandably been described as “world class and a jewel in the crown of the UK economy”. It is the third most profitable economic activity after tourism and finance [...]

Moreover:

The interests of pharmaceutical companies and those of the public, patients and the NHS often overlap but they are not identical. For the industry, medical need must be combined with the likelihood of a reasonable return on investment. An effective regulatory regime to ensure that the industry works in the public interest is essential. Unfortunately, the present regulatory system is failing to provide this.

Interestingly, since the British Parliament is the main sponsor of pharmaceutical industry, it also notes (our italics):

The Department of Health has for too long optimistically assumed that the interests of health and of the industry are as one. This may reflect the fact that the Department sponsors the industry as well as looking after health. The result is that the industry has been left to its own devices for too long [...] The consequences of lax oversight is *that the industry's influence has expanded and a number of practices have developed which act against the public interest.*

And regarding the «practices developed by the pharmaceutical industry, which act against the public interest», the legislator mentions, among others:

The industry affects every level of healthcare provision, from the drugs that are initially discovered and developed through clinical trials, to the promotion of drugs to the prescriber and the patient groups, to the prescription of medicines and the compilation of clinical guidelines. We heard allegations that clinical trials were not adequately designed – that they could be designed to show the new drug in the best light – and sometimes fail to indicate the true effects of a medicine on health outcomes relevant to the patient. We were informed of several high-profile cases of suppression of trial results. We also heard of selective publication strategies and ghost-writing. The suppression of negative clinical trial findings leads to a body of evidence that does not reflect the true risk: benefit profile of the medicine in question. [...] Once licensed, medicines are intensely promoted to prescribers. Coupled with company-sponsored information from medical journals and supplements, “medical education” materials, advertisements and sponsorship to attend conferences, workshops and other events, it is little wonder that prescribing practices are

affected. [...] At the heart of the problem may be the trend for the industry to become ever more driven by its marketing force. [...] What has been described as the “medicalisation” of society – the belief that every problem requires medical treatment – may also be attributed in part to the activities of the pharmaceutical industry. While the pharmaceutical industry cannot be blamed for creating unhealthy reliance on, and over-use of, medicines, it has certainly exacerbated it. There has been a trend towards categorizing more and more individuals as “abnormal” or in need of drug treatment.

The last mentioned phenomenon, to which we now turn, is today commonly known as *disease mongering*.

Disease mongering

Increasingly, industry has found itself under fire from detractors who contend that, in the pursuit of profits, companies are in league with medical doctors and patient advocacy groups to “monger diseases”, i.e. convince people that their usually mild ailment urgently needs drug treatment. Disease mongering is basically trying to convince well people that they are sick, and represents the most insidious of the various forms of medical advertising [18-20].

Examples of disease mongering include the following:

1. Erectile Dysfunction (ED) [21]
2. Attention Deficit Hyperactivity Disorder (ADHD) [22]
3. Female Sexual Dysfunction (FSD) [23]
4. Bipolar Disorder [24]
5. Restless Legs Syndrome [25]
6. Selective Estrogen Receptor Modulators (SERM) deficiency, Statin Deficiency, Circadian Dysrhythmia, Asthma That Requires “Two Drugs”, “Treatment Resistant” Conditions [26]
7. Osteopenia [27, 28]

Around the world there are attempts to identify, understand, and combat the threat to human health from the corporate-sponsored selling of sickness.

At a consumer level Health Action International [29], a group working for a more rational use of medicines, has for a long time warned about the blurring of the limits between ordinary life and medical illness in order to expand markets for drugs and other technologies [30]. At governmental level the House of Commons, after receiving the warning of the Royal College of Physicians about this matter [31], recommended that industry-funded disease-awareness campaigns should no longer be “veiled advertising” of branded drugs.

Analysts suggest that a genuine sustainable change, however, will not take place until policymakers better understand the phenomenon of disease mongering and the potential benefits of acting against it [32]. But a key question remains: is there sufficient *political will* among government regulatory agencies to enforce existing regulations governing drug promotion or to introduce new solutions? Most regulatory agencies fail to treat regulation of drug promotion as a public health concern. Unless this changes, the public can expect more unfettered disease-mongering, warning them that without the latest treatment, life will be grim indeed [33].

The Controlled Clinical Trial

Regarding the “science” on which all this business is grounded, it is basically represented by the Controlled Clinical Trial (CCT), universally considered the “gold standard” to prove the effectiveness and safety of investigational new drugs. In 1991, Dr Harris L. Coulter, in his book *The Controlled Clinical Trial: An Analysis* [34] reported that «CCT cannot guarantee drug safety and efficacy because the theoretical requirements of CCT are both unrealistic and unscientific». This point of view was more recently confirmed by scientists who reported that there is no evidence in favour of performing large-scale CCTs other than the vested interests of the pharmaceutical industry to defy sound arguments which demonstrate that the methodology of these studies is deeply flawed [35]. As a matter of fact, the CCT methodology is based on the unrealistic and unscientific assumption that any given

disease shows the same characteristic features in different individuals and, therefore, can be treated in the same way. In the real world, however, there is no such thing as two identical individuals. Dr Coulter therefore concludes: «The CCT can never tell a doctor how a given patient will react to a given drug at any given time». The relevance of individual differences in drug treatment is highlighted by pharmacogenetics (and pharmacogenomics), a relatively new branch of conventional medicine, confirming that this point of view does not belong to homoeopathy only [36, 37].

On the other hand, the unpredictability of the individual response to drugs is confirmed by countless reports of deaths from adverse drug reactions, leading US magazines and newspapers to claim that «the FDA approves deadly drugs, and delays lifesaving therapies» [38], or prestigious scientific journals to declare that it is time for the creation of a new black box warning and withdrawals for prescription medications [39]. According to Dr Coulter, the CCT has become popular primarily for political reasons [40]. Given its costs, it is used by pharmaceutical companies to limit competition and raise the costs of medications to the public.

But monopolistic objectives are not the only built-in fraud feature of the CCT. Fraud in the safety testing of drugs is a strong likelihood, since investigators may receive more than one million dollars annually (in 1991!) from their testing programs. Among the most frightful examples of dishonesty, fraud, negligence, and other kinds of wrongdoing in clinical trials, the author mentions the trials of a drug designed to prevent kidney transplant rejection which led to 85 deaths among the 650 patients participating, and not one of these deaths was reported to the Food and Drug Administration (FDA).

This trend towards fraud in CCTs has not changed very much, but rather increased in recent years: as reported by *Nature* [41] the attorney-general of New York State sued GlaxoSmithKline (GSK) for allegedly suppressing negative results of trials that tested the safety and efficacy of four different studies on Paxil. Fraud in clinical research and CCTs has been reported by some important scientific and medical journals, such as the *British Medical Journal* [42], *Science* [43], the *Journal of Internal Medicine* [44], and *The*

Lancet itself [45]. With this picture in mind, the reader may now evaluate more objectively the clinical and scientific relevance of the methodology behind CCTs and finally understand why large comparisons of such investigations, as performed in meta-analyses, would only lead to confusing, uncertain, and misleading conclusions.

Conclusion

Democracy is about *freedom* and the “rule by the people”, and *Science* is democratic, in its freedom of thoughts and activities.

As we have seen, the narrow-minded and mystifying attitude of modern Medicine is essentially explained by the need of pharmaceutical industry to protect its corporate interests, a business which covers almost any aspect of the medical Science and Art. As a consequence, while modern Medicine asserts its “scientific” dignity and aspirations, it ends up by denying the freedom which should be inherent in every medical act.

A probably apocryphal [46] statement commonly attributed to Dr Benjamin Rush,⁴ is worth quoting because of the message it conveys (our italics):

Unless we put Medical Freedom into the Constitution, *the time will come when medicine will organize into an undercover dictatorship* [...] to restrict the art of healing to one class of men, and deny equal privilege to others, will represent the Bastille of Medical Science. All such laws are un-American and despotic and have no place in a Republic [...] The Constitution of this Republic should make special privilege for Medical Freedom as well as Religious Freedom.

As we can easily see, the «undercover dictatorship of medicine» has become an openly declared tyranny as Medicine has been miserably subjugated to the multibillion dollar business of pharmaceutical companies, which impose their “standards” on every aspect of medical profession, including medical “education”... and whoever believes or acts differently is labelled as either a fool or a “quack”. Let

⁴ A most respected physician of his time, a signer of the Declaration of Independence, and a delegate to the Constitutional Convention.

the open minds rebel against this regime and resurrect the true missionary spirit of Medicine.

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10. Henry Bauer

Evidence-Based Medicine? Wishful Thinking

It is simply no longer possible to believe much of the clinical research that is published, or to rely on the judgment of trusted physicians or authoritative medical guidelines. I take no pleasure in this conclusion, which I reached slowly and reluctantly over my two decades as an editor of *The New England Journal of Medicine*.

Marcia Angell [1]

A corollary of Angell's conclusion is that some part of contemporary medical practice, promoted or endorsed by mainstream institutions, is based on misleading information and thereby either medically harmful, or just medically useless but wasteful of time and money, or occasionally medically helpful but only by coincidental chance.

Proponents and groupies of mainstream medicine like to use the phrase "evidence-based medicine" as though it described contemporary practices. It doesn't, far from it. Evidence-based medicine is a venture that was launched about a quarter century ago¹ precisely because so little medical practice was based on sound evidence. There has been no appreciable improvement.

AIDS Rethinkers and HIV Skeptics are familiar with the discrepancy between the HIV=AIDS theory, promoted by all official bodies, and the actual data about HIV and about AIDS:

- "HIV tests" do not detect "HIV";
- the epidemiology of positive "HIV" tests shows that "it" is not infectious and not sexually transmitted;
- there is no correlation between "HIV" numbers and "AIDS" numbers; etc. etc. etc.

But this discrepancy between official pronouncements and the actual facts — findings published in the primary medical-science research literature — is not unique to HIV/AIDS. Rather, it illustrates the degree to which current medicine is misguided and often harmful.

¹ www.openclinical.org/ebm.html

For example, individuals with “high” cholesterol are routinely administered statins, in absence of evidence that “high” cholesterol is in itself harmful and actually bespeaks cardiovascular disease. Moreover the statins have such serious “side” effects as mental confusion, muscle weakness and eventually muscle wasting, and more:

CHOLESTEROL IS NOT CORRELATED WITH DEATH FROM HEART DISEASE

The following chart is from *The Cholesterol Myth exposed* -<http://www.youtube.com/watch?v=iBSSCNaaDcE>
Dr Malcolm Kendrick speaks about World Health Organisation data gathered in their MONI-CA study (MONItoring Trends in CArdiovascular Disease)



The highest rates of death from heart disease are among Australian Aborigines, who also have the lowest average level of cholesterol. The highest average levels of cholesterol are in Switzerland, where the rate of death from heart disease is among the lowest. In any case, it is obvious that there is no correlation between the red and the black lines.

For much further data and many references pointing to the same conclusion, and further that statins do not offer significant benefits at the cost of dangerous side effects, see Myth 3, pp. 78-104, in *Malignant Medical Myths* by Joel M. Kauffman.

A report from the Institute of Medicine [4] points out that all the measures currently used as indicators of cardiovascular disease are not valid measures of cardiovascular disease: blood pressure, cholesterol (total, “bad”, ratio...), C-reactive protein, troponin — none of them is a valid indication of heart disease, still less are any of them *causes* of heart disease.

Cholesterol does not *cause* cardiovascular disease, whether it be high, low, bad, good, or anything else.

“High” blood pressure does not *cause* heart disease or heart attacks or strokes.

It is just that all those things are correlated with one another — correlated primarily because all of them increase naturally, normally, with age. The Institute of Medicine report mentions that *243 risk factors* have been identified for cardiovascular disease. *Risk factors are correlations, symptoms, not causes.* Therefore it should not be surprising that the presently routine treatments — blood-pressure lowerers (antihypertensives), cholesterol lowerers (statins), and more — have not been proved to be of benefit: «there are no valid data on the effectiveness» of «statins, anti-hypertensives, and bisphosphanates» ([5]; the last are prescribed against osteoporosis).

All this comes from the primary, peer-reviewed medical-science literature, and it is at odds with “what everyone knows”, and with what we hear from the doctors and the drug companies and the National Institutes of Health and the media. That’s an extraordinary thing to say, but anyone can confirm it for themselves by looking at the publicly available medical-science publications.

An impetus for me to do that was the experience of having planned surgery called off at the last moment because my blood pressure was said to be too high, about 190/90. My protests that stress has this effect, that my pressure goes up several tens of points just from being in a doctor’s office, fell on deaf ears. So for many weeks I monitored my blood pressure frequently, and found that it varies between 120 and 180 systolic and between 70 and 90 diastolic, during the day and from one day to the next, even without any unusual stresses that I’m aware of. Literature and Google searches soon delivered a wealth of information concordant with those observations, most notably that it is perfectly normal for blood pressure to increase with age. Indeed, some decades ago, the medical rule of thumb had been that systolic pressure approximates 100 plus one’s age² — which would have made 180 normal for me.

Current data suggest a somewhat lower rate of age-induced increase, but the essential point is this: It has been known

² www.spacedoc.com/blood_pressure_heart_disease.htm

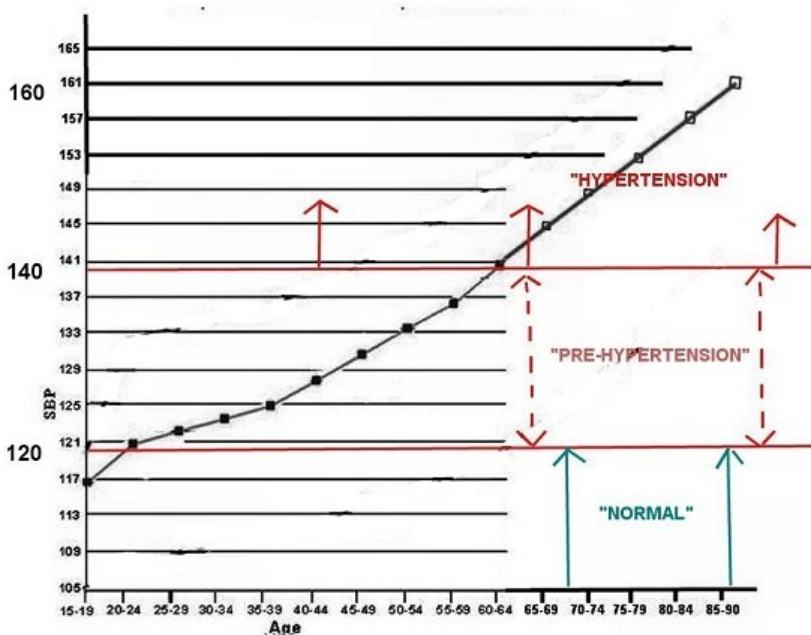
for more than a century that blood pressure normally increases with age, yet the official guidelines define hypertension — blood pressure too high — without taking this into account. The consequence is that perfectly healthy, symptom-free seniors are liable to be diagnosed with hypertension and subjected to medication: one third of Americans, and 75-80% of those aged 60 or more, are defined to suffer from hypertension and require treatment.

Age and Blood Pressure Variation

Systolic Blood Pressure Chart

extrapolated to higher ages from MedIndia

http://www.medindia.net/patients/calculators/bp_chart.asp



One of the pervasive and severely damaging problems with contemporary medical “science” and practice is the confusion of correlation with causation. The notion that high blood pressure, pre-hypertension or hypertension, means higher than the average healthy 25-year-old is absurd on its face, and reflects that pervasive confusion. *Every* ailment and disease becomes more prevalent with age, so all those are correlated with one another: hearing loss,

dementia, heart disease, cancer, blood pressure, organ failure, etc. etc. etc. Those correlations are no basis for claiming that high blood pressure *causes* any of those things, any more than that dementia (say) causes cancer or that hearing loss causes heart disease.

Cholesterol and blood pressure, then, are two illustrations of Marcia Angell's reluctant conclusion that «It is simply no longer possible [...] to rely on the judgment of trusted physicians or authoritative medical guidelines». So what does one do?

One has to search and digest the literature for oneself and weigh those data against official proclamations and doctors' advice. That's what M. Aziz did when circumstances of his own family led him to realize the neglected importance of vitamin D. He relates his experience in his [2].

Some time ago, official guidelines for the recommended intake of vitamin D were increased considerably, but Aziz suggests that even more would be beneficial. His book is well worth reading for its cornucopia of citations from the medical-science literature, some of them revealing connections previously unknown to me, for example between vitamin D and immunity, and telomeres, and cholesterol, and HIV/AIDS; as well as the fact that vitamin D is a steroid and hormone-like. And the fact that under sunlight we manufacture vitamin D in the skin from... *cholesterol*! By lowering cholesterol, we may even be accentuating deficiency of vitamin D...

Of course one needs to be sceptical and judicious with all claims, those from alternative or complementary medicine as well as from mainstream sources.³ Thus one should not accept without further ado the claim that lowering cholesterol could even bring on Alzheimer's disease, which is suggested by Henry Lorin because cholesterol is an essential component of all cell walls [6].

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Appendix – What's wrong with present-day medicine

This is a small selection but covers the salient points.

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(Psychiatry and Stories of Cutthroat Competition are listed separately below)

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11. David Rasnick, PhD

AIDS Drugs Cause AIDS and Death

During three decades we have seen the metamorphosis of the AIDS (Acquired Immune Deficiency Syndrome) epidemic of the 1980s into the hybrid HIV/AIDS, which in 2010 became finally an HIV pandemic. HIV/AIDS was concocted to conceal the fact that since 1993, well over half of all new AIDS cases in the USA were disease-free [1]. Thus was a real health problem transformed into the public health fantasy of HIV.

An explicit indication of the sinister nature of this transformation was the headline "Hair Strand Study" that appeared in *San Francisco Chronicle* on November 5, 2009. The article disclosed that the City of San Francisco in conjunction with the University of California San Francisco were recruiting dark-haired HIV-negative men and women to take anti-HIV drugs. The declared purposes of the study were: 1) to see if the presence of the drugs in hair could be used as a means of determining whether or not patients were complying with prescribed anti-HIV regimens, and 2) to see if HIV-negative people would benefit from taking the drugs.

Purpose 1) raises serious sociological and human rights issues. Purpose 2) is simply insane. The anti-HIV drugs are among the most toxic substances every approved for human use. They come with black box labels warning of the life-threatening consequences of taking the drugs. Today, the anti-HIV drugs are responsible for around *three quarters* of all the diseases and deaths of those taking the drugs. The actual number is probably higher but a precise accounting is not possible as discussed later.

"Rich AIDS" and "Poor AIDS"

Most people are not aware there were two AIDS epidemics: one for the rich, and one for the poor. Back in the days when it was called AIDS, if a person living in the United States came down with one or more of the so-called AIDS-defining diseases (such as pneumonia, particular fungal,

bacterial and viral diseases, or wasting, Kaposi's sarcoma, dementia, lymphoma, cervical cancer, etc.) and—this is essential—also had antibodies to HIV, that person was officially diagnosed with AIDS. But as early as 1985, the World Health Organization, led by the Centers for Disease Control (CDC) in the USA [2], came up with a completely different definition of AIDS for people living in Africa and other desperately poor places *that did not include HIV as part of the definition*. An African need only suffer with fever, diarrhoea, persistent cough, weight-loss, or TB (or any combination) to be declared an AIDS case. The absurdity of the different definitions for the rich and poor is apparent when one realizes that 90% of US and African AIDS cases would no longer have AIDS if they simply switched continents [3, 4]. Even though "Rich AIDS" and "Poor AIDS" are completely different, they are, nonetheless, both treated with the same very expensive and highly toxic anti-HIV drugs.

Anti-HIV drugs


In general, prescription drugs are dangerous materials. In 1998, Lazarou and colleagues [5] reported that every year prescription drugs used properly kill over 100,000 and seriously injure more than 2 million Americans, «making these reactions between the fourth and sixth leading cause of death». One year later, Orenstein and LeGall-Salmon [6] warned:

Combination antiretroviral therapy [...] places patients with HIV disease at high risk for adverse drug reactions and interactions. Severe hepatitis has been reported with all of the currently available classes of antiretroviral agents.

Not surprisingly, liver failure has become the leading cause of death among Americans taking the anti-HIV drugs.

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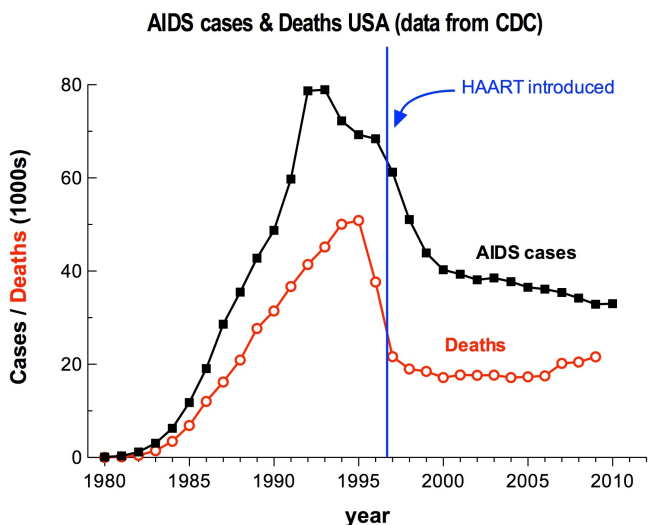
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AZT (a nucleoside analog) was the first anti-HIV drug. Nucleoside analogs are the backbone of the combination drugs known as HAART (Highly Active Anti-Retroviral Therapy). Nucleoside analogs were developed in the 1960s as cancer chemotherapy to kill dividing cells. They are cytotoxic, which means cell poison. One of the ways this class of drugs kills cells is by terminating DNA synthesis. As a consequence, the nucleoside analogs are carcinogens [7-9]. Prior to the advent of AIDS, AZT had not been used to treat cancer because it was too toxic. A doctor who prescribed nucleoside analogs for life to a cancer patient would be guilty of malpractice, probably lose his license, and might end up in jail. But if you have positive antibodies on the so-called HIV tests, the standard of care is to treat you with these drugs for life—which, thanks to the drugs, will be all too short.

The figure below, based on CDC¹ data shows AIDS in the USA peaked in 1993, years before the combination of anti-HIV drugs called HAART appeared in late 1996. The figure clearly shows the decline in AIDS cases and deaths preceded HAART. Equally clearly – and ominously – the natural decline in deaths prior to the availability of HAART stopped abruptly with its widespread use, *the exact opposite of what is claimed by the media*. AIDS was never significant (in terms of cases) in the USA and Europe, where it has virtually disappeared, again contrary to media headlines. The residual number of AIDS cases and deaths

¹ Centers for Disease Control and Prevention.

following the introduction of HAART would be much lower if the HIV tests and anti-HIV drugs were eliminated.



Anti-HIV drugs in Africa

To keep sales and profits up, the marketing of the HIV-tests and anti-HIV drugs was shifted from the relatively AIDS-free zones of the USA and Europe to Africa and other poor regions of the world. Africans of course can't pay for the colossally expensive drugs but taxpayers in the USA (primarily) and Europe can and do. Legislation such as the American PEPFAR² program provides tens of billions of dollars so the pharmaceutical companies can dump their anti-HIV drugs in Africa.

While the horrors of the anti-HIV drugs (see table below) are not publicized in the USA, Africans freely talk about "The Ugly Side of ARVs" (antiretroviral drugs). In 2005, the *African Woman and Child Feature Service* (Nairobi) delivered a devastating exposé on the toxicity of anti-HIV drugs. A few quotes give the flavor of the report:

«Seen as the key intervention in prolonging the lives of those infected with HIV, antiretroviral drugs are now turning out to be lethal [...]»

² President's Emergency Plan For AIDS Relief.

«Doctors tell stories of witnessing patients lose lives as they fail to triumph over life-threatening ARV side-effects».

«[T]hese side-effects become deadly if those dispensing the drugs lack the skills to diagnose them in time».

«Although this is the reality, some of the doctors do not want to speak openly about it for fear of creating panic [...]».

«[L]ife-threatening side-effects occasioned by ARVs is...lined up for discussions at the upcoming International Conference on Aids and STDs in Africa to held in Abuja, Nigeria early next month». [I looked for proceedings from that conference but was not able to find anything.]

**Partial list of the diseases, including death,
caused by anti-HIV drugs [4]**

AIDS-defining	Other
immuno-deficiency	anemia
leukopenia	neutropenia
fever	nausea
dementia	lipodystro-phy
weight loss	"protease paunch"
lymphoma	muscle atrophy
diarrhea	mitochon-drial dysfun-ction
death	hepatitis
	birth defects
	nephritis
	lactic acidosis
	heart infarct

No evidence that anti-HIV drugs save lives

Given the decades of pronouncements that the anti-HIV drugs save lives, one might assume the drugs must be worth the risk of toxicity. Incredibly, however, there is not a trace of scientific-clinical evidence that the anti-HIV drugs save lives. Not even one clinical trial has shown the anti-HIV drugs are effective. The disclaimers required by the Food And Drug Administration that accompany each anti-

HIV drug state this explicitly. Here are four typical examples, in the most recent versions.

Glaxo's *Ziagen*:

ZIAGEN does not cure HIV-1 infection or AIDS. We do not know if ZIAGEN will help you live longer or have fewer of the medical problems that people get with HIV-1 or AIDS.»

Merck's *Crixivan*:

CRIXIVAN is not a cure for HIV infection and patients may continue to develop opportunistic infections and other complications associated with HIV disease. The long-term effects of CRIXIVAN are unknown at this time.

Boehringer Ingelheim's *Viramune*:

VIRAMUNE is not a cure for HIV-1 infection; patients may continue to experience illnesses associated with advanced HIV-1 infection, including opportunistic infections.

Glaxo's *Combivir* is the most disturbing of all:

There have been no clinical trials conducted with COMBIVIR.

The invention of a new syndrome

To hide the fact that anti-HIV drugs cause AIDS diseases and death, *Immune Reconstitution Syndrome* (IRS) was invented. It is important to understand that IRS appears *only after* taking anti-HIV drugs. The table below shows that if you have the diseases before treatment, they're called AIDS. If the exact same diseases show up after taking the drugs, they're IRS.

In 2005, Dr Bill Powderly of University College in Dublin asked what is one to make of the long list of AIDS-defining diseases cropping up shortly after a person starts taking ARVs? Are the new diseases IRS or AIDS? – Drug toxicity? – A new disease process? What is a doctor to do? Stop or continue anti-HIV drugs? – Stop or change opportunistic therapy? – Add immunosuppressive drugs?

Powderly's last question is totally perplexing. Why would one give immunosuppressive drugs to AIDS (immune deficiency is in the name) patients who were already taking the highly immunosuppressive ARVs? IRS is a serious and growing problem as the table next page shows.

Doctor and Patient's Dilemma: Is it AIDS or IRS?

AIDS = HIV + ...	IRS = ARV + ...
KS	KS
MAC	MAC
TB	TB
Cryptococcus	Cryptococcus
PCP	PCP
Cytomegalovirus	Cytomegalovirus
Histoplasmosis	Histoplasmosis
Herpes	Herpes
Leukoencephalopathy	Leukoencephalopathy
Leprosy	Leprosy
Meningitis	Meningitis
Lymphoma	Lymphoma
CDC HIV/AIDS <i>Surveillance Report, year end edition, 1997</i>	[20]

The problem is even worse because IRS is only the tip of the toxic-drug iceberg. Haddow et al. [11] devised the sixth and most convoluted definition of IRS to date in an effort to keep up with the ever-growing list of IRS diseases. Their most frightening revelation was the extraordinary number of "adverse events" experienced by patients taking the anti-HIV drugs. The authors evaluated 498 patients on HAART and found they suffered 620 toxic reactions, of which 23-41% were arbitrarily designated as IRS. AIDS-defining diseases are only a subset of IRS diseases. Here is an expanded list of IRS diseases as of 2008 [10].

Further toxicities of the anti-HIV drugs

The anti-HIV drugs are highly toxic to mitochondria, leading to failure of multiple organs—muscle, pancreas, liver, heart, peripheral nervous system, brain—causing lactic acidosis and death [12].

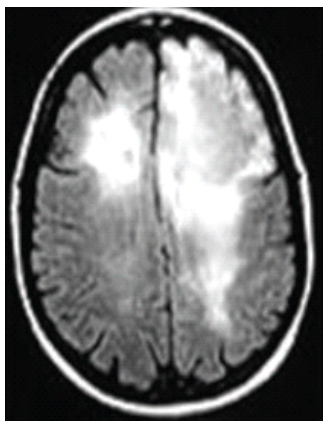
High Rates of IRS

(%)	Reference
30	Nature Rev Microbio online, 2012
25	Clin Neurol Neurosurg online, 2012
10-40	MJ 196:318-321, 2012
50	Pediatr Nephrol 27(4):667-669, 2011
25-35	Oral Dis 16(3):248-256, 2010
12	K S 14 weeks after ARV, Mozambique, JAIDS 53(5):589-597, 2009
23-41	Clin Infect Dis 49:1424-1432, 2009 (620 events/498 patients)
51	Clin Exp Dermatol 35(5):477-481, 2009
4-66	Clin Infect Dis 48(1):101-107, 2009
15-25	Curr HIV/AIDS Rep 6(3):162-171, 2009
10-32	AIDS Res Ther 6:16, 2009
22	Int J STD AIDS 20(7):447-452, 2009. Indian J Dermatol Venereol Leprol 74(6):619-621, 2008
14	PLoS ONE 4(2):e4520, 2009
17-32	Drugs 68(2):191-208, 2008

IRS Diseases as of 2008 [10]

Infections	Other Conditions
<u>Mycobacteria</u>	<u>Inflammatory</u>
Tuberculosis	Sarcoidosis
Non-TB mycobacteria	Foreign body reaction
Leprosy	Folliculitis
Bacille-Calmette-Guerin	Lymphoid interstitial pneumonitis
<u>Fungus</u>	Photodermatitis
<i>Cryptococcus</i>	Peyronie's disease
<i>Pneumocystis</i>	Dermatofibromata
<i>Histoplasma</i>	Dyshidrosis
<i>Candida</i>	Kaposi's sarcoma
<i>Tinea corporis</i>	<u>Cancer</u>
<u>Protozoa</u>	Lymphoma
<i>Toxoplasma</i>	Lung
<i>Microsporidia</i>	<u>Other</u>
<i>Leishmania</i>	Progressive Multifocal leukoencephalopathy
<i>Cryptosporidia</i>	Lupus
<u>Helminth</u>	Thyroid disease
<i>Schistosoma</i>	Rheumatoid arthritis
<i>Strongyloides</i>	Guillain-Barré syndrome
<u>Virus</u>	Reiter's syndrome
Herpes simplex	Polymyositis
Herpes zoster	Relapsing polychondritis
Cytomegalovirus	Alopecia
JC virus (PML)	Cerebral vasculitis
HIV encephalitis	
Hepatitis	
Parvovirus	
Molluscum contagiosum	
(warts)	
Polyoma BK virus	
<u>Bacteria</u>	
Bartonell	

Here are just two of the most common serious diseases caused by the anti-HIV drugs of which patients and the public are ignorant. Concealing the toxicity of the anti-HIV drugs is a colossal scandal of global proportions.



PML

It is not publicized that around 50% of patients taking anti-HIV drugs come down with brain damage called progressive multifocal leukoencephalopathy (PML) within weeks to months [13].



Immune Recovery Uveitis

...and 11-83% of patients lose some or all of their vision [14, 15].

The table below shows another problem not reported by the media: the alarming increase in the incidence of cancer among those taking the anti-HIV drugs.

Increased incidence of cancer in those taking HAART

Cancer	Fold Increase	Ref*
Anal	60	R
	43	P
	15	B
Non-Hodgkin Lymphoma	23	E
	8	B
Hodgkin Lymphoma	18	R
	15	P
	5	B
Cervical	13	B
	12	P
Liver	8	R
	8	P
	3	B
Lung	4	R
	3	P
	2	B
Melanoma	4	R
	3	P
	2	B
Oropharyngeal	3	R
	3	P
Other	2-3	R,P

* B = [16]; E = [17]; P = [18]; R = [19].

Conclusion

As previously mentioned, Africa is the dumping ground for the anti-HIV drugs. The local organizations fronting for the pharmaceutical companies, such as Treatment Action Campaign (TAC), have been tasked with the job of downplaying the high incidence and magnitude of anti-HIV drug toxicity. The ad by TAC below wants people to believe that Immune Reconstitution Syndrome is a sign the anti-HIV drugs are improving a person's immune system. This slight of hand not only attempts to shine a positive light on IRS but also permits the apparent lowering of AIDS-defining

diseases and deaths by the accounting trick of renaming them IRS. George Orwell and Lewis Carroll must be turning over in their graves.

IMMUNE RECONSTITUTION SYNDROME (IRS)
Some people who start ARV treatment at very low CD4 counts can get ill soon after starting. This is often a result of a condition called Immune Reconstitution Syndrome (IRS).

When you start ARV medication your immune system gets stronger. This can cause germs that were sleeping in your body to wake up too. This is called Immune Reconstitution Syndrome (IRS). Some people become ill with TB, Pneumonia, Cryptococcal Meningitis or generally feel sick because of IRS.

IRS is not a side effect of ARVs and does not mean your ARVs are not working for you. You must be treated for the condition or illness you have and be monitored properly at a hospital.

IRS can be managed and most people do recover with treatment. Families must get a full explanation about HIV, its treatments and why people sometimes do not survive despite having started ARV treatment.

Make sure a thorough medical examination is done before you start ARVs. All clinics and hospitals should have medicines to treat Opportunistic Infections.

TAC
TREATMENT ACTION CAMPAIGN

Plan for Life: Get Tested - Get Treatment - Use Condoms

NATIONAL OFFICE: 021-750 3867, KWAZULU-NATAL: 031-354 9873
CAPETOWN: 021-462 0000, NORTHERN CAPE: 018-750 0080
LIMPOPO: 053-931 546, GREEKOWA: 053-750 0080
WESTERN CAPE: 021-447 3883/8

In conclusion, there is neither an AIDS nor an HIV epidemic but instead an epidemic of HIV antibody testing and anti-HIV-drugging—especially of the poor. This manmade catastrophe would end if the HIV antibody tests and the anti-HIV drugs were eliminated.

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The Bigger the Lie... The Wakefield case

Introduction

I have been investigating, campaigning and writing about different incidents and cases in medicine and the pharmaceutical industry since the late 1980s. In 1989, working as a private investigator I began investigating a new lobby group set up in Britain first called the "Campaign Against Health Fraud" and now called "HealthWatch" and part of a much bigger international pharmaceutical lobby that includes the "Skeptics" and "Sense About Science".

All the investigative work and writing that I have done since then concerns the growth of this lobby and others associated with it. They are mainly funded by pharmaceutical companies and they are opposed to anything that challenges allopathic medicine and its profitability.

In 2005, I read about Dr Andrew Wakefield and seeing that his case fitted into my writings and investigations, I contacted him and became involved in his case. It is possible that some of you know nothing about Dr Wakefield's case. Others might know a number of things — whatever you do know, it is unlikely to be anything like the truth. Everything that has happened to Dr Andrew Wakefield was constructed by people linked to, influenced by or threatened by pharmaceutical interests, and often these individuals were involved with lobby groups.

Broadly speaking, Dr Wakefield was accused over a 6 year period, 3 of which involved a trial before the UK General Medical Council (GMC), of taking money from the government and using it to fake research showing that the MMR (Mumps, Measles, Rubella) vaccination caused autism. He did this – it was said – to make money for himself and aid parents who had a legal claim on behalf of their vaccine damaged children against three international pharmaceutical companies.

By 2010, Wakefield had been erased from the medical register in the UK, and had three of his published peer-

reviewed papers deleted from the research record. Labelled as a charlatan and a crook, and threatened by constant attacks on his work in the UK, he sought exile in the US. I am going to try and set the record straight in this talk.

There are two main perspectives which one can take when looking at such huge conspiracies designed to destroy an individual's career and reputation. The first and the most common, is to investigate evidence that the accusers are involved in a conspiracy, that they have links and vested interests in common etc.; for the last six years I have done this. I reported every day of the GMC trial for the parents who supported Dr Wakefield. In 2008 and 2009 I organised, edited and published two books written almost exclusively by parents, with an introduction by me [4,5]. I wrote 9 essays exposing the dirty tricks organised against Wakefield.

For this talk, however, I want to lay out, very simply what Dr Wakefield did rather than what he was accused of doing. From this description of what he did, you will be able to draw your own conclusions about whether or not he was guilty of anything.

The Wakefield case is the most complex and massive of all the cases that I have ever worked on, its outcome more extremely disillusioning than any other case. Dr Wakefield's narrative is exceptionally complex. I have simplified it as far as possible.

The MMR vaccine

In the late 1980s Dr Andrew Wakefield was a highly respected medical research worker in the area of Crohn's disease and bowel transplantation. He was funded mainly by pharmaceutical companies and had won a number of awards.

After working in Canada, he returned to Britain in the late 1980s after he had been head hunted by the Royal Free Hospital (RFH) in North London, to organise and run an experimental gastroenterological unit.

Setting up the unit which was to concentrate on Crohn's disease and Inflammatory Bowel Disease, Wakefield

gathered around him outstanding clinical workers including Professor John Walker-Smith, considered one of the greatest paediatric gastroenterologists in Europe.

Wakefield's contract with the hospital involved only research and did not allow any kind of clinical work.

At around the same time that Wakefield was arriving at the Royal Free Hospital, in the late 1980s, three brands of the MMR vaccine developed in the 1970s were introduced by the UK Department of Health. MMR was actually a completely unnecessary multiple vaccination. It was supposed to immunize against Mumps, Measles and Rubella. But if we look at the history of vaccination and these three illnesses a number of things become clear.

Prior to MMR the UK National Health Service (NHS) did not recommend a vaccination for mumps. The rubella vaccine was given only to women who might come into contact with rubella while pregnant, particularly through their children. Measles vaccine was given routinely and was considered safe, except that it was occasionally noted to cause bowel problems as was the wild variety.

The main support for this multiple vaccination came from the government, who was, with the pharmaceutical company GlaxoSmithKline (previously GlaxoWellcome) hell bent on the use of multiple vaccines which they said could in the future contain up to 300 viral strains, and prevent with one injection nearly all the diseases of mankind.

In the case of MMR, two of the three brands of MMR vaccine used by the UK Department of Health, contained the *Urabe* mumps virus strain, while the third one previously used in the US contained the Jeryl Lynn strain. There had been inadequate research into the safety of multiple vaccines and even the mixing of viruses was known to cause adverse effects.

The British government knew before they launched MMR in the UK that the *Urabe* mumps strain caused serious adverse reactions, principally involving meningitis. These reactions had been recorded and investigated in Canada where the vaccine was withdrawn, and in Japan where it was later to be withdrawn.

When in 1992 it became evident, in Britain, that there were

many cases of adverse reaction to the Urabe strain mumps MMR vaccine, the British government too withdrew this vaccine, leaving only one MMR vaccine in use. However, during the 4 years of its use thousands of children had been damaged — the government immediately denied this damage.

The birth of a case-review study

Around 1993 the peace of Dr Andrew Wakefield's research at the Royal Free Hospital (RFH) was disturbed by a woman who brought her autistic son to the hospital. This woman told Wakefield that after having his MMR vaccination her son had suffered the most terrible bowel problems – constant and explosive diarrhoea accompanied by crippling pain. After a short time this condition was accompanied by an autism spectrum disorder that was later labelled “regressive autism”: a state where a child who had previously been meeting all their goals, lost abilities – stopped talking, stopped eye contact, and retreated into their own world.

Initially Dr Andrew Wakefield wanted to have nothing to do with this mother and child, principally because, he said, he knew nothing about autism, seeing it as a mental illness unrelated to his research. However within a very short time, word spread about the interests of the RFH in Inflammatory Bowel Disease (IBD), and a steady flow of parents with similarly damaged children made their way to the RFH.

On admission, Wakefield assessed these children for their bowel disorders and of course noted any autism spectrum disorder problems. The children were then passed on for a clinical assessment to Professor Walker-Smith.

As more children arrived at the hospital, it became evident to both Wakefield and Walker-Smith that despite their combined years of experience, neither of them had any idea how these children had become ill so quickly and what were the environmental triggers or causal pathways of the illness.

Around 1993, Wakefield was growing more deeply concerned about these cases of inflammatory bowel disease and regressive autism. He wrote to the NHS (National

Health Service) head of vaccine and immunology, Dr Salisbury, asking for a meeting to discuss what he explained might be a public health crisis developing around the MMR vaccination. It was *five years* before Salisbury agreed to a meeting.

As expert and conscientious doctors, who had a good rapport with parents, Wakefield and Walker-Smith decided upon a course of action. Despite the fact that many of the children showed classical signs of autism which sometimes made it hard to carry out in-hospital clinical tests, they decided on a battery of tests, including colonoscopy and, in the first couple of cases, lumbar puncture. The object of the tests, almost solely in relation to IBD were to construct a clinical picture of the children and help describe the illnesses they suffered.

Beyond the RFH other things were happening with respect to MMR vaccines and adverse reactions. A lawyer who had been involved in a number of environmentally-triggered damage cases began to attract parents who thought that their children's illnesses had occurred as a consequence of their MMR vaccination.

In around 1992, this lawyer had embarked upon a claim with a large number of parents, against three vaccine manufacturing pharmaceutical companies. Around 1994, the lawyer approached Dr Wakefield asking if he would act as an expert witness. Despite not having concluded his research, Dr Wakefield agreed. He became an expert witness for the parents in a case which, by 2003, had gathered over one and a half thousand claimants.

On the instructions of the lawyer, Wakefield set out a research programme that he thought would get to the bottom of why the children had become so deeply damaged so quickly. The lawyer applied for and was finally granted Legal Aid funding, which has been available to claimants in civil and criminal cases for the last 80 years in the UK, to help them prove their case with expert witnesses. It is important to stress that this was around 1995 and in the end, apart from statistical work, any work carried out with this money on this research is not pertinent to what was to happen to Dr Wakefield.

The *Lancet* paper

Inside the RFH, around 1995-6 Wakefield took a first step to writing up a diagnostic picture of the children who had turned up and been given the clinical tests. This paper was written with 12 other contributors because these contributors had been involved in designing and carrying out the tests used on the children.

When the paper was finally published in 1998, it was not the results of a research study but a "case review study" [1]. The paper involved the detailed reporting of 12 children who had received clinical examinations having presented sequentially at the RFH with similar symptoms.

There is some slight debate about whether a case review study needs ethical committee approval. The rules governing such papers go something like this: if the initial cases are written up for research purposes then they need ethical committee approval; however, if the patients are seen for primarily clinical reasons then their cases do not need ethical approval to be written up.

There is a twist to this and that is that all clinical and diagnostic surgical procedures like colonoscopy entail the taking of histological samples from the body. These samples are kept by hospitals and can years later be used for research, such samples have to be covered by both parental consent and ethical committee agreement. This was the case of all the children written up in the case review paper.

Even if this case review paper and its writing had needed ethical committee approval, John Walker-Smith had this after he was granted it more or less *in perpetuity*, at his previous hospital.

Wakefield submitted the paper which had 13 authors to *The Lancet*, edited by Dr Richard Horton. Wakefield had been published previously in *The Lancet* and Horton was familiar with his work. From the beginning it appeared that Horton was 100% behind Wakefield and the paper. The case review study was peer-reviewed and accepted for publication.

Wakefield signed the *conflict of interest clause*, used by *The Lancet* at that time: this said that the author should make mention of anything which, if not disclosed, might at a later date embarrass the author. Wakefield could think of nothing

of this kind, no money had been used to carry out the case review from anywhere other than his own pocket. Certainly, the Legal Aid money granted for research had not yet been used and anyway the RFH — embarrassed by the use of money gained to fight a case for patients against the funders of pharmaceutical research at hospitals — had actually taken it off Wakefield and put it in the general Hospital fund.

So, in 1998, *The Lancet* published a case review study of 12 children which suggested a clinical association between unknown physical and environmental factors and inflammatory bowel disease and, in a majority of cases, the later onset of regressive autism.

As will be clear to you and any other thinking person, this case review could draw no conclusions about which factors had precipitated these conditions so quickly in these children. It was not a research paper, there was no epidemiology, there were no control groups.

The paper's authors did quote those parents who had mentioned in interviews that the illnesses had followed their child's MMR vaccination. Although this observation didn't constitute any kind of proof of a condition, it was absolutely correct and essential for the paper's authors to have cited these parents' observations.

Like any researcher, Wakefield was forming his own opinions about what had caused the IBD in these children. In his opinion it was the measles vaccine virus. This however was a hypothesis, necessary for research to move forward, but presently of little evidential value.

At its simplest the *Lancet* paper claimed that paediatric gastroenterologists at the RFH had discovered a "new" form of IBD, the causes, beginning and end points of which were so far unclear. It had a sudden onset, definite symptoms and in some children could be linked to the future onset of regressive autism.

The press briefing

On the evening of the publication of the *Lancet* paper, University College London, which partnered the RFH, held a

press briefing about the paper. Dr Wakefield did not organize this briefing, it was organised by the Dean of the University Department who appeared at that time to be in complete agreement with Wakefield that the triple vaccine was not safe. It was becoming clear, however, that Wakefield in particular was angry with the government generally, and the Department of Health in particular, for refusing to take seriously theories which could help diagnose and treat an increasing number of children that appeared to be affected by adverse reactions to the MMR vaccination.

Other academic work undertaken by Wakefield at this time showed him to be increasingly inhabiting the role of dissident. In his paper written with Scott M. Montgomery and published in *Adverse Drug Reactions* in 2000 he argued that there had been woefully insufficient safety trials of the new triple vaccination [2].

But it was the press briefing that ended Wakefield's career. While the authors and the head of department went through the case review paper in a matter of fact way, the media was looking for a developing drama with Wakefield as the central character.

Towards the end of the briefing, a reporter asked Wakefield, what parents, who were now faced with giving their children MMR, should do? Again, Wakefield acted with the utmost propriety and with an eye to the "precautionary principle" replied, that it might be best to return to the use of single vaccines until research at the RFH was finished.

In suggesting that parents should return to single vaccines Wakefield was standing in the way of a billion dollar tank — the future of multiple vaccines. From this time onwards the assault on Wakefield, though initially muted, became over the following four years, relentless and the disintegration of his career inescapable. He was branded as the doctor who claimed that MMR vaccination caused autism — *all* MMR vaccination and *all* autism. In fact to all intents and purposes, Wakefield's story ends here, from now on the forces of darkness take over the narrative and Wakefield is affected rather than affecting.

In the months following the press briefing, the government

withdrew the license for the import and prescription of single vaccines and then invented the fiction that Wakefield had held out false hope to parents when single vaccines hadn't existed in Britain for a long time. Companies that were importing single vaccines, completely legally, were harassed and put under surveillance.

In the background a journalist called Brian Deer, a consumer affairs reporter working free-lance for Rupert Murdoch's *Sunday Times*, published a series of "starter" stories about expert witnesses in previous vaccine trials. These experts were portrayed by Deer as cunning, self-obsessed careerists who knew nothing about science and were in medicine for the money.

This switch in the narrative from the parents of damaged children, to the crooked doctor, was aided by constant attempts to make the parents and their children invisible. Wakefield lost all his grants and funding; his rolling contract at the RFH was not renewed. His phones and his family house were bugged. Other authors of the *Lancet* paper were scattered and silenced under threat from unseen forces. In 2002, Wakefield felt that it was no longer safe for him in Britain and he left with his family for the US.

In 2003, the parents court case began to run into difficulties. Legal Aid was withdrawn from the decade long case, leaving one and a half thousand claimants with vaccine damaged children high and dry without a case in court.

With the civil action for damages over, Wakefield was no longer protected by *sub judice*. A massive propaganda campaign was initiated by the pharmaceutical companies and the government. Informal regulations were passed by the House of Lords and a commons science and technology committee, that stopped the reporting in all media of personal stories of pharmaceutical adverse reactions and determined that only scientists could write articles about medicine, drugs and adverse reactions.

The *Sunday Times*' attack

In February 2004 Brian Deer produced a most scurrilous attack on Wakefield in the *Sunday Times* newspaper.

Stretching over four pages, it was a farrago of lies, put together with the help of major figures in the vaccine establishment and a private detective agency owned by the Association of British Pharmaceutical Industries. The major accusations were:

- That Wakefield had experimented on autistic children, carrying out research on them in an attempt to establish that MMR was unsafe.
- That Wakefield had carried out unsafe and dangerous procedures on the children.
- That he had patented his own rival vaccination to MMR.
- That he had lied about the children who came to the RFH — none of them had IBD, but all of them were in varying forms autistic.
- That, although he had experimented on children, he was not even a paediatrician.
- That he had personally used the money paid by the Legal Aid Board, for his own purposes.
- That by saying that “MMR caused autism” Wakefield had badly damaged the government vaccine programme that would inevitably result in the deaths of many children, *ergo* Wakefield was responsible for killing children.
- That he had failed to declare his conflict of interest in the case review paper published in *The Lancet*. This being that he had funded the research with money from Legal Aid that he had received to help him attack pharmaceutical companies.
- That all the research into children had been done without ethical committee, or parental, approval.

In passing, this disgusting pastiche cited the then Minister of Health demanding that Dr Wakefield should be taken before the UK General Medical Council (GMC). On the Monday following the publication of this “trash journalism”, Tony Blair the UK prime Minister, with a slippery cynical smirk told reporters that there was much more to the story than the public knew. Off paper, Deer campaigned for Wakefield to be charged by the police, with fraud, endangerment, and other criminal offences.

The Fitness to Practice hearing

Within a week of the *Sunday Times* article Deer had lodged his “supporting evidence” with the GMC which then took almost three years to bring around 80 charges against Wakefield, and the two other consultants he had worked with, Walker-Smith and Simon Murch.

The resultant Fitness to Practice hearing prosecuted by the GMC, in their building in London, lasted 3 years and resulted in February 2010 in a finding of guilt against Wakefield on every single charge. But perhaps more importantly the 3 year hearing, which joined no parents to the charges, managed to create the reality that there were no vaccine damaged children in Britain.

I attended every day of the GMC hearing, reporting the proceedings for the parents who because of their children were often unable to travel frequently to London. I explained how the GMC manipulated the evidence and pointed to such simple matters as the fact that the Chair of the Panel, “the jury foreman” chosen by the GMC, was found to have shares in GlaxoSmithKline the manufacturers of MMR. How Richard Horton's line manager at *The Lancet* during the times of crises in 2004 was, as well as being a manager at Elsevier (the publishers of *The Lancet*), a non-executive board member of GlaxoSmithKline. And following the final verdict of the GMC, the manager of the *Sunday Times* and the son of Rupert Murdoch was also given a place on the GlaxoSmithKline Board.

Following the findings of the hearing, Wakefield was stripped of his registration as a doctor and two of his published peer-reviewed papers were deleted from the record. Dr Wakefield, his exemplary work, the children he tried to help at the RFH in London and the parents who to this day support Wakefield have all been swept under the huge carpet of corporate Britain and made invisible — there are no cases of vaccine damage in Britain.

Concluding remarks

For those who find difficulty in the meaning of this story about Dr Andrew Wakefield and the making invisible of over 2,000 cases of vaccine damaged children, it would be

beneficial to look at the reports of the Global Alliance for Vaccines and Immunization (GAVI) conference that took place on June 13, 2011, in London. At this meeting the UK government donated £800 million of taxpayers' money to leading UK vaccine manufacturers, including GlaxoSmithKline, so that they could develop their vaccine programme for developing countries. With this kind of public money available to private enterprise during a European wide crisis — itself created by high earning corporations — it is little wonder that the pharmaceutical companies would want to deny any adverse reactions or problems with the safety of vaccines.

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Ethics, Surgeons, and Transplantation

Decisions about how to practice medicine can be made in one of three ways:

1. We can assume that the problems are so complex that they must be left to the experts, that is, to scientists and their ethics counsellors.
2. We can insist that these problems must be handled by the public, even though the public often lacks adequate technical knowledge or sufficient reflection on the ethical issues involved, because this is what our established values require.
3. We can strive to create an informed public that works with technical professionals and their ethics counsellors to reach an informed consensus.

The first option is intelligent but undemocratic. The second is democratic but unintelligent. The third is an intelligent and democratic way that integrates cultures of expertise into a self-reflective public. Only this can set the stage for realizing the full promise of ethics. The public is always keenly interested in where surgery is going and the integrity of those who are taking us there. However the unprecedented ability of scientists to manipulate life and death, to create altered biological processes, and to re-engineer biological systems as in transplantation has made fundamental changes in how we heal and how we relate to the living and to the dying world [1-74].

Ethical problems of organ procurement for transplantation

A manner that is "ethically acceptable" is one that corresponds to the Natural Moral Law and its four axioms:

- (1) Good ought to be done, and evil must be avoided.
- (2) Good may not be withheld.
- (3) Evil may not be done, and
- (4) Evil may not be done that good might come of it.

Organ procurement and allocation decisions pose the biggest and unresolved of ethical problems in medicine. An incomplete list would include: multiple and ever increasing standards of death; consent to organ donation; adequate information to public, donor and relatives; excess demand of organs; compensation for donation; organ distribution; living donation; repeated transplants; use of flawed organs; baby harvesting; inverse age; executed donors; criminal recipients; tourist transplants. and so on.

However the basic crucial question is if it is ethical to ask for donation during the worse moments that a human being and his family are suffering, to excise a beating heart from a person who has all vital signs [50,64,65,72], i.e. a patient who even if he is dying or will eventually die has a 97 per cent of body functioning, and may even give birth to a healthy foetus [61,74].

However this means nothing to the organ procurement business and to its sponsors and devotees. The patient with head trauma has been hunted everywhere by the emergency services. There are hundreds of professionals ready and anxious to hunt such patients and declare them as soon as possible "brain dead" (BD). Physicians outside the business, the general public, and the media ignore the cruel aspects of organ procurement from the initial emergency call, to admission to hospital and to the organ procurement surgery. The public is influenced by media manipulated by the business representatives and assumes that – even if the organ procurement has been questioned and doctors have many doubts about it [13] – it must be all right if the medical experts of the most famous universities are doing, supporting, and advertising it. History has shown that what is ethically and morally wrong is always wrong, even if governments, laws, priests, philosophers and thousands of experts are approving it and if crowds are applauding and cheering, as it was in the past with inquisition, guillotine, hangings and the likes. In brief, wrong remains always wrong even if done for a good end.

In the past fifty years few independent experts, i.e. experts with no conflict of interest whatsoever, have been brave enough to challenge the laws, the ethics, and the practice of organ procurement [10,13,14,18,20,21,29,46,52,57,68].

Some have been silenced. Many others have just kept silent after leaving the field [21]. Media, congresses, and medical publications have nearly always ignored the critics of organ procurement.

It is also obvious that medical journal based on transplantation cannot oppose organ procurement. And bioethicists cannot speak against the main source of income and prestige of their hospital or university, as it is difficult to get a man to understand something, when his salary depends upon his not understanding it or justifying it.

Media have always been shifted their attention on patients who are waiting for organs. Physicians and surgeons not personally involved in the procurement business ignore the organ procurement process. Many avoid the problem for fear of being considered non-altruistic, too conservative, or uninformed about the technological progress of medical sciences. Many others prefer the tranquillity of self-imposed ignorance or the refuge of denial. They should at least know that *not a single investigation or action on the donors - while they await extraction of their organs - is in the interest of the patient*. Every step, invasive or not, is done to ensure both the earliest certification of death [13], and its total opposite, which is the best biological vitality of the body – or even to crash the functioning brain as in Donation after Cardiac Death (DCD) [7,10,16,17,51,53].

The multiple definitions of death

Death is a process of great variability, however it has historically been defined as what happens when the heart and lungs stop i.e. *rigor mortis, algor mortis, livor mortis* [20,23,29,62,64,65]. For the entire history of humanity it has been a matter of waiting long enough to be sure to avoid deadly mistakes caused by mimicking conditions. In the transplant era the push has been intentionally in the opposite direction. Organ procurement business and the transplant industry cannot wait since they need a perfect living body and want to speed up as much as they can the legal determination of death [3,4,28,65]. The earlier the declaration of death, the higher both the harvest and the success of the business. Physicians were artfully persuaded

to pronounce and to certify beating heart patients "brain dead" (BD) before the procurement surgery commenced to avoid the myriad of legal and ethical problems connected.

The "brain death" definition did not originate or develop by way of application of the scientific method but following the heart transplant that took place in South Africa in 1967. Jingoistic thoughts were instrumental to open the way to an initial technical exploit but the results were dismaying since as of March 1, 1971, the total number of heart recipients was 167 and the total number of deaths 143. Even Dr D. Cooley, the prominent heart surgeon operating in one of the finest hospitals, had the world record of 100 per cent of deaths [66]. Nevertheless the media were cheering the entire planet on.

The pressures of the newly self-proclaimed transplant surgeons to make heart transplantation legally acceptable were instrumental to the invention of the Ad Hoc Committee of the Harvard Medical School to Examine the Definition of Brain Death [1]. Few questioned the scientific status of the new definition. It was based on no patients. The moral status was outside the aims of the Harvard thirteen men who reversed ten thousands years of humanity dealing with death.

The primary purpose of the Harvard Committee was not to determine if irreversible coma was an appropriate criterion for death but to establish it as a new criterion for death and make medically and legally acceptable to get beating hearts for transplantation. The committee declared that death could be proclaimed if a ventilator-dependent patient fails to respond to a series of reflex tests. This allowed the earliest certification of death so that a brain injured patient with a healthy, beating heart and fully operating body (including liver, kidney and endocrine system) can now be defined as dead, just like a cold corpse.

The Harvard Criteria in other terms established that a prognosis of death – by the way common to all human beings since their birth – is legally equivalent to a certification of death. Transplant surgeons obtained a legal authorization to the surgical procurement of organs from

dying patients now classified as dead corpses. They had no longer to worry about a prosecution for murder.

In the following decades this change gave birth to the most extravagant definitions of death. As a matter of fact now the number of different types of deaths equals the number of hospitals: what is death here is not death there. Numerous authors have showed the methodological frailties of both the brain and heart approach to the criteria of death used in connection with organ procurement and transplantation [36,38,40,70a]. They even propose to abandon the definition of death, and suggest a pragmatic definition of "explantability window" [6].

Death is now diversified as :

- metabolic/non-metabolic,
- reversible/irreversible,
- slowed/accelerated,
- brain/non-brain,
- beating/non-beating,
- adapted/non-adapted,
- accompanied/unaccompanied,
- dignified/undignified,
- peaceful/not-peaceful,
- assisted/non-assisted,
- crashed/non-crashed,
- expected/unexpected,
- guided/non-guided and so on.

This means that everything can be said and done on a seriously ill or dying human being. The transplant business changed death from a natural and sometimes compassionate event in an unnatural tragedy. The media's silence on the many patients who had been certified dead and who have come back to life has not yet been able to destroy the public trust in the acceptance of the definitions of death by the authoritative Harvard Committee and its partisan epigones.

More recently many doctors involved in the transplantation of human organs have admitted that donors are not truly

dead [49,51,54,60,65,66,67,68,69,70a] but affirm that the quality of life of the brain-injured comatose donors is so pitiful, that he may as well be sacrificed so that their organs can save someone else's life [12,19,26,69]. Western society seems to be rapidly approaching a stage where the moment of death will be determined [57] not so much by objective bodily changes as by the philosophy of personhood of those in charge. In the organ procurement case there is a real danger that we are seeing euthanasia or better dysthanasia by default and by the back door. Everyone admitted to hospital would like to be treated as an individual, with compassion and dignity. The medical profession should never lose sight of the fact that the most important people in the hospitals are patients as such, not only someone else such as "waiting" patients and their families.

The Dead Donor Rule (DDR)

According to law, organ transplantation must abide by a cornerstone of organ procurement, the so-called *dead-donor rule* (DDR). A person has to be declared dead before any vital organs can be removed. Yet organs have to be biologically alive for a successful transplant to a recipient. Surgeons have found a paradoxical situation – a dead person with live organs – by fashioning a category of people with beating hearts and functioning body who are classified as brain dead. They are usually classified BD after a stroke or a traumatic head injury and are considered by the transplant business just as dead as if they had rigor, algor, and livor mortis.

The 1981 Uniform Determination of Death Act [44] also defines death as the «irreversible cessation of circulatory and respiratory functions», which left an opening for another source of donors. As a matter of fact in the late 1980s, the University of Pittsburgh Medical Center redefined again the definition of death to make it more suitable to organ procurement, which created another way for the transplant business to procure organs after heart had stopped but brain was still alive: the so called *Donor after Cardiac Death* (DCD) [7].

The Children's Hospital in Boston convened task force of doctors, lawyers and health care professionals to explore the ethics of allowing DCD. After two years of regular meetings, the group was unable to reach a consensus. «The more we talked about it, the more polarized we became», recalls Dr Peter Laussen, a committee co-chairman. Supporters of DCD argued that the practice was legal and compatible with families' wishes. Those opposed worried that caregivers would see critically ill patients merely as organ donors, and their end-of-life care could be compromised. At a certain point in the committee's debate, members were asked to mark where they stood on DCD, on a continuum, with one end signifying "totally disagree" and the other "totally agree". The participants almost uniformly chose one extreme or the other. The USA federal government asked the Institute of Medicine to gather experts to determine how a dying donor might be treated. The experts ended up endorsing the procedure for donation after cardiac death DCD, in which death occurs through a process of withdrawing life support and allowing the heart to develop "irreversible cessation".

There were two crucial conditions.

First, families could not be pressured to stop life support; they had to come to the decision on their own, in consultation with their relative's doctor. No member of the organ-procurement team could participate in the family's decision or declare death.

Second, "irreversible cessation" of cardiac function meant that at least five minutes had to pass without a heartbeat.¹ That interval was arbitrary — the panel of experts made no reference to supporting research — and they admitted that «this recommendation is only an expert judgment».

It is unfortunate for the experts to know that patients recently survived more than *seventy-five* minutes of cardiac arrest.

A new class of potential organ donors was invented by Institute of Medicine: living patients with little hope of

¹ [This is a progress, so to speak, with respect to the Pittsburgh protocol, according to which cardiac death occurs after *two* (!) minutes of cardiac arrest [78]. (*Editor's Note*)]

recovery who could be declared dead soon after life-support removal. Within a decade, the number of such donors increased tenfold in USA. DCD now account for 8 percent of organ transplants in USA, up to 20 percent in certain areas. Still, many hospitals were slow to adopt this practice. Donation after cardiac death DCD still arouses suspicion. It has been cautioned that if families and doctors also decided it was acceptable to euthanize patients to procure their organs, «You would destroy organ donation».

The newly invented definitions of death have now been falsified openly. Speaking in 2011 at the American Society of Bioethics and Humanities in Minneapolis, Neil Lazar (Toronto General Hospital), Maxwell J. Smith (University of Toronto) and David Rodriguez-Arias (Basque University) said that it was more important to know that patients in BD are in a "comfortable" and "risk-free" situation rather than whether they are alive [49]. They stressed the ambiguity of death regardless of the criteria determining the death of brain and heart: «"Cardiac death" (DCD) could be reversible and "brain death" is not always verifiable». They therefore concluded that

the "dead donor rule" DDR is not an acceptable strategy to protect donors from harm in DCD protocols. We propose a threefold alternative to justify organ procurement practices: (1) ensuring that donors are sufficiently protected from harm; (2) ensuring that they are respected through informed consent; and (3) ensuring that society is fully informed of the inherently debatable nature of any criterion to declare death.

They further suggested that DDR should be abandoned despite this seems macabre to lay people!

In fact, today we have a cruel medicalization even of the death process that is no longer protected, peaceful, and comforted by relatives. The so-called brain dead is preceded by an artificially prolonged agony caused by unnecessary and counterproductive investigations and treatments. Many leading experts confirm that the new definitions of death are just the trick of the tetragonal obstinacy of the transplant business and the understandable but incorrect request for lease of life by those who are given the alternative: transplant or death. Two eminent American

bioethicists [60] debating if it is morally wrong to kill people argue that they believe that «killing by itself is not morally wrong, although it is still morally wrong to cause total disability». Ultimately their aim is to further justify organ donation after cardiac death (DCD). The authors state frankly that the patient is not dead at that point because it is possible that the patient's heart could start beating again:

[T]he criterion of irreversibility has not been satisfied; hence, these patients are not known to be dead at the time of organ procurement.

However, a nagging suspicion that these patients might not be dead is still a substantial stumbling block because the medical profession insists that donors must always be dead. But they have a tricky solution:

[T]he dead donor rule is routinely violated in the contemporary practice of vital organ donation. Consistency with traditional medical ethics would entail that this kind of vital organ donation must cease immediately. This outcome would, however, be extremely harmful and unreasonable from an ethical point of view [because patients who could be saved would die]. Luckily, it is easily obviated by abandoning the norm against killing.

This radical and shocking conclusion, they say, is necessary to bring greater precision to what we mean by “killing”. Rendering someone totally and permanently incapacitated is just as bad as taking a life, or so they contend. In their view killing disabled patients does them no harm:

Then killing her cannot disrespect her autonomy, because she has no autonomy left. It also cannot be unfair to kill her if it does her no harm.

Nor, they say, is life sacred. In their opinion the only relevant difference between life and death is the existence of abilities – and a brain-damaged person no longer has these [60]:

[I]f killing were wrong just because it is causing death or the loss of life, then the same principle would apply with the same strength to pulling weeds out of a garden. If it is not immoral to weed a garden, then life as such cannot really be sacred, and killing as such cannot be morally wrong.

Other experts are on the same line of thought, such as [12] in *Bioethics*:

If a patient opts for VAE [voluntary active euthanasia] in a society that permits it, and then chooses termination via RVO [removing vital organs], it seems clear that no more harm is done to others than if he were terminated by any other means.

Or in the *Journal of Medical Ethics* [35b]:

In the longer run, the medical profession and society [...] should be prepared to accept the reality and justifiability of life terminating acts in medicine in the context of stopping life sustaining treatment and performing vital organ transplantation.

Or an Editorial in *Nature* [76]:

Few things are as sensitive as death. But concerns about the legal details of declaring death in someone who will never again be the person he or she was should be weighed against the value of giving a full and healthy life to someone who will die without a transplant.

Here are Truog and Miller in the *New England Journal of Medicine* [70b]:

Whether death occurs as the result of ventilator withdrawal or organ procurement, the ethically relevant precondition is valid consent by the patient or surrogate. With such consent, there is no harm or wrong done in retrieving vital organs before death, provided that anesthesia is administered.

Here is Hoffenberg *et al.* in *The Lancet* [77]:

If the legal definition of death were to be changed to include comprehensive irreversible loss of higher brain function, it would be possible to take the life of a patient (or more accurately stop the heart since the patient would be defined as dead) by a lethal injection and then to remove the organs for transplantation [...]

Here is Truog in *Critical Care Medicine* [70c]:

We propose that individuals who desire to donate their organs and who are either neurologically devastated or imminently dying should be able to donate their organs without first being declared dead.

It is relevant 1) to remind that somebody trying to kill – even with the best intention and for a good end – has to accept the self-defence of the other party, and 2) to note that medicine still remains in the public view an ethical enterprise. But if we want to keep medicine ethical, it is important that the aforementioned proposals should not be allowed to germinate. Most people will oppose killing for organs. Thus, the best way to prevent this dark agenda from ever becoming the legal public policy is to expose it everywhere and especially in popular media every time it is proposed. The need to procure donor organs that are as fresh as possible, have pushed many countries to model their legal definition of death on the USA law passed in 1981. The law is straightforward:

An individual who has sustained either (1) irreversible cessation of circulatory and respiratory functions, or (2) irreversible cessation of all functions of the entire brain, including the brain stem, is dead.

In practice, physicians know that they are probably obeying the interested spirit, but not the letter, of this law. Many experts are feeling increasingly uncomfortable about it. In particular, the members of the transplant business know that they cannot guarantee full compliance with three of the law's phrases: "irreversible", "all functions" and "entire brain". But what if, as is sometimes the case, part of the brain is still functioning? Post-mortem observations demonstrate that relatively large areas of tissue can be metabolically active in different brain areas at the time death is declared. The criterion of irreversibility raises the question of how long one should wait to be sure that no function will re-emerge since death is a long process during which systems, networks, and cells gradually disintegrate. At some point, the person is no longer there, and can never be made to return. But the kind of clear, unambiguous boundary assumed in the law simply does not exist. It has also been proposed that the law should be changed to describe more accurately and honestly the way that death is determined in clinical practice. Most doctors have hesitated to say so too loudly for fear of being considered as greedy harvesters eager to strip living patients of their organs.

Some transplant surgeons and bioethicists would like that lawmakers reconsider rigid definitions of death, and are calling for another, wider public debate and discussion on redrafting laws that push doctors towards fiction and deceit. The transplant business however prefers to go ahead with public indoctrination and advertising sold as the culture of donation and the gift of life. They are frightened by the people reaction to their gruesome proposal and are trying to find euphemistic terms to avoid backfire. Every surgeon involved in the process of organ procurement should know that the DDR has not been adhered to in practice. The transplant business and its supporters are aware and panic that public information could easily discourage organ procurement. Most organ procurement professionals know how incendiary the theme is and design their strategy accordingly. The transplant business works on the effect not on the cause of illnesses. Prevention of obesity, hepatitis B and C, alcoholism are clearly outside the scope of the transplant business. The unique goal has always been to develop a robust donor system that will provide more organs. Personal, social as well as moral, ethical, economic and practical cost to the so called donor are a forgotten optional.

The so-called Donor

An injured patient classified as potential donor is subject to invasive procedures after a questionable consent. Many organ procurement doctors believe the term "life support" should never have been coined. They suspect the phrase is a significant factor about people not signing donor cards and prefer the expression "organ support" or "organ preservation". Intensive Care Unit (ICU) personnel feel confused about having to perform cardiopulmonary resuscitation on a patient who has been declared dead, whereas a 'do-not-resuscitate' order has been written for a legally living patient in the next bed.

Among the set of criteria for BD the most criticised is the Apnea Test [10,11,13]. This test has no benefit at all for the comatose patient and aggravates the patient's already compromised condition. It is done without the knowledge or

informed consent of family members. When the ventilator is turned off to see if the patient can breathe on his own the results is choking or suffocating this human person who has already a problem of ventilation. The resulting accumulation of carbon dioxide in the body can cause further damage to the injured brain and even true death. The increase in carbon dioxide causes the brain to swell, which further decreases the already compromised circulation within the skull. When the brain, heart, lungs, or other vital organs are in a damaged state, even a very short time without breathing will further terminally damage them. The Apnea Test can also induce a decrease in blood pressure or cardiac arrest. The sole purpose of this stressful and potentially lethal test is to determine the patient's ability to breathe on his own in order to declare him "brain dead" [10,11,13]. The Apnea test risks inevitably further damage and even killing a comatose patient and should be considered unethical and declared illegal as an inhumane medical procedure. If family members were informed of the brutality and risk of the procedure most of them would deny permission. When a heart attack patient is admitted to the emergency room he is never subjected to a stress test in order to verify whether he is suffering from terminal heart failure. Instead the patient is given special care and protection from further stress to the heart. If patients were not subjected to the Apnea Test, they could have better chance of recovery if treated with timely therapeutic hypothermia [72].

Even worse in *non-heart-beating donation* (NHBD) or DCD there is the so-called ante-mortem intervention for organ preservation (e.g. femoral vascular exposure, heparin, vasodilators, ECMO² etc.) to control the dying process. In this case there is a reverse of circulatory criterion of death. Therefore the surgeons suppress brain and heart function mechanically with balloon and with pharmacologic intervention. In other words since in their opinion the patient donor is going to die they kill him scientifically and crash the healthy brain. It is hard to witness an actual NHBD/DCD procedure without conceding that the process of declaring death in any setting is inherently arbitrary,

² ExtraCorporeal Membrane Oxygenation.

gruesome and utterly unethical. The Denver protocol has even rejected the five-minute rule imposed by the Institute of Medicine and picked three minutes instead for little children [7] . Waiting just over a minute after cardiac arrest to declare death is simply unprecedented and open the door to killing or active euthanasia for organ procurement [17].

The so-called Donor families

The death of a loved one is always difficult. Reactions are influenced both by the circumstances of a death, particularly when it is sudden or accidental, and by the relationship with the person who died.

A child's death arouses an overwhelming sense of injustice for lost potential, unfulfilled dreams and senseless suffering. Parents may feel responsible for the child's death, no matter how irrational that may seem. Parents usually feel that they have lost a vital part of their own identity.

A spouse's death is also very traumatic. The death may necessitate major social adjustments requiring the surviving spouse to parent alone, adjust to single life and maybe even return to work.

In addition to the severe emotional shock and a state of temporal insanity, the death may cause a potential financial crisis and various forms of post-traumatic stress disorder (PTSD). Many families under the stress of a the death of a loved one sign for donation to obtain the illusion of a form of immortality for the dying, to become part of social body, or to oblige the uninformed wishes of the dying, always under previous social, medical, media influences. Numbing and guilty feelings are in most cases partly responsible for surrendering to the manipulative questions of professional requesters.

A nationwide procurement system requires a huge investment in information technology to expand hospital capacity for procuring organs from distressed families. It requires changes in people's attitudes by intensive lobbying, manipulation, indoctrination, emotional appeals to solidarity. Social barriers to organ procurement in western countries have been partially overcome by full indoctrination of families on social and psychological

ground. Other governments, such as the Chinese government, are well known for using their authority to enforce sweeping changes across society.

Transplant coordinators

Vultures hover where marauding hyenas roam

An African proverb

Highly specialized and trained organ procurement staff coordinate the process of organ and tissue procurement and allocation. Early referral of potential donors to procurement coordinators is requested to allow for evaluation of living patients as potential donors. Information that the procurement coordinator needs to evaluate a potential donor includes: anticipated cause of death, status of the declaration of death, the family's understanding and knowledge of the situation, and obviously age, race, sex, diagnosis, date and time of admission, vital signs, current medications, laboratory results and a detailed medical history. If consent for donation and organ procurement is obtained, private information about a potential donor's social profile, including sexual habits, family structure, travel history, and substance use or abuse, is elicited from the donor family.

The procurement coordinator also addresses medico-legal issues such as the confirmation and documentation of brain death according to applicable laws and hospital policy. Upon review of the potential donor's medical record, the procurement coordinator initiates the process for placement of the organs. Information about the potential donor is entered into a database for matching with potential recipients. At the same time a specially trained family support coordinator works with social workers to notify the death of the dying and counsel the family through the donation process. The coordinators, while offering practical help to grieving family needs, aim at making a pitch for organ donation. To facilitate the nasty job all receive intensive training on how to manipulate grieving and shocked families. Coordinators conduct also training and manipulating sessions on organ donation for the candid hospital staffs, can audit all patient records to make sure

that potential donors are not being missed, and get to know the nurses and doctors who work with the most severely injured patients. The work is emotionally draining, especially in the case of children but the business says that coordinators love it.

Transplant coordinators may have quotas, punishments for insufficient procurements, and career advancements and/or money according to the conversion rate. What gives the *organ procurement organization* (OPO) the right to carry out the organ recovery with only the deceased patient's consent? Their opinion is that the dying's wishes should be honoured, patient's consent trumps surrogate consent since the industry lobbied to approve many laws to support it. Legislation has been passed recognizing the equivocal rights of the deceased to donate organs. The identification/donor card as advanced directive is now more stringent than a contract, even if, as it happened, there were by thousands mistakenly reported on a health service computer.

The procurement organizations are paid by national health services, get government grants, raise charitable donations. In some countries they are supported mostly by charges added to hospital bills under law. The system, with obvious variations, has been adopted in many countries.

The procurement groups are immediately alerted when a hospital receive a patient with brain trauma who might be a donor or eventually declared a so-called brain dead patient. In some countries the organization sends a nurse to assess the potential donor and take steps to keep organs working. Elsewhere there is a coordinator waiting in the hospital for prospective organs. The standard practice was to have that nurse, along with hospital staff members, help the family and broach the subject of donation. However the job was considered too much for one person, and many hospitals began hiring and training also family coordinators in order to help relatives with a hidden agenda of avoiding refusal, to increase the gruesome harvest and to put every burden and responsibility of consent on the family. The coordinators connect relatives with social workers and tongue-tied clergy. Many of the family coordinators relatives have received organs. Some are chosen in part to reflect the ethnic communities they will work in. The

transplant coordinators are not concerned with the patient's life. They are prepared with a variety of courses to obtain from grieving relatives organs for transplant. They are instructed to intervene in the most terrible moment in the life of a family and to manipulate relatives with psychological techniques designed to yield consent to the request for removal. The organ procurement coordinator, for example, is instructed to use statements prepared by psychologists such as the following, which are taught in courses:

- I will answer to any question or request on your part!
- I'm here to give you a great opportunity to donate the organs of your child!
- She and her husband have a great opportunity to make their child a hero through the gift of organ donation!
- Most people, if they are given "the chance" to save a life, do it!
- When you decide to donate ...! [They assume that you have already taken the decision]
- If you have other questions, I will guide you through the process of donation ...!

In practice, their insistence is reversed as the relatives' offering. The employment, wages and professional recognition of coordinators may depends on the percentage of subscriptions to removal that they are able to obtain from relatives. The only real concern for the patient is that it can be used for sampling of its organs. This is an integral part of the work as stated in the courses for coordinators: "no donor no transplant".

A criminologist pointed out the psychological similarity among coordinators and "angels of death". Psychologists trying to understand the motivations of Dr Swango, a well-known American angel of death, were surprised to know that his greatest pleasure was to get out of the ICU and to tell parents that their son was brain dead. The choice of a job that requires to communicate to parents that their son is brain death is indicative of some psychological motivations. It should be stressed, however, that a significant percentage of coordinators decide to leave the field [21]

because they probably realize what is happening with the work they have chosen to do.

Altruism and organ procurement

Organ procurement business attribute to donor card holder or dying person and his family the reward of altruism. The basic principle of altruism, according to philosopher Ayn Rand (1905–1982), is that man has no right to exist and even die for his own sake. Altruism requires that service to others is the only justification of human existence and death. Altruism affirms that self-sacrifice is the highest moral duty, virtue and value. Altruism should not be confused with kindness, good will, or respect for the rights of others. These are not primary values, but consequences – which, in fact, altruism makes impossible. The irreducible primary and basic absolute of altruism is self-sacrifice – which means: self-immolation, self-abnegation, self-denial, self-destruction – which means: the self as a standard of evil, the selfless as a standard of the good.

Paraphrasing Rand we could say that the issue is whether other people's needs are the first mortgage on your life and your organs, and the moral purpose of your existence and even of your death. The issue is whether man is to be regarded as a sacrificial animal even when he is frail and unconscious and in the supreme moment of his life.

Altruistic procurement business declares that organ donation taken for the benefit of others is good, and any refusal of a donor card for quick organ procurement or any refusal of the butchery of a man is evil. Thus for the transplant business the beneficiary or recipient is the only criterion of moral value – and so long as that beneficiary is anybody other than the patient with healthy organs, anything goes. Doctors and transplant specialists know very well that promoting altruism is not an end in itself. It is only a means to spur the so-called donations. The aggressive request of altruism by organ procurement business is only a thievish request of self-sacrifice.

Donor cards

The Death Lottery Tickets (commonly known as donor cards) are the life insurance of organ procurement industry. Donor cards are offered to uninformed people in many settings: from hospitals to internet, from universities to playgrounds. No effort is made to explain clearly for the future donor what constitutes death for the organ procurement business. People accept incuriously the card with a scandalous lack of understanding about the organ procurement procedures, with a reassuring reward of social acceptance but certainly with the secret hope *not* to win the jackpot – the jackpot being a precipitous declaration of death, a series of non- authorized damaging invasive procedures and a horrible surgical butchery. Ticking a box in a driver's license or in an identity card, or accepting a organ donor card during a party, hardly qualifies as informed medical consent. The organ procurement business provides "tick boxes" allowing citizens to give advance directive in vehicle-registration forms, driver's-license applications, and other public documents. Even children are encouraged to be part of the flock, and indoctrinated to sign. All such documents specify that organs may be harvested only "after my death", but there is no explanation of what constitutes "death" for the organ procurement business. The business is practically allowed to strip as many organs as possible out of a living corpse, regardless of what box has been ticked. And since they will very soon be able to sell donated organs as well, patients are going to be worth more dead than alive. The industry knows there is no legal aid for clinical negligence or similar cases.

A flow of advertising on organ donation is constantly streaming from the television, internet, printed media. It is a bombardment of words and pictures. The speed at which this information is communicated makes it easy for the signal to take control, switching the viewer's brain to stand-by as information is absorbed without analysis or questions. Media's constant signal shapes the conclusions of the masses and produces the collective norm of organ procurement.

The signal prescribes what is truth through the words of so-called experts and authorities, gelding the consciousness

and independent thoughts of those subjected to it. Through television, web and media, the masses can be made to accept the most monstrous distortions of reality such as the organ procurement from a child sold as organ donation. The signal is a chill wind of continuous oppression over the minds of the masses. It controls the management of society and culture, creating uniformity across all subjects. The fuel for this vehicle of mass deception is a technique known as *perception management*, where an array of psychological techniques are used to alter the truth, leading the viewer to a desired conclusion. Some call this spin or propaganda, while others know it, simply, as lying. According to a master of propaganda, "If you tell a lie big enough and keep repeating it, people will eventually come to believe it". It is subtly communicated that one should stay within the collective and never challenge the message, for doing so may be considered an aggression towards the scientific culture of organ donation. The message is: "Be a donor; always obey scientific authority; you know nothing; listen only to experts; be content and never question or express alternative ideas".

This signal is being broadcast across millions of screens, indoctrinating the unconscious minds of those who choose this as their only reality. Self-censorship occurs when these individuals become so deeply indoctrinated that they are afraid to discuss any information outside the paradigm of created culture. Our consciousness has been destroyed so much that the fiction of the living corpse has become reality. The transplant business has always used the incredibly powerful weapon of mass psychology as a method of controlling the minds of the masses and altering the behaviour of individuals. Predictive programming is a tool used by the establishment to acclimatize the public to new ideas, trends, and beliefs.

The donor card is presented as "a conscious choice". It would be enough to make explicit the requests made by some doctors before signing a Donor Card:

- Would you authorize the burial of your child before the heartbeat stops?

- Would you sign for artificially prolonging the agony of your child to benefit an unknown member of society?
- Would you accept that your child would be treated as a potential BD while is carried to the hospital?
- Would you trust surgeons, anaesthetists and nurses who tell you that your child died while he is dying?
- Would you trust a university, or a hospital, or a country, which practices the fiction of brain death?

It is therefore very strange that for any other minor procedure informed consent is required, but for the acceptance of this most final of operations no explanation nor counter-signature is required, nor is the opportunity given to discuss the surgical methods and the question of anaesthesia.

Incentives to donation

Organ donation has been marketed as a selfless act, but donor altruism and death rates from head trauma are not enough to reduce transplant waiting lists. A broad range of actions and incentives have been considered to reward the donors. Suggestions vary from the simple sending an official "thank you" to the donor to the creation of a free market in body parts. Some experts proposed that people who commit to being an organ donor should have priority for receiving an organ in case they need a transplant. The authors believe that making willingness to donate as the key determinant – rather than time on a transplant waiting list – would increase the organ supply in a "fair and equitable" way. To ensure fairness, patients who are already on the waiting list would have the first chance to sign up. The authors astutely believe that many useful organs could be obtained from transplant candidates who die while awaiting organs. It is questionable whether such plans would meet their goal of increasing organ donation, as they might favour older, sicker patients.

In 1996, the Board of Directors of the United Network for Organ Sharing (UNOS) granted "preferred status" to those who have donated organs. The concept of preferred status involves rewarding organ donors by providing a modest

recognition for their willingness to donate. Under preferred status, a patient will be assigned four points if he or she has donated for transplantation within the US his or her vital organ or a segment of a vital organ (i.e. kidney, liver segment, lung segment, partial pancreas, small bowel segment). Critics of preferred status maintain that there is no ethical justification for attaching unique moral worth to a willingness to give, and that the implementation of such a system would be highly problematic.

The UK Government promoted without success “presumed consent”. After canvassing public opinion, the UK Organ Donation Taskforce rejected the idea saying that presumed consent has the potential to undermine the concept of donations as a gift. The reality is probably different : they feared an avalanche of opt-out. Governments were warned that donation rates reflect clever and aggressive management, i.e. influence on public and manipulation on grieving families.

Proposed rewards for organ procurement also include a discount on funeral expenses, a small contribution to a retirement fund, an offer of health insurance, a tuition voucher, or a charitable contribution in donor’s name.

Celebratory events

Celebratory events are professionally orchestrated events to show a panoply of symbolic expressions (gift of life) which transform the patient body in systematic greenery (harvest-explant-transplant) while obscuring death, human suffering, and body commodification [56]. At the same time those cheerful social events systematically silence public grief of the families and deny the individual identities of the explanted. Donor associations are usually made of future and past recipients plus their interested families and friends under the strict surveillance of the business.

For years now, the organ procurement organizations worldwide have been in thrall to the theory of “nudge” – a behavioural persuasion which is a way for governments or organizations to influence our behaviour without using laws to do so. Effectively, it is social engineering without anyone noticing, nanny organizations where nanny stays hidden

behind the curtains. Rather than ordering people around to be automatic organ provider in case of accidents or leaving them to behave in ways that is not in the interest of recipients, the health services can gently manoeuvre them into behaving sensibly, i.e. accepting a donor card or signing a non-opposition. Who could possibly object? The utilitarian maxim that guides most people of a liberal persuasion was set out by John Stuart Mill in his *On Liberty* (1859):

[T]he only purpose for which power can rightfully be exercised over any member of a civilised society, against his will, is to prevent harm to others. His own good, either physical or moral, is not a sufficient warrant.

Nudge, therefore, offers a non-legislative way to intervene in our lives and even in our deaths. It could be argued that, used properly, it does conform to Mill's condition for state intervention. Anti-obesity campaigns, for instance, can be justified because excessively overweight people who develop diabetes and other ailments harm others who have to pay for their treatment on the NHS. The same can be said about drinking, smoking, and speeding. Nudges used in isolation will often not be effective in changing the behaviour of the population. Instead, a whole range of measures – including some regulatory measures – are needed to change behaviour in a way that will make a difference to the transplant business' biggest problem: consent.

An Orwellian newspeak has been elaborated in the organ procurement business : death is life and life is death, grief is love and love is grief. The organ is a new pump for the recipient, an exchangeable socio-cultural resource for the progressive sociologist, a spare part for doctors. What is an organ procurement surgery for doctors is a gift of life for the donor associations. Media newspeak is evolving from donation to opportunity, or more recently to duty and compulsion. However for the trauma patients and their families donation is actually prolonged agony, quartering, dissection, clamping, flushing, disembowelment, grief and guilty feelings for surrendering to the requests of the coordinators.

Consent to organ procurement

The consent to any medical act – including a terminal act such as the organ procurement – should be given by a competent individual who has received the necessary information, adequately understood the information, who after considering the information, has arrived at a decision without having been subjected to coercion, undue influence or inducement or intimidation (CIOMS³ International Ethical Guidelines).

Consent should always be a moral and legal requirement. Comprehensibility should be essential, but since proper information is considered too traumatic and even cruel it threatens the opportunity to acquire consent to organ procurement. The leading German transplant surgeon was used to say “If we inform the public properly we won't be able to procure organs any longer”. But the new progressive ethicists say that it is immoral to require consent for cadaver organ donation and that no one has the right to say what should be done to their body after death [19]. They suggest the need to rethink our attitudes to the bodies of the dead in order to increase our willingness to donate organs and tissues [54], or that in organ procurement dead interests are less important than living needs and cadaver organs should be automatically available [26]. Families however are not told that testing procedures hasten death or at least are looking only for sign of death. Families are not told that there is an ethical debate. The organ procurement agencies try to deny that there is an ethical debate. The responsibility for obtaining informed consent for organ donation in emergency is assigned to coordinators. The talking about the urgent need for organs and the uncertain consolation that some families derive from knowing that their loved one was able to help others is a tricky form of manipulation of distressed people in a state of insanity.

Recently the procurement organizations adopted a strategy known as the “presumptive approach for organ donation”. Under this approach, organ-procurement coordinators are encouraged to introduce themselves to families as members

³ Council for International Organizations of Medical Sciences.

of the “medical team” or as “grief counselors”, without disclosing that their role is explicitly one of dual advocacy. Operating under the assumption that organ donation is simply “the right thing to do”, they simultaneously represent the conflicting interests of the patient as potential donor and the pool of potential recipients and their families longing for organs. The typical phrases used in the standard approach contrast with those of the presumptive approach, which are clearly misleading and manipulative. These concerns are not just theoretical. As a critical care physician in Chicago observed, “I have seen these guys come in and almost browbeat families into submission to get them to donate organs”. Eminent experts expressed sincere doubts if all those millions whose names are on the organ donor lists fully understand what they are deemed to have agreed to by ticking boxes offering their organs “after my death”. If they did not understand that they might be certified dead for that purpose on controversial criteria rather than the age-old criteria of death as commonly understood, they were deceived by the wording and their “consent” is invalid [20]. The presumptive approach clearly undermines many of the core elements of informed consent.

An instructive contrast can be drawn between approaches to obtaining consent for participation in medical research, on the one hand, and for organ donation, on the other. The two activities have much in common. Yet in seeking informed consent for research, meticulous safeguards have been adopted to ensure that the consent is fully informed, voluntary, and free of any manipulation or coercion, whereas in the case of organ donation families are counselled by people whose agenda and approach are inherently rife with conflicts of interest and manipulative. This strategy seriously threatens the medical commitment to the importance of informed consent and undermines fundamental principles that support respect for patients and their families. As one ethicist has noted, “Most people who agree to be organ donors think about it in terms of what will happen to their body after they die. This [approach] has implications for what they do to you ...*before* you die”.

Over the past few years, the pendulum has swung too far in the direction of procuring organs at the expense of

commitments that are fundamental to the patient–physician relationship. If uncorrected, this trend will substantially erode the public's trust in the transplantation business. Failure to obtain adequate informed consent will place hospitals and caregivers at risk for litigation ranging from medical negligence to battery and homicide, even if the laws have been drafted to avoid this risk.

The rules governing family consent and the declaration of death and removal of organs vary dramatically around the world and even around the same country, raising unresolved questions about when life ends. Proponents of organ transplantation [38] published an article admitting that "brain dead" donors are alive (yes, alive!) and all restrictions should be removed in order to obtain more organs for transplantation. More recently a provocative proposal by doctors from Canada and Spain created a stir in bioethics circles. They wrote in the *American Journal of Bioethics* [49]:

Rigorous informed consent, protection from harm, and transparency toward the public could constitute a threefold pillar on which organ procurement of vital organs could operate in an ethically acceptable and socially responsible way.

They said

Let's scrap the fiction that most patients are dead when their organs are removed and allow doctors to take them from people who are still living.

Like conservative critics of organ transplants, they stressed the ambiguity of determining death no matter which of the two criteria for death are used. «"Cardiac death" (DCD) could be reversible and "brain death" is not always verifiable». They realised that scrapping the "dead donor rule" (DDR) will seem ghoulish to the public. For this reason, they called for an extensive public education campaign so that people could continue to donate their organs. There is a series of new trends of the totalitarian state in case too many people are frightened off from signing as organ donors: the consent of everyone will be assumed unless it is explicitly withdrawn i.e. the consent will be presumed or even forced.

Privacy of patient

Donor privacy is constantly although sometimes legally violated by organ procurement business even before the patient is declared brain dead. In most cases according to the law it is sufficient to be a prospective (sic!) donor. Transplant coordinators have the right to inspect all medical records of all patients. They take the liberty to inform the media that organs have been donated in order to establish a fashion trend toward donation and procurement.

By contrast, the recipient's privacy is severely and actively protected especially from the donor family and obviously from the press in case of faulty or unsuccessful transplant. Operating room (OR) deaths as well post-op deaths are strictly kept secret. Borderline transplant in patients who do not need a transplant, botched series of transplants that required the closure of the department for investigation, and survival rates mixing different types of transplants are also always kept secret.

Some surviving recipients are then showed at celebratory and fund-raising events, and as trophies in medical meetings and talk shows.

The organ procurement business, better known as transplant business, want absolute and total control over bodies from cradle to grave, inside and out [18,28,31,32,40] even when inside the grave there are those who steal assets from the dead [9].

Organ procurement surgeons

A prominent heart surgeon would recall the eerie moment of heart excision [66]:

[...] you are the one who makes the final blow and takes out the heart and this is a peculiar feeling the first time you do it [...] I guess just like an executioner who has to pull the switch on the electric chair because it is job. It bothers him the first time, but the more times he does it, the less it bothers him. [...] It was upsetting to me personally the first time I did it, but the more I did it the easier it became [...] The first time you feel as if you are killing the patient.

The executioners are people who carry out the death penalty. The nature and psychology of the individuals who perform the role of executioner and how they approach the job have been extensively studied [2,35a]. On the contrary, no literature has been devoted to how and why do surgeons apply for and get the job as an organ procurement agent. What motivates somebody to do the dark job of surgical execution and how do they rationalise and cope with the work that they do? Are professional organ procurement surgeons morbid individuals or are they highly principled with a strong sense of right and wrong? How are organ procurement surgeons remunerated? Do they get counselling on the work that they do? How long does a professional organ procurement surgeon's career last? These are all puzzling questions and probably not what comes to the top of the mind. Mind you that's hardly surprising as the job itself probably doesn't figure strongly in school career advice sessions or university milk rounds.

It is well known that moral agency is manifested in both the power to refrain from behaving inhumanely and the proactive power to behave humanely. Moral agency is embedded in a broader socio-cognitive self theory encompassing self-organizing, proactive, self-reflective and self-regulatory mechanisms rooted in personal standards linked to self-sanctions. The self-regulatory mechanisms governing moral conduct do not come into play unless they are activated and there are many psychosocial manoeuvres by which moral self-sanctions are selectively disengaged from inhumane conduct. The moral disengagement in surgical organ procurement may centre on the cognitive restructuring of inhumane conduct into a benign or worthy one by moral justification, sanitizing language, and advantageous comparison.

There is a disavowal of a sense of personal agency by diffusion or displacement of responsibility, by disregarding or minimizing the injurious effects of organ procurement actions, and attribution of blame to the donors or their families, and dehumanization of the victimized donor. Many inhumanities operate through a supportive network of legitimate enterprises run by otherwise considerate people who contribute to destructive activities by disconnected

subdivision of functions and diffusion of responsibility [2]. In a book entitled *Everybody Does It*, Gabor [22] documents the pervasiveness of moral disengagement in all walks of life. Psychological theories of morality focus heavily on moral thought to the neglect of moral conduct. People and donors and their families suffer from the wrongs done to them directly or indirectly, regardless of how agents might justify their actions.

Technique of organ procurement surgery

Anaesthetic agents are not commonly used for pain control, but they are injected, with or without paralytics, to treat muscle spasms or reflex hypertension and to reduce the stress to the procurement team, since both anaesthesiologists and nurses had become frightened when the supposed "cadaver", who is breathing with the assistance of a ventilator, would squirm and move as the procedure goes on. When anaesthetics are not used, the heart rate and blood pressure of the donor patient increase. The infusion of anaesthetic removes this frightening response.

In the human experience the truly dead patient cannot have any change in heart rate. Similarly blood pressure variations do not occur in truly dead patients. The heart of a person about to be disembowelled beats at the same rate of a healthy person's heart, and the rate increases as a response to the surgical manoeuvres. Vasodilators are needed to control hypertension. Heparin, intravenous fluids, thorazine, steroids, antibiotics, mannitol, alpha blockers, prostaglandin, blood transfusions and other drugs are usually administered.

The organ procurement surgery is generally divided in two parts: warm and cold dissection. The preparation in the OR includes placing of two electrosurgery pads and two suction lines. Both arms are fixed next to the body unless the anaesthesia colleagues have reason for extending one or both of them. The patient is opened through a long midline incision from the jugular notch to xyphoid to pubis, perhaps supplemented by transverse incisions. Retracting the abdominal wall with a retractor with long extensions, together with the already retracted sternum, makes the

widest possible surgical exposure ever possible. Removal of abdominal organs is performed en bloc after in situ perfusion with iced asanguinous preservation solutions. The aorta and vena cava are controlled just below the diaphragm and distally, where perfusion cannulae are placed. If the liver is to be procured, the portal vein is also cannulated. After systemic heparinization, the aorta is cross-clamped and perfused with cold preservative. At this point, ventilatory and circulatory support are discontinued, and the anaesthesiologist may leave. The organs are then quickly removed en bloc. If the lungs are to be transplanted, the anaesthesiologist is asked to hand-ventilate while the organ is being prepared for transportation and storage. During the procedure the patient suffers considerable heat and blood loss. The anaesthesiologist's job is done with the exsanguinations when the flush lines and the control clamps on the aortic and portal cannulas are opened. The flush closely resembles the halal or kosher technique on animals.

Ice is placed all over the abdominal organs. When the warm dissection is done the cold dissection is started with a preservation solution. For multiple organ procurement, the operation requires approximately four hours. Every physician should understand the ghoulish nature and duration of the organ procurement procedure and the entire technique should be shown to families and public to demonstrate its unthinkable brutality and how it closely resembles to meat procurement from other species.

Euphemistic labelling and advantageous comparison

Euphemistic language is widely used to make harmful conduct respectable and to reduce personal responsibility for it. Donation and gift of life are the euphemistic mantra of the transplant business. We therefore can read verbal sanitation such as: "Do something nice with your body". Language shapes thought patterns on which actions are based. Activities such as organ procurement can take on very different appearances depending on what they are called. Euphemizing can therefore grow into a wrongful

weapon [5]. By camouflaging awful activities such as organ procurement surgery in the innocent and sanitizing parlance of the gift of life and the likes the activity loses its repugnancy. Governments are masters of euphemization since soldiers “waste” people rather than kill them, and bombing missions are described as “servicing the target” in the likeness of a public utility arousing imagery of curative activities. Civilians killed by bombs or drones are linguistically converted to “collateral damage”.

Advantageous comparison is another way of making harmful conduct look good. How behaviour is viewed is coloured by what it is compared against. By exploiting the contrast principle, reprehensible acts can be made righteous. For example, the massive destruction in Vietnam was minimized by portraying the American military intervention as saving people from Communist enslavement. The transplant business says : “A life may depend on it [your organ] – do you dare do less?”, “Organ donation saves the Nation”, “Save future generation [if you become an organ donor]”.

Exonerating comparison relies heavily on moral justification by utilitarian standards. The utilitarian cost-benefit calculus, however, can be quite slippery in specific applications such as organ procurement for salvaging an individual in the waiting list... waiting, that is, for the death of another human being.

Cognitive restructuring of harmful conduct through moral justifications, sanitizing language, and exonerating comparisons is the most powerful set of psychological mechanisms for disengaging moral control. What was once morally condemnable, becomes a source of self-valuation. Professionals of the transplant business work hard to become proficient at them and take pride in their accomplishments.

Displaced responsibility

People will behave in ways they normally repudiate if a legitimate authority accepts responsibility for the effects of their conduct [15,34]. Under displaced responsibility, the entire transplant business views their actions as stemming

from the dictates of scientific authorities, generous and altruistic approval of families, benefit of other individuals and society rather than being personally responsible for them. Because they are not the actual agent of their actions, they are spared self-condemning reactions for organ procurement or – if you prefer – killing dying patients.

Self-exemption from gross inhumanities by displacement of responsibility is most gruesomely revealed in socially sanctioned mass executions. In psychological studies of disengagement of moral control by displacement of responsibility, authorities explicitly authorize injurious actions and hold themselves responsible for the harm caused by their followers. For example, Milgram [34] got people to escalate their level of aggression by commanding them to do so and telling them that he took full responsibility for the consequences of their actions. The greater the legitimacy and closeness of the authority issuing morally dubious or injurious commands, the higher the level of obedient action or aggression. When harmful practices are publicized, they are officially dismissed as only isolated incidents arising from misunderstanding of what had been authorized, or the blame is assigned to subordinates, who get portrayed as misguided or overzealous.

The exercise of moral control is also weakened when personal agency is obscured by diffusing responsibility [2] as it happens for organ procurement from a dying patient. Kelman [30] gives an analysis of the different ways in which a sense of personal agency get obscured by diffusing personal accountability. A sense of responsibility can be diffused, and thereby diminished, by division of labor. An enterprise such as organ procurement requires the services of thousands of people, each performing subdivided jobs that seem harmless in themselves.

After activities become routinized into detached subfunctions, people shift their attention from the morality of what they are doing to the operational details and efficiency of their specific job.

Recipients say: *We are just waiting.*

OPO people say: *We just organize.*

Requesters give justifications: *We just explain & request.*

Hospital administrators: *We strictly abide by the laws & protocols.*

ICU doctors explain: *We just keep the patient biologically alive.*

Organ Procurement Surgeons justify: *We are just called for.*

Transplant Surgeons explain: *We just receive the organs.*

Media self-exonerate: *We just report news.*

Bioethicists declare: *We just analyse the utilitarian values.*

Additional ways of weakening moral control operate by disregarding or distorting the effects of one's actions. When people pursue activities that are harmful to others for reasons of personal gain or social pressure, they avoid facing the harm they cause or minimize it. The dying person becomes only a corpse. If minimization does not work, the agent can discredit the evidence of harm. As long as the results of one's conduct are ignored, minimized, distorted or disbelieved, there is little reason for self-censure to be activated. It is easier to harm patients when their suffering is not visible and when injurious actions such as organ procurement surgery and harvesting are physically and temporally remote. The operating room is a close environment forbidden to the grieving families and to the public. When people can see and hear the suffering they cause, vicariously aroused distress and self-censure serve as self-restrainers. People are less compliant to the injurious activity as the victim's humanity becomes more evident and personalized. The single humanization by a powerful photograph of inflicted destruction that won the Pulitzer prize probably did more to turn the American public against the war than the countless reports filed by journalists. The military now bans cameras and journalists from battlefield areas and prisons to block disturbing images of death and destruction.⁴ The same ban is tacitly active in hospitals all around the world.

⁴ [The ongoing case of Bradley Manning (see chapter 15, footnote 15) is enough to get an idea of how strict is the state censorship in USA. (*Editor's Note*)]

Self-censure for cruel conduct can be disengaged by stripping people of human qualities and classifying them as mere corpses. Once dehumanized, they are no longer viewed as persons with feelings, hopes and concerns but as subhuman [30] or non-human objects. Patients are portrayed as mindless "corpses". If dispossessioning one's foes of humanness does not weaken self-censure, it can be eliminated by attributing corpse qualities to them.

Transplant business now imposes government legislation, asks for increasing money, and obtains organs by requesting donation from the grieving families. Its secular priests and acolytes visit schools and indoctrinate children with ghastly practices disguised as images of benevolence. They distribute in schools board games such as *Trapiantopoli*, that a local transplant business invented to "educate" children to the new techno-culture of donation.

They refrain from teaching children and families how to prevent accidents and injuries, but illustrate how masochistic altruism is socially acceptable, desirable and even mandatory. Animals including chimpanzees, squirrels and dogs are given more protection and compassion by the public than dying children. Transplant enthusiasts hunt as prized prey seriously injured persons. People fall victims of their own trust in biomedical technology. It is common experience to read in our prestigious medical journals and hospital guidelines the self-proclaimed push for aggressive promotion/education, aggressive referral, aggressive definition of death, aggressive consent pursuit or presumed consent, and mandated, forced but always uninformed donation. Even families have resorted to a compelled donation by minors or mentally retarded minors via the courts. This is encroachment, a disguised cannibalism certainly worse than that found in the animal kingdom.

Conclusion

The general public and even health care professional are often wary of ethical scrutiny. They are mostly reluctant to engage in ethical and moral conversation about life and death and are mostly in a state of denial regarding suffering and death. Lay people are manipulated and influenced by

the transplant business which include secular bioethicists, surgeons, anaesthesiologists, organ procurement coordinators, ICU nurses, media and other people of the industry. The continuous powerful lobbying and deceitful marketing techniques being used to encourage the so-called donation of human organs silences every opposition to the practices of organ procurement and harvesting.

A worldwide billion-dollar industry has been created and lives on the mass manipulation for organ donation and procurement. Hospitals and medical universities receive prestige and big funding from transplant programs. No other surgical program can contribute to financial success – provided, obviously, that there is a steady flow of organs from accidents. Billion of euros are diverted from prevention of accidents and from preventable illnesses to the organization of the transplant business. A lack of organs because of better safety rules and lives saved is, unquestionably, a good thing for everybody except the transplant business.

Dying patients are not means to another's end, even a good end. Patients are persons, not an assemblage of spare parts, even when facing death. Living, dying and even dead human persons are always precious. Body hunting and harvesting by coordinators, surgeons, anaesthesiologists, and people of the organ procurement and transplant business are lowering the human society into a technocannibalistic society. Democracy in science requires knowledge, respect, fairness, consensus – not undue influence, manipulation, deceptive consensus request or even force as it has been recently proposed. The totalitarian states did not ask for consent before executions in order to acquire legal immunity.

The positions of those who support the historically understood definition of death and the supporters of the Harvard death with its many variants, including the newly invented DCD and the post-birth abortion, cannot have the possibility of reaching a meeting point for two logical reasons.

First, death is a process that in most cases can be influenced by modern techniques, so anyone can claim to

have the correct definition and in the face of a possible medical error evaluation, the so-called donor is hopelessly and legally sentenced to death without any possibility to discover the error.

Second, eminent scientists and bioethicists have now admitted that the dogma of the dead donor is false [49] and is false even the dogma of cardiac death (DCD or NHBD) as hearts of DCD patients have been successfully transplanted.

The medical profession has a huge task to resist and counteract the ideological and organisational establishment of the ethics of transplant bazaar. Unless a more open, not biased and democratic look will be made, the transplant business will remain the technical evolution of the totalitarian state with the same actors, excited bystanders, lascivious propaganda, and cruel methods similar to that of stone age cannibalism, medieval torture and death penalty. The common practice of killing for organs as it is now openly admitted by leading experts [51] will be opposed by most people when the entire process of organ procurement will be known.

From the UK to North America to Australia, aging populations and a decline in organ donations have led governments and medical experts to propose what would have been unthinkable decades ago — namely, hastening or causing the death of one person in order to reap organs for another. The call for new protocols is presented with charts and studies; it is offered in dense medical or academic jargon; and it always includes humanitarian phrases. But a scratch or two beneath the surface reveals a totalitarian push of astonishing arrogance.

Thus, the best way to prevent the new agenda from ever becoming the legal public policy is to expose the organ procurement deceptions everywhere every time it is proposed. Only an informed public and medical profession that closely works with technical professionals without any conflict of interest can reach an unbiased opinion, make an informed choice to the public, avoid euphemization, refuse dehumanization of the dying, condemn manipulation, and

most probably have the gut to say a firm "NO" to the indecent proposals of organ procurement business.

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*Public Opinion, Official Lies,
and Whistleblowers*

14. Massimo Mazzucco

If “Conspiracy Theorists” Exist It’s Your Fault

An open letter to the mainstream journalists in the US

This letter is addressed to all those journalists who stand by the official version of 9/11, and systematically label those who reject it as “conspiracy theorists,” “self-delusional people,” or just plain “wackos”.

You are completely different from one another, yet you all seem to share a sense of irritation that emerges each time you are confronted with such an “uncomfortable” issue as 9/11.

Well, you should know that if “conspiracy theorists” exist it’s your fault in the first place.

Had you only asked the most obvious and natural questions, when presented with the official story of 9/11, things would have certainly gone in a much different way.

Right after the attacks, for example, you could have asked:

– How come we are not shown a single security video from the 19 terrorists boarding the four hijacked planes?

As we all know, large airports like Boston, Newark or Dulles have hundreds of security cameras recording every possible activity taking place within their premises. Images must exist of the 19 hijackers at the check-in counters, proceeding through security gates and finally boarding the planes that were eventually hijacked. Why weren’t we shown a single one of these images in the days following the attacks?

Or you could’ve asked:

– How is it possible that on the evening of September 10, 2001, a full military plan to attack Afghanistan was placed on George Bush’s desk, to be reviewed by the President upon his return from Florida?

This means that the attacks on the following morning were just a sheer coincidence, which offered the US the most convenient motivation to proceed with a plan that had

already been prepared down to the smallest detail. Did you really not find this even a little suspicious?

Or you could have asked:

– How is it possible that people who have never piloted a jet in their life can commandeer a 100-ton Boeing and perform spectacular acrobatics such as those described by radar controllers on September 11?

Since when does training on small piston planes enable you to jump into the seat of a large airliner and perform high-speed turns, breathtaking plunges and ground-level approaches which are called “practically impossible” by pilots with 30 years of experience?

Or you could have asked:

– Where did the Boeing that crashed in Pennsylvania go, since we weren’t shown a single engine, a single chunk of fuselage, a single piece of wing, landing gear or tail stabilizer?

Have you ever seen a plane crash where not a single part of the plane remains recognizable after the accident?

All these are perfectly legitimate and rational questions, which certainly don’t suggest the “twisted mind” of a “social misfit” – as many people like to characterize the “conspiracy theorists.” In fact, all it takes to pose these questions is normal common sense.

Yet, you have never asked these questions.

You have accepted the official version at face value, without ever raising a single eyebrow about what you were being told, despite the most evident and undeniable inconsistencies.

This is why the 9/11 “conspiracy theorists” were born. They were born because you never posed the most natural and logical questions, and we had to do it for you.

And what’s tragic, by the way, is that these questions have still not received an answer today.

You should therefore stop sticking labels on those who have taken up responsibilities that were yours in the first place, and you should engage instead in some serious soul searching on the real reasons that brought you to turn a blind eye on such a grave and important episode in our

recent history – an episode that has created wars, fear, hatred and mistrust all across the world.

All it takes for evil to triumph – it has been said – is for good men to do nothing.

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15. Marco Mamone Capria, Marcos Cesar Danhoni Neves

The Implausibility of the Official Explanation of 9/11: Science and Participatory Democracy*

It is difficult to get a man to understand something when his salary depends upon his *not* understanding it.

U. Sinclair, 1935

1. Introduction

On September 11, 2001 – a Tuesday – in New York City and Washington, D.C., a crime of enormous consequence occurred. In the morning, four terrorist events took place against US targets, causing the loss of nearly 3,000 lives, almost all civilians, and laying the grounds for a decade of violations of international law by the US government and its allies in the name of the “War on Terror”.

Two Boeing 767 from Boston each struck one of the two skyscrapers collectively known as the Twin Towers of the World Trade Center (WTC) in New York City. The Towers, whose construction had ended, respectively, in 1972 (the North Tower, or WTC 1) and in 1973 (the South Tower, or WTC 2), had each

- 110 floors (above ground),
- 417 m (WTC 1) and 415 m (WTC 2) of height,
- a square basis of 63,4 m of side.

WTC 1 was hit by American Airlines Flight 11 (*Plane 1*) at 8:45 a.m. from the north at about the 93rd floor, and collapsed at 10:28 after burning for 102 minutes. Plane 1 had left Boston at 7:59.

WTC 2 was hit by United Airlines Flight 175 (*Plane 2*) at 9:05 a.m. from the south at about the 80th floor, and collapsed at 9:59 a.m. – thus earlier than WTC1 –, after burning for just 56 minutes. Plane 2 had left Boston at 8:14.

* Unless otherwise specified, all italics in the citations are added.

For the Twin Towers the total times of collapse have been estimated officially 11 seconds for WTC 1 and 9 seconds for WTC 2, although a precise figure is hard to pin down.¹

A less well-known fact is that there was a *third* skyscraper in the WTC which also collapsed, in the late afternoon, namely the WTC building N.7 (WTC 7). This more recent building, whose construction had ended in 1987, had

- 47 floors (above ground),
- 186 m of height,
- an irregular trapezoidal basis, with its north side 100 m long, the south side 75 m long, and 44 m wide.

Very remarkably, WTC 7 was not hit by any plane, but nonetheless crumbled vertically on its footprint in less than 7 seconds – at 5:21 p.m., that is, roughly *seven hours* after the collapse of the Twin Towers.

On the same day, the Pentagon was hit at 9:38 a.m. by what the official version claims to have been a Boeing 757, American Airlines Flight 77 (*Plane 3*), which had departed from Dulles (in the Washington area) at 8:10, although what precisely was the object which struck the Pentagon remains to this day controversial.

A fourth hijacked passenger plane, a Boeing 757 of the United Airlines, Flight 93 (*Plane 4*), which had departed from Newark (in the New York area) at 8:42, fell at 10:03 a.m. (or more likely 10:06)² in a field near Shanksville, Pennsylvania, supposedly after an upheaval of the passengers against the terrorists and before the aircraft could reach its target, which is supposed to have been the Capitol or the White House, in Washington D. C.

So everything – except for the WTC 7's collapse – occurred in 78 minutes, *without the US air defence succeeding in preventing even one of these terrorist attacks.*

Notice that each of the 4 planes were very little crowded, an unusual feature for those planes and those travel hours:

¹ This is the estimate by NIST (cit. in [48, p. 36]); the dust clouds make it difficult to be very precise, and in fact a different estimate has been advanced, of 14 to 16 seconds for both Twin Towers [40].

² The first time is the official one, the second one is more likely, and the difference is important, as explained in [35, pp. 126-30].

flight	aircraft	capacity	passengers	hijackers	crew
Flight 11	Boeing 767-223ER	158	76	5	11
Flight 175	Boeing 767-222	166	46	5	9
Flight 77	Boeing 757-223	188	50	5	6
Flight 93	Boeing 757-223	182	26	4	7

<http://911research.wtc7.net/planes/attack/index.html>

Overall only 36% of the total capacity was occupied.

The US government used immediately these events as an excuse for launching several illegal military campaigns, overturning the Iraqi government and occupying Afghanistan, with the help of allied governments sharing the reasons (most of them arguably or demonstrably unsound) and the responsibility for a pretended world war on international terrorism. *More than a million* people have been killed as a direct or indirect result (and possibly several millions) [36, pp. 287, 309n106], millions of people have been physically and/or mentally disabled, and multi-generational damage has been caused in the form of widespread pollution by carcinogenic agents in the invaded countries [43]. In the name of the War on Terror preventive war has been licensed again and international law has been reverted to the pre-Nuremberg stage,³ including interrogation under torture. For these reasons alone, it is exceedingly important to have the most accurate information about 9/11.⁴

³ The Nuremberg Judgment (1946) contained the following statement: «To initiate a war of aggression, therefore, is not only an international crime; it is the supreme international crime differing only from other war crimes in that it contains within itself the accumulated evil of the whole» (cit. in [20]).

⁴ Many articles and books have been published criticizing the official version of 9/11; Griffin's books ([34, 35, 36]) are well argued,

However, we also think that this is, among other things, a particularly enlightening example of the management of evidence and public opinion, showing how mainstream media, government agencies, scientists, pseudo-sceptics (usually calling themselves “debunkers”), and the academic world can and do cooperate in stymieing vital public debates and discrediting and/or silencing whistleblowers and, more generally, dissidents, in order to manufacture and solidify consent in favour of official opinions.

2. What is the official version?

The official version is contained in *The 9/11 Commission Report* [1], issued in 2004, and, as far as the mechanism of the collapse of the skyscrapers is concerned, first in the report of the Federal Emergency Management Agency (FEMA), issued in 2002, and then in the *Final Report* of the National Institute of Standards and Technology (NIST), issued in 2005, with additions in 2008 [28]. Other ingredients of the official version can be found in statements by other official agencies, such as FBI, and interviews with members of the Bush administration.

The 9/11 commission was formed 441 days after the attacks, the Bush administration having tried to avoid its formation for as long as possible.⁵ It was chaired by Thomas Kean (the chairman, directly appointed by Bush, after his first choice, none else than Henry Kissinger, had resigned) and Lee Hamilton. Kean and Hamilton in 2006 wrote that the commission they chaired was «not allowed to interrogate any of these detainees» (the people arrested under the charge of being involved in the planning of the 9/11 attacks), or at least «to observe the interrogation of detainees through one-way glass», or even just to *talk to the interrogators* [35, p. 196]. Moreover, an outline of the final report of the Commission had been already drafted, including «chapter headings, subheadings, and sub-

referenced, and readable.

⁵ It has been pointed out that in the case of the sinking of the Titanic, the assassination of John F. Kennedy, the Challenger disaster, and the Pearl Harbor attack the corresponding delay has been, respectively, of 6, 7, 7, and 9 days [85, p. 26].

subheadings» by its executive director, Philip Zelikow, «essentially a member of the Bush White House», *before* the first meeting had been convened [36, p. 89].

In 2008 Kean and Hamilton wrote [50]:

The commission's mandate was sweeping and it explicitly included the intelligence agencies. But the recent revelations that the CIA destroyed videotaped interrogations of Qaeda operatives leads us to conclude that the agency failed to respond to our lawful requests for information about the 9/11 plot. Those who knew about those videotapes — and did not tell us about them — obstructed our investigation. [...] As a legal matter, it is not up to us to examine the CIA's failure to disclose the existence of these tapes. That is for others. What we do know is that government officials decided not to inform a lawfully constituted body, created by Congress and the president, to investigate one the greatest tragedies to confront this country. We call that obstruction.

But the obstructionism by the government was obvious in many ways from the start: suffice it to say that the investigation of Whitewater and Monica Lewinski had costed US taxpayers \$64 million, while the 9/11 Commission received only *about \$3 million* [80].

Now a bare but accurate outline of the scenario officially presented to the public would run as follows.⁶

According to the official version, a conspiracy was staged by a Saudi terrorist, Osama bin Laden, based in some caves in Afghanistan or Pakistan, leading 19 Muslim suicide terrorists to take control, by using knives and cardboard cutters, of four passenger planes in USA (5 terrorists for each of the first three planes, 4 in the last one) and to hijack them towards 4 symbolic national buildings taken as targets. The paths followed by Plane 3 and Plane 4 took them, unaccountably, hundreds of kilometres (about 400 and 600 km, respectively) far from their targets. And yet three of the targets (WTC 1, WTC 2, and the Pentagon) were actually hit, in what can only be ranked as *the* most successful terrorist plot ever designed in modern history. None of the terrorists had ever practised as Boeing pilot.

⁶ We shall come back in detail on several of the points listed here.

Not a single one of the regular pilots of the planes sent the coded alarm signal for an hijack to controllers on the ground.⁷

Moreover, as regards the WTC buildings, they all fell down, according to the official version, as a consequence of the structural damage induced essentially by the fires caused by the impact of the two planes, directly (WTC 1 and WTC 2), or indirectly (WTC 7) through ejection of debris from WTC 1 (that is, from more than 90 meters). Thus the terrorists succeeded in destroying *three* skyscrapers (WTC 1, WTC 2, WTC 7) after having targeted and hit only *two*. Nothing in the history of structural engineering could make them hope to destroy *even just one*, since the collapse of a steel structure skyscraper had *never* occurred as a consequence of fires.

A crucial ingredient in the official version is that the terrorists are supposed to have received no aid whatsoever by any individuals within either the US administration, or the US (or any other country's) intelligence, or the US air control authorities. Not only that, but Bush and others (including Kean and Hamilton [34, pp. 133-7]) repeatedly emphasized that the hypothesis of suicide hijacking of planes targeted to important national buildings had never been envisioned before 9/11.

3. Conspiracy theories

Just to be faithful to the promise, in its preface, «to provide the fullest possible account of the events surrounding 9/11», the *9/11 Commission Report* did not even as much as *mention* the collapse of WTC 7. In fact the US government succeeded in locking the whole mainstream media system in a tacit agreement *not* to talk of the collapse of WTC 7. As a result, a poll in May 2006 found that 43% of the US citizens were still unaware that that collapse had occurred, and still in *June 2011* a poll found that 33% of *New York* citizens (!) *did not know about it* [36, p. 122]. This is an important fact to keep in mind when examining the evidence on 9/11, for two main reasons:

⁷ This is called “squawking the hijack code”, and takes just seconds [36, pp. 29-30].

- it is a clear-cut example of a successful global conspiracy by the mainstream media to misinform citizens;
- the collapse of WTC 7 was as public and documented a fact as any conceivable, and yet it has been possible to keep it largely outside the public discourse on 9/11 for a decade.

Now, if the US administration has been able to erase, to most practical purposes, a publicly witnessed and easily checked fact, it is clear that it does not need to work too hard to defuse any particular revelations coming from the odd individual wanting to discharge his or her conscience...

As we have seen, also the official version of what happened on 9/11 is, in the strictest sense, a *conspiracy theory* – a peculiar conspiracy, in fact, involving just about two dozens Arabs, successfully pitting their wits against the uppermost world military power. It is different from other conspiracy theories on 9/11 mainly insofar as it insists, as we shall see, *on a chain of miraculous, or nearly miraculous, occurrences favouring the terrorist design*.

In other words, the official version is a conspiracy-blessed-with-miracles theory, where “miracle” stands, in some instances, for an extraordinary occurrence favouring the conspirators, and in others for a physical impossibility.⁸ Occam's razor would therefore advise to accept it only in the very last resort, that is, if nothing else were shown to be able to explain the known facts about 9/11. So it is only by exploiting the hoariest of sophisms, *petitio principii* (i.e. to “prove” a claim... by assuming it) that the believers in the official version can shamelessly give their critics the name of “denialists” and “conspiracy theorists”. That a conspiracy did occur is not disputed by anyone. What is controversial is exactly *which steps were taken* in that conspiracy and *by whom*.⁹

⁸ Or, if you prefer, an event whose probability, given the ordinary physical laws, is close to zero.

⁹ A not-too-bright apologist of the official version of 9/11 has written in a book that «All conspiracies theories – all of them – attract anti-Semites» [16]. From this it would immediately follow that the group of the supporters of the official version is rife with anti-Semites (whatever this charge amounts to).

In this article we offer no detailed hypothetical scenarios in substitution of the official one as to the actors and the planners of the terrorist attacks, although it is clear that, if the criticisms of the official version here outlined are on the whole correct (and we think this is by now out of question), the Bush administration cannot be exonerated from substantial responsibilities.

The idea that the US government may have planned a "false-flag operation"¹⁰ is of course not at all far-fetched, as such operations have played an important historical role for well over a century, including the Gulf of Tonkin incident (1964), and the earlier and most famous¹¹ attack on Pearl-Harbor (1941). A by now relatively well-known description of such operations is contained in the so-called "Northwoods memorandum", dated «13 March 1962», where several attacks against US were proposed to create a pretext for an

¹⁰ That is, a criminal action in disguise, so to speak, that is falsely presented and advertised as having been performed by one's enemies, in order to have an excuse to start a prosecution, or a war, against them. Chapter II of Webster Tarpley's book ("The Theory and Practice of Synthetic Terrorism" [74, pp. 78-127]) is a useful historical and theoretical exposition of how this works.

¹¹ Griffin's first essay on 9/11 is entitled "The New Pearl Harbor" [31]. The reference is to a document [62] published just one year before 9/11 by "Project for a New American Century" (an extreme right-wing think-tank, comprising several of the most prominent members of the Bush Administration: Dick Cheney, Lewis Libby, Donald Rumsfeld, Paul Wolfowitz, Richard Perle etc.), where in a section on the importance for US to «preserve its technological edge on future battlefield» one could read: «The United States cannot simply declare a "strategic pause" while experimenting with new technologies and operational concepts. Nor can it choose to pursue a transformation strategy that would decouple American and allied interests. A transformation strategy that solely pursued capabilities for projecting force from the United States, for example, and sacrificed forward basing and presence, would be at odds with larger American policy goals and would trouble American allies. Further, the process of transformation, even if it brings revolutionary change, is *likely to be a long one, absent some catastrophic and catalyzing event – like a new Pearl Harbor*» [62, pp. 50-1].

US invasion of Cuba.¹² In particular two of the proposals were (our italics):

7. *Hijacking attempts against civil air and surface craft* should appear to continue as harassing measures condoned by the government of Cuba. Concurrently, genuine defections of Cuban civil and military air and surface craft should be encouraged.

8. It is possible to create *an incident which will demonstrate convincingly that a Cuban aircraft has attacked and shot down a chartered civil airliner* en route from the United States to Jamaica, Guatemala, Panama, or Venezuela. The destination would be chosen only to cause the flight plan route to cross Cuba. The passengers could be a group of college students off on a holiday or any grouping of persons with a common interest to support chartering a non-scheduled flight.

The "Northwoods" proposals were rejected by the Kennedy administration.

Notice that it is often possible to prove that a certain theory is wrong and at the same time to be unable to substitute it with a completely satisfactory alternative.¹³ For instance, suppose that someone comes up claiming that the *Iliad* was written by Shakespeare. To show him or her wrong you need not know who was the true author of *Iliad* (as a matter of fact *nobody* knows the right answer). However, if the standard interpretation of *Iliad* had been based for years on the identification of its author with the author of *Hamlet*, refuting this claim would be a very valuable undertaking, insofar as it would free the public from a potential source of serious misunderstandings of both

¹² See, for instance, [73, pp. 115-20].

¹³ One can agree with Falk, who wrote in 2008: «What has not been established by the "9/11 Truth Movement" is a convincing counter-narrative – that is, an alternate version of the events that clears up to what degree, if at all, the attacks resulted from incompetence, deliberate inaction, and outright complicity». And yet he added: «Any close student of 9/11 is aware of the many serious discrepancies between the official version of what took place and the actual happenings of that fateful day in 2001» [23].

works.¹⁴ After all, the most influential epistemological theory in the 20th century, the one linked to Karl Popper's name, holds that this is the very way science progresses – that is, by showing the falsity of (“falsifying”) proposed conjectures. Surely there is more than a grain of truth in this approach.

Similarly, in the case of 9/11 no one should feel that their doubts are somewhat groundless or misplaced simply because of an inability to provide a documented reconstruction which explains “everything”. What we are confident enough to say is that the official explanation of 9/11 is far from satisfactory, and at some crucial points provably false. On the whole it so strains credulity that, should it turn out to be true, no responsible thinker would regret to be the last to believe it.

4. Psychological resistances

As we have seen, an important difference between the official conspiracy theory and others is that the former *postulates* that the White House or any other political or military US authorities are not to be blamed for what occurred, and that therefore they had no reason for telling lies to the American people. In fact one of the reasons for the resistance of so many to give heed to sceptical arguments on 9/11 is that these arguments conflict with a deep-seated need to trust in the human representatives of the national unity: the president, the government, the army etc.

This type of will-to-believe also explains the strange attractiveness, to many people, of a totally flawed claim, rating as very unlikely that Bush and his close collaborators might have shamelessly and obdurately lied as regards their involvement in the 9/11 slaughter. There are two related remarks which, together, completely destroy this claim.

The first one is that those who have been to *any* extent complicit of such a heinous crime know full well that by confessing even a small fragment of the compromising truth they have everything to lose – including their life. Any

¹⁴ See also footnote 7 of chapter 17 in this book.

minimally rational being in their place would adopt the only viable strategy, namely that of denying charges *to the bitter end*, and to excuse any surfacing inconsistencies with failures of memory, emotional shock, gaps in the chain of command, even plain stupidity etc. – anything is good, except for inactive awareness of, let alone active complicity in, the plan behind that crime.

Some commentators seem to believe that it would be impossible, or nearly so, to keep all conspirators in a sufficiently complex plot silent for a long stretch of time. This supposition fails to consider that: 1) not all actors in a conspiracy have the same degree of awareness of what is going on; 2) whistleblowers or other witnesses willing to contribute crucial evidence can easily be silenced, dismissed, or downplayed;¹⁵ 3) there are several historical examples of terrorist actions for which no one has been sentenced guilty during several decades¹⁶ (and virtually during the whole lifetime of those more directly involved).

There is another point strengthening our first remark. People indicted with serious criminal offences are generally not believed at face value by a prosecutor in what they say in their own defence, because *lying is in general a lesser crime with respect to that of which they are (rightly or wrongly) suspected*. This is particularly true with such crimes as high treason or slaughter. So no sensible person would ever believe in untested professions of innocence by people that may be held responsible for crimes of this kind.

5. Ascertained criminal lies of the Bush administration

The second remark is that the US authorities in the Bush administration *did* tell criminal lies to the American people and to the world, and that, moreover, *this has occurred not*

¹⁵ Or put on trial and threatened with life imprisonment, as shown in the case of Bradley Manning, who has transmitted cables to Wikileaks related to the Iraq and Afghan wars.

¹⁶ To cite just one important instance, in Italy five major terrorist bombings between 1969 and 1980, resulting in the slaughter of dozens of innocent people, have remained unpunished to this day.

once, but several times. Since most mainstream journalists seem to assume we live in a fairytale world where government's members never lie knowingly to their citizenry about serious matters, it is useful to dwell on this point in some depth.

An especially notorious case is the Bush administration fabricating the black legend of the weapons of mass destruction (WMDs) in Iraq in order to support their previous decision of invading that country. Everybody remembers Secretary of Defence Colin Powell wielding a model vial of anthrax in front of the Security Council of the United Nations on February 5, 2003, as evidence of Iraq hiding WMDs. Powell said:

“My colleagues, every statement I make today is backed by sources, solid sources. These are not assertion. What we're giving you are facts and conclusions based on solid intelligence”.

Notwithstanding this assurance, it can be proved that Powell was lying, and that he knew it.¹⁷ In terms of criminal consequences the nearly 3,000 victims of the four attacks pale if compared to the death toll of the Iraq and Afghanistan wars – actually they are less than *half* the *American* victims of those wars, let alone the 130,000 psychiatric casualties.¹⁸ But these are not the only proven criminal lies of the Bush administration against their people – and in saying this we have also to include *the two stolen*

¹⁷ «[...] there's no question that Powell was consciously lying: he fabricated “evidence” and ignored repeated warnings that what he was saying was false. [...] Clearly, Powell's loyalty to George Bush extended to being willing to deceive the world: the United nations, Americans, and the coalition troops about to be sent to kill and die in Iraq. He's never been held accountable for his actions, and it's extremely unlikely he ever will be» [69]. See also chapter 1, section 9.2.

¹⁸ «Here are indications of the lingering costs of 11 years of warfare. Nearly 130,000 U.S. troops have been diagnosed with post-traumatic stress disorder, and vastly more have experienced brain injuries. Over 1,700 have undergone life-changing limb amputations. Over 50,000 have been wounded in action. As of Wednesday, 6,656 U.S. troops and Defense Department civilians have died» [3].

presidential elections in 2000 and 2004 [59, VIII], which have been the necessary premise for all other crimes.

Another example is closer to 9/11, both by its nature and because of temporal contiguity.

Starting from September 11, 2001 about 40,000 people (firemen, ambulance technicians, soldiers, policemen, doctors etc.) worked for weeks, night and day, on the remains of the WTC buildings on "ground zero" (the Pile, as was to be known), immersed in a cloud of toxic dust, «approximately one million tons of pulverized concrete, glass, asbestos, PCB's, lead and more than 400 chemicals» [71]. They were called the "First Responders". The 30-year-old policeman Joseph Zadroga was one of them. He died in 2006 of lung failure, following a sickness begun after a few days of work. For the first time in Zadroga's case, a death was «officially linked to inhaling the dust created when the towers fell».

Public officials, and in particular the New York mayor Rudy Giuliani, had insisted that there was nothing to worry about the New York air. Giuliani had stated: «As you get beyond the epicenter of recovery site, the asbestos levels are either safe or nonexistent».

The head of the Environmental Protection Agency (EPA), Christine Todd Whitman, had said, while holding up a respirator mask:

"Everything we've tested for, which includes asbestos, lead and VOC (Volatile Organic Compounds), have been below any level of concern for the general public. Obviously for those working down here, these are very important".

However respirators were at first not available, and when available they turned out to be useless, because they were cumbersome and often clogged. On September 18, Whitman in a press release added: «Given the scope of the tragedy from last week, I am glad to reassure the people of New York and Washington, DC that their air is safe to breathe and their water is safe to drink». She explained later that she meant not the Pile, but «lower Manhattan». According to a government investigation, however, her reassurances were premature, since the EPA test results on the air «were not yet in and EPA press releases were

changed by the White House Council on Environmental Quality to sound more reassuring».

Through Condoleezza Rice, the National Security Advisor, the White House had the final word on the release of these EPA's statements [22], so the White House was ultimately responsible for any falsely reassuring claim concerning the health risks of the Pile. The reason the White House pressured EPA into making reassuring claims and thus endangering the life of *many thousands of people*, was to enable Wall Street to start working again as soon as possible [82]:

On June 25, 2007, Whitman testified before a House of Representatives committee chaired by Jerrold Nadler. She said that a White House official informed her that *President Bush expected that the Financial District would reopen within three days*, that is, by September 14. She said that she replied that this would be cumbersome, since the EPA was still judging the health situation in the area. Investigations after the attacks suggest that *the Bush administration pressured Whitman and Giuliani to provide health reassurances in order to keep Wall Street operating*.

The James Zadroga 9/11 Health and Compensation Act was passed only on December 22, 2010 – that is, *nine years later*, during the first term of the Obama administration. This shows both the low regard of the Bush administration for American lives, and the readiness of its members to tell potentially lethal lies in order to protect financial interests of special groups.

The above has a general relevance as regards 9/11, as it establishes a basic rule: if to support a claim one needs to assume the essential trustworthiness of Bush and/or of his collaborators, then the claim is *not* adequately supported and should be declared invalid.

Moreover, it is crucial here to remember what everybody knows, which is that Bush, Rice, Powell, Cheney, Rumsfeld, Wolfowitz and others did not have to suffer any serious consequences from their *ascertained* criminal lies. Indeed they *thrived* on them (as we said, they succeeded in stealing the presidential election *twice*), and *they have never been indicted, let alone tried, for those lies*. This is enough to show how little in touch with reality are those

who surmise that the Bush administration would have refrained from being involved in a conspiracy against their own citizens for fear of revelations coming from some “deep throat”: if you can get away with proven lies of that size, lies on which you have justified wars of aggression, that is «the supreme international crime» (cf. footnote 3), then you know you can get away with lies of *any other kind*.

6. An experiment in mass brainwashing

The 9/11 coverage by the mainstream media represents one of the biggest experiments in the engineering of belief and public opinion. Of course not everybody, and in fact not even a majority of the world's population, has been convinced by the official version. As has been explained very well 11 years later, you do not need to be a scientist to appreciate that the official version simply does not hold water ([67], italics are ours):

You only have to know two things.

One is that according to the official story, a handful of Arabs, mainly Saudi Arabians, operating independently of any government and competent intelligence service, men without James Bond and V for Vendetta capabilities, outwitted *not only the CIA, FBI, and National Security Agency, but all 16 US intelligence agencies, along with all security agencies of America's NATO allies and Israel's Mossad*. Not only did the entire intelligence forces of the Western world fail, but *on the morning of the attack the entire apparatus of the National Security State simultaneously failed*. Airport security failed four times in one hour. NORAD¹⁹ failed. Air Traffic Control failed. The US Air Force failed. The National Security Council failed. Dick Cheney²⁰ failed. Absolutely nothing worked. *The world's only superpower was helpless at the humiliating mercy of a few undistinguished Arabs*.

It is hard to image a more far-fetched story – except for the second thing you need to know: the humiliating failure of US National Security did not result in immediate demands

¹⁹ [North American Aerospace Defense Command]

²⁰ [Vice President of the United States from 2001 to 2009, under President George W. Bush.]

from the President of the United States, from Congress, from the Joint Chiefs of Staff, and from the media for an investigation of how such improbable total failure could have occurred. *No one was held accountable for the greatest failure of national security in world history.* Instead, the White House dragged its feet for a year resisting any investigation until the persistent demands from 9/11 families for accountability forced President George W. Bush to appoint a political commission, devoid of any experts, to hold a pretend investigation.

When an accurate description of an opinion sounds so much like a satirical exposure of that opinion, you are on safe ground if you think of it as a lost cause.

Incidentally, the author of this passage (and of several other valuable sceptical contributions on 9/11, e.g. [66]) is Paul Craig Roberts, formerly associate editor of the *Wall Street Journal*, contributing editor for *National Review*, and Assistant Secretary of the Treasury in the Reagan administration (the «Father of Reaganomics», as he has been called) – a good counterexample to the standard mainstream media misrepresentation of 9/11 scepticism as tendentious expression of left-wing leanings. In fact no more than common sense and honesty is needed to realize that the official version on 9/11 is untenable.

We may add, on the other hand, that several well-known left-wing commentators have aligned themselves with the official version, for different reasons. Perhaps the silliest reason (unfortunately including among its adherents even Noam Chomsky) is that looking for alternative explanations of 9/11 would divert the attention of activists from other, genuine goals. Chomsky said [13]:

One of the major consequences of the 9/11 movement has been to draw enormous amounts of energy and effort away from activism directed to real and ongoing crimes of state and their institutional background, crimes that are far more serious than blowing up the WTC would be, if there were any credibility to that thesis.

“Far more serious than blowing up the WTC”? It is hard to take *this* claim seriously, as it involves a huge underestimate of the extraordinary emotional value of 9/11, as a tool to make acceptable to citizens of US and its allies

any violations of human rights that the US government chose to engage in during the following decade, including wars based on utterly inadequate or faked evidence and, on top of it, lacking the authorization by the United Nations. Since the fall of 2001, virtually every international crime, and some major domestic ones (like the USA Patriot Act of October 2001), by the US government has been justified as legitimate defence against a supposedly ubiquitous terrorist army, on the assumption that 9/11 was indisputable evidence of "America under attack" by *foreign* enemies, rather than an "inside job".²¹

Notwithstanding the *prima facie* unbelievability of the official version, so clearly exhibited in Roberts' outline, and the wealth of circumstantial evidence against it, the mainstream media have succeeded in disqualifying all different opinions, and labelling them, preposterously as we have seen in section 3, as "conspiracyist" and "denialist". This is quite a remarkable achievement in itself, since it shows that in our complacently styled "free" countries it is unnecessary to censor heterodox opinions, so long as authorities can put a social stigma on them: this is functionally equivalent to censorship, but without the bad-looking accompaniment of formal prohibition and legal enforcement.

7. Silencing the dissidents, and the rise of the movement for 9/11 truth

However, there is no denying that, in the case of 9/11, censorship and, particularly, self-censorship have been

²¹ See also [9]. A useful, detailed analysis of some of Chomsky's historical blind spots (including Pearl Harbor and the John Kennedy's assassination) and of his role as a "left gatekeeper" can be found in [85, pp. 179-224]. Another left-wing author unwilling to take up the 9/11 data as evidence of an inside operation is Naomi Klein, author of an interesting essay on how special interest groups profit on the mass shock provoked by bloodsheds and natural catastrophes. Of course she also discusses 9/11 ([51, pp. 295-8] and elsewhere) as an example, but carefully refrains from any suggestion that it might have been engineered or aided by people inside the Bush administration (see [84] for confirming evidence).

thriving for more than a decade in the academic world and in the mainstream media.

A well-known case in point is that of Steven Jones, a renowned physics professor at Brigham Young University (BYU) in Provo, Utah.²² Jones, based on his speciality, advanced very serious arguments against the official reconstruction of the dynamics of the collapse of the Twin Towers and of WTC 7 [45, 46, 47]. Now in September 2006 his university placed him on paid leave «in connection with controversial statements and writings he has made on the 2001 destruction of the world Trade Center in New York» [5]:

Jones's work on the subject includes a recent paper in the online *Journal of 9/11 Studies*,²³ which he co-edits. That paper includes a disclaimer labeling it "the sole responsibility of the author". But the university is anxious to dissociate itself from Jones's hypothesis, saying it has "not been published in appropriate scientific venues".

Jones's outrageous mistreatment by his university administration is a clear example of prosecution of dissidents in the contemporary US academic world, whenever they dare to question really politically sensitive topics – such as the official version of 9/11. The failure of the academic community to stage a mass protest against this infringement of academic freedom gives a measure of the decline of standards and professional dignity in the US university.²⁴

Jones's is not the only scientist who got into trouble for voicing concerns about the official version of 9/11. Kevin Ryan, Site Manager at the Underwriters Laboratories (South Bend, Indiana), where the steel components used in the construction of the WTC buildings had been certified, was fired as soon as he published an e-mail he had sent in November 2004, in which he had pointed out that the tests performed on models of the floor assemblies indicated «that the [WTC] buildings should have easily withstood the

²² A self-presentation is contained in [46].

²³ [www.journalof911studies.com]

²⁴ Jones decided to retire and become "Professor Emeritus", from January 1, 2007.

thermal stress caused by pools of burning jet fuel» [68] – a fact, by the way, that was to be admitted in the final NIST report [57, p. 141].

Other university professors have been harassed by local authorities for dissenting from the 9/11 official version [44].

As to the physical events involved in the destruction of the Twin Towers and WTC 7, an independent statement from non-governmental professional bodies in engineering and physics has never been produced concerning the *sheer scientific plausibility* of the official account of the collapses of the Twin Towers and of WTC 7. It is comforting, though, that several organizations with membership in those and other relevant professional bodies have been created in order to criticize in very strong and thoughtful terms the official version. Here is an incomplete list:²⁵

- Architects and Engineers for 9/11 Truth (with over 1,900 professional members at the time of our writing)²⁶,
- Scientists for 9/11 Truth,
- Scientists for 9/11 Truth and Justice,
- Scholars for 9/11 Truth,
- Lawyers for 9/11 Truth,
- Media Professionals for 9/11 Truth,
- Medical Professionals for 9/11 Truth,
- Pilots for 9/11 Truth,
- Firefighters for 9/11 Truth,
- Political Leaders for 9/11 Truth,
- Military Officers for 9/11 Truth,
- Intelligence Officers for 9/11 Truth etc.

²⁵ Most internet addresses can be found in www.911truth.org.

²⁶ Chomsky is on record for saying: «If you look at the evidence [advanced by the 9/11 Truth Movement], anybody who knows anything about the sciences would instantly discount that evidence» (cit. in [36, p. 34]), which in view of the high number of sceptical engineers and architects is surely mistaken. From an intellectual of Chomsky's stature and public standing one should not expect anything less than a public retraction of this factually false statement.

In fact the following remark gives an encouraging appraisal of the situation:

Among scientists and professionals in the relevant fields who have studied the evidence, the weight of scientific and professional opinion is now overwhelmingly on the side of the 9/11 truth Movement. Whereas over 1,000 such people have publicly supported the stance of this movement, *there are virtually no scientists or professionals in the relevant fields who have gone on record in defense of the official story – except for people whose livelihood would be threatened if they refused to support it.* This caveat is important, because, as Upton Sinclair famously observed: “It is difficult to get a man to understand something when his salary depends upon his *not* understanding it”. [36, p. 77]

Moreover, a wide citizen movement for the truth on 9/11 has been growing in several countries, showing the importance of the contribution that critical and participant citizens can make in a situation where the so-called experts have been to a large extent co-opted to defend, mostly by their silence, the government's version of the facts. Important contributions have been made by non-scientists, like an Italian filmmaker, screenwriter, and journalist, Massimo Mazzucco [X], and a theology professor, David Ray Griffin. The latter between 2004 and 2011 has published 10 books on 9/11 (plus one on Osama bin-Laden), which provide an authoritative and scholarly source for most of the critical evidence and arguments against the official version.²⁷ Not unexpectedly, notwithstanding the high quality of this body of writings, they have been essentially ignored by mainstream journals and magazines, let alone radio and television programs [36, pp. 248-51].

Many well-known people have voiced their disagreement with the official version. Among them, we may cite: Andreas von Buelow, former German Defense Minister and Minister of Technology [V]; Michael Meacher, British Member of Parliament [XI, 55]; Charlie Sheen, actor [15]; Robert Fisk, Middle East correspondent for *The Independent* [27]; Lynn Margulis, biologist [54]; Richard Falk, professor

²⁷ A sympathetic portrait of Griffin is contained in [85, pp. 303-20].

of International Law and Practice at Princeton University [23].²⁸

An important recent development in the fight for truth on 9/11 has been the creation, advertised in a press release of September 9, 2011, of the website "Consensus 9/11: The 9/11 Best Evidence Panel" [17], whose purpose is «to provide the world with a clear statement, based on expert independent opinion, of some of the best evidence opposing the official narrative about 9/11». To the material assembled in this website and to the separate contributions by the members of this panel (they are 22, including Griffin, Mazzucco, Jones, David Chandler, Niels Harrit) and by other writers (see in particular [30, 84, 74] and the invaluable referenced chronology [77]) this chapter is largely indebted.

8. Some examples of facts which do not fit the vulgata

To those entering for the first time the 9/11 cluster of problems, the most striking feature is the very low level of accuracy and consistency in the official statements concerning it. In fact one of Griffin's contributions is a 350-page scholarly book simply documenting the *internal* contradictions in the official version of what happened before and after the 9/11 events [35]; and, as to the 9/11 Commission report itself, he has defined it, with very good reasons, «a 571-Page Lie» [32]. In fact, as we shall see more in detail, the official version of what happened in US on September 11 is rife with contradictions, explanatory gaps, and incredible "exception-to-the-rule" claims.

In this section we record a very small sample of facts which are at variance with what the mainstream media have reported to their audiences. Then, in the following four sections we shall concentrate on four crucial issues. Until a really convincing explanation of these puzzling features will be found, the official version can be said to have been *refuted*, and the need for a truly independent and thorough inquiry established.

²⁸ Many other names are listed, with pertinent quotations, in [80].

We warn the readers that the list of contradictions in the official version could have been made much longer²⁹ and that the more one learns about 9/11 the more unlikely that version becomes. In fact, from the point of view of the general public, there may even be a danger in “overkilling” the official version, since the addition of ever new arguments and facts may be perceived as an implicit admission that there are not really decisive arguments yet. Actually, in our opinion the facts described in the present article provide *overwhelming evidence to the effect that the Bush administration has systematically lied to the world as to the nature of 9/11*. The only reasonable explanation for those lies (in themselves amounting to complicity) is that *that administration was involved at an earlier stage in the 9/11 conspiracy*.

8.1 Bush and the pet goat story

The 2004 documentary by Michael Moore, *Fahrenheit 9/11* [XII], has made the whole world acquainted with a video featuring the US President, George W. Bush, who during the terrorist attacks was participating in a reading drill at an elementary school at Sarasota, Florida. Bush had been told about Plane 1 hitting WTC 1 just before he was entering the school (at 8:55 a.m.). Between 9:06 and 9:07 the chief of staff, Andrew Card, whispered in his ear: «A second plane hit the second Tower. America is under attack».

Now, whoever in Bush's place would have been deeply shocked *at least* by the second piece of news, and would have immediately called a stop to the drill. Instead the video proves that Bush remained quietly at his place for seven minutes as children read aloud the story “The Pet Goat”, and then stayed at the school for other twenty minutes. This is in itself a very bizarre reaction under the official assumption that the news had caught the president entirely by surprise. And yet it is not nearly as bizarre as the reaction of his staff, who failed to apply what was the standard procedure in the circumstances, that is rushing the president out of the school as soon as possible to hide him in some safe place.³⁰ In case they had failed to do so out of negligence, they should have been severely punished in due

²⁹ See also chapter 14.

course: but this did not happen, so we have all reasons to think that they were following orders.

Sure enough, at the White House it was realized quite soon that what had happened in the Sarasota school was incompatible with the official notion that neither Bush nor his staff could be certain that the life of the president *was not at serious risk* in those dramatic moments. After all, terrorists who could stage the WTC attacks might well have taken the little trouble of getting informed about the president's widely advertised public encounters. In fact Card told in 2002 the *San Francisco Chronicle* that Bush

“looked up – it was only a matter of seconds [sic!], but it seemed [sic!] like minutes. [...] And he just excused himself very politely to the teacher and to the students and he left”.

Clearly the White House in 2002 had decided to conceal the truth; they corrected their account only after the video had appeared in the public domain (in 2003, and in a reduced version since June 2002) [35, p. 4].

So here we have a proof that:

- the White House lied in order to avoid raising suspicions as to the extent of the president's and his staff's awareness of what was happening;
- in the Florida school Bush and his staff behaved as if «America is under attack» did not imply that the US president had to stop immediately the comparatively irrelevant task he was performing in those minutes.

8.2 Were suicide hijackings unexpected?

Three years later, on April 13, 2004 Bush said at a press conference (cit. in [35, p. 134]):

³⁰ In an interview on September 16, 2001, Vice President Dick Cheney gave the following description of how he was treated in his office at the White House after it was clear that Plane 3 *might* aim at the White House: «[...] my Secret Service agents came in and, under these circumstances, they just move. They don't say “sir” or ask politely. They came in and said., “Sir, we have to leave immediately”, and grabbed me and...»; the interviewer asked: «Literally grabbed you and moved you?» and Cheney confirmed: «Yeah. And, you know, your feet touch the floor periodically [...]» [36, pp. 172-3]. Something very, very different from what happened in the Sarasota school.

"[T]here was [...] nobody in our government [...] [who] could envision flying airplanes into buildings on such a massive scale [...] Had I had any inkling whatsoever that the people were going to fly airplanes into buildings, we would have moved heaven and earth to save the country".

At least by that time, however, both Bush and the members of the 9/11 Commission, which in the same year stood by Bush's statement, should have been perfectly aware that *the opposite was true*. Ten years earlier, in 1994, a Pentagon expert had written (cit. in [35, p. 136]):

Targets such as the World Trade Center not only provide the requisite casualties, but, because of their symbolic nature, provide more bang for the buck. In order to maximize their odds for success, terrorist groups will likely consider mounting multiple, simultaneous operations.

This is so precise as to sound as a *prediction* of 9/11. And yet it was not the only report advising the government to take very seriously the threat of suicide hijacking targeting the «symbolic» buildings that were in fact hit in 2001. Indeed, the hypothesis of airplanes used by terrorists as missiles targeting national buildings was the basis for *military exercises* performed in October 2000, May 2001, and July 2001! So Bush and the 9/11 Commission engaged in shameless misinformation – obviously to play down the Bush administration's responsibility in 9/11.

8.3 Telephone calls from the planes

An especially disturbing inconsistency in the official version [36, pp. 124-70] has to do with the telephone calls which were supposedly made by passengers and crew members using cell phones from Planes 2,3,4 (that is, from all planes except for the one targeting the WTC 1). In particular it is reported that there were at least 11 cell phone calls from Plane 4 alone, out of a total of more than 15 calls from all flights.

The reported content of these phone calls has been the foundation of the worldwide advertised story concerning a few al-Qaeda hijackers wielding box cutters and knives, and taking control of the planes, where they supposedly succeeded in subduing a group of passengers and crew members eight to seventeen times more numerous – by

using only those primitive weapons. To evaluate the intrinsic likelihood of such scenario one has just to think, in particular, that «The so-called muscle hijackers [of Plane 3] were not physically imposing, as the majority of them were between 5'5" and 5'7" in height and slender in build» (this is from the 9/11 Commission report), a circumstance to be contrasted with the fact that the pilot of Plane 3, a former Navy pilot and boxer (a «really though one»), «even up to his death [...] enjoyed boating, in-line skating, and weightlifting, and was "in great shape", according to his friend [...]» ([70], cf. [36, p. 153]).

Now in 2006 the FBI presented a report at a trial against Zacarias Moussaoui (supposedly the "20th terrorist") which shows that *no cell phone* calls (as opposed to calls by *onboard* phones) had ever been made from *any* of the four hijacked flights! Most strikingly, both calls from Plane 3 by a well-known conservative commentator, Barbara Olson, supposedly alerting her husband, Ted Olson (the US solicitor general during the first term of the Bush administration), went *both unconnected* according to the FBI: and yet Ted Olson had told CNN that in these calls his wife had informed him that

"all passengers and flight personnel, including the pilots, were herded to the back of the plane by armed hijackers. The only weapons she mentioned were knives and cardboard cutters".

A little too much to be explained in a mere... 0 seconds. Popular movies have been produced having as their subject the situation of the people in the hijacked planes, based on the accounts coming from cell phone calls – which, according to the FBI, were never made.

Moreover, the telephone calls allegedly coming from the 4 planes have an unmistakeable touch of unreality: no background noise, a strange calmness in the voice of people supposedly talking from the hijacked planes, speakers refusing to talk to their children in what they had very strong reasons to think that would have been their last contact with them, etc. The hypothesis that all the phone calls may have been faked, for instance by using voice-morphing technology [36, pp. 134-9], seems plausible.

9. Collapse of the WTC towers

On 9/11, three steel-structure towers suffered total collapses: WTC 1, WTC 2, and WTC 7. Knowing exactly how these steel-structure buildings collapsed is obviously very important, even from a strictly technical point of view – engineers cannot build better buildings in the future without knowledge regarding the precise circumstances under which these towers collapsed. All three buildings fell vertically – rather than on a side – and with an acceleration of the same order of magnitude as free fall, suggesting that lower floors provided little to no resistance to the floors above.

9.1 Three unprecedented events... all during the same day, all in New York City

The official theory posits that fire, initiated by jet fuel, triggered the collapse of the Twin Towers. However, there appears to be no example, before or after the three WTC towers, of steel structure highrises collapsing due to fire. There may also be no other cases of highrise buildings, which were not deliberately demolished using explosives, falling at near free-fall speeds – other than on 9/11. It is worth emphasizing that if *one* exceptional and unprecedented event is in itself worth investigating in detail, *three of them*, and of the same kind, occurring the same day and at the same place, are something very suspicious.

Two structural engineers siding with the official version still had to concede, in 2007, that what happened at the WTC on 9/11 according to the orthodox version was *unprecedented and unexpected from the viewpoint of their whole profession* [6, p. 308]:

The destruction of the World Trade Center (WTC) on September 11, 2001 was not only the largest mass murder in US history but also a big surprise for the structural engineering profession, perhaps the biggest since the collapse of the Tacoma Bridge in 1940. No experienced structural engineer watching the attack expected the WTC towers to collapse. No skyscraper has ever before collapsed due to fire.

So all those who have been suggesting (and among the “debunkers” there are quite a few) that “real” experts in

structural engineering should have found nothing particularly to wonder at have been seriously misleading the public.³¹

Crucially, what can explain the symmetrical, and in part strictly free-fall, kind of collapse of WTC 7 (which may be viewed online in [I, II]), a 47-story skyscraper with 24 core columns and 57 perimeter columns, *that was not hit by a jet*? What is the probability that this could have occurred unintentionally? What is the probability that such an event could have occurred the same day and within 100 meters of the collapse of other two skyscrapers?

So difficult to explain is, in particular, the collapse of WTC 7 that the *New York Times* wrote [29]:

Almost lost in the chaos of the collapse of the World Trade Center is a mystery that under normal circumstances would probably have captured the attention of the city and the world. That mystery is the collapse of a nearby 47-story, two-million-square-foot building seven hours after flaming debris from the towers rained down on it, igniting what became an out-of-control fire.

Notice that the fires supposedly weakening the steel structure of WTC 1 and WTC 2 were necessarily short-lived – since the two towers took respectively 102 and 56 minutes to totally collapse (cf. section 1). To appreciate from this viewpoint the triple miracle of the WTC it is enough to consider the following examples [33]:

In 1988, a fire in the First Interstate Bank Building in Los Angeles raged for 3.5 hours and gutted 5 of this building's 62 floors, but there was no significant structural damage [...]. In 1991, a huge fire in Philadelphia's One Meridian Plaza lasted for 18 hours and gutted 8 of the building's 38 floors, but, said the FEMA report, although "[b]eams and girders sagged and twisted [...] under severe fire exposures [...], the columns continued to support their loads without obvious damage" [...]. In Caracas in 2004, a fire in a 50-story building raged for 17 hours, completely gutting the building's top 20 floors, and yet it did not collapse [...]. And yet we are supposed to believe that a 56-minute fire caused [WTC 2] to collapse.

³¹ Some fires *did* cause the collapse of smaller steel structures which, however, cannot be compared with the WTC skyscrapers [74].

As to the structural strength of the WTC towers, this is what the construction manager of WTC said to a journalist in October 2001 [8]:

I spoke with Hyman Brown, a University of Colorado civil engineering professor and the World Trade Center's construction manager. Brown had watched in confusion as the towers came down. "It was over-designed to withstand almost anything including hurricanes, high winds, *bombings and an airplane hitting it*", he said.

And in the same month Robert McNamara, president of the engineering firm McNamara and Salvia, said that «the World Trade Center was probably one of the more resistant tall building structures [...] nowadays, they just don't build them as tough as the World Trade Center» [4].

In fact in 1993, after a bomb had exploded in WTC 1, a leading structural engineer for the WTC, John Skilling, had explained (cit. in [48]):

"We looked at every possible thing we could think of that could happen to the buildings, *even to the extent of an airplane hitting the side*", said John Skilling, head structural engineer [...] Concerned because of a case where an airplane hit the Empire State Building [which did not collapse], Skilling's people did an analysis that showed the towers would withstand the impact of a Boeing 707. "Our analysis indicated the biggest problem would be the fact that all the fuel (from the airplane) would dump into the building. There would be a horrendous fire. A lot of people would be killed", he said. "*The building structure would still be there*".

The experts of FEMA concluded in their 2002 report [26]:

The specifics of the fires in WTC 7 and how they caused the building to collapse remain unknown at this time. [...] *the best hypothesis has only a low probability of occurrence*. Further research, investigation, and analyses are needed to resolve this issue.

It seems obvious that if the *best hypothesis* is improbable (which means that "best hypothesis" is used here in a pickwickian sense!), then we are very far from being entitled to dogmatize on what really happened. And yet this simple methodological point seems to have been missed by most apologists of the official version.

In any case not a single one of the engineers in charge of the structural stability of the WTC buildings has been indicted and prosecuted, let alone sentenced. Leslie E. Robertson, one of them, stated in an interview that «the circumstances of the 11 September were outside of that which we considered in the design» [X], which, as we have seen, is simply not true – unless the “circumstances” Robertson is referring to are even “outside” the official version.

9.2 The hypothesis of controlled demolitions

On the other hand, an intentional, *controlled demolition* of the building agrees very well with the physical evidence, as was first argued in detail by Jones [45, 46, 47] (section 7), and is also consistent with several independent facts. We list just a few:³²

(1) many witnesses reported having heard explosions *before* the beginning of the fall of each of the three skyscrapers ([35, pp. 237-52], [64]);

(2) «Squibs are rapidly ejecting high pressure material outside of the building. When WTC 7 collapsed, seven of these squibs were observed coming from different floors. [...] They provide the direct evidence for explosions on those floors»³³;

(3) for several weeks *pools of molten steel* in the Pile have been observed and described by reliable professionals, which implies that a much higher temperature with respect to that which may possibly be reached in office fires had been reached;

(4) concrete and other materials were reduced to dust, and the collapse created big dust clouds;

(5) independent researchers have found on all the examined samples of steel from the Pile some very similar and «distinctive red/gray chips», recognized as «unreacted

³² See [X] presenting a visual comparison with actual controlled demolitions. A detailed and referenced exposition, with other relevant points strengthening the case for a controlled demolition, is provided in [36, pp. 36-65].

³³ This is a quotation from a video interview to Crockett Grabbe, a physicist, in 2007 (transcript of the relevant passage in [61]).

thermitic material» (the thermite is a substance used to cut steel columns in controlled demolitions)³⁴;

(6) samples of sulfidized steel and samples of steel with holes have been found, suggesting that melting and even evaporation of steel should have occurred.

When mention is made of samples of the WTC debris it is important to remember that the NIST examined only «236 structural steel elements», since only «0.25 percent to 0.5 percent of the 200,000 tons of steel» from the Twin Towers was recovered (cit. in [48]). Why? This was denounced at the beginning of 2002 in very strong terms on an international magazine for fire and emergency services personnel [53]:

For more than three months, structural steel from the World Trade Center has been and continues to be cut up and sold for scrap. Crucial evidence that could answer many questions about high-rise building design practices and performance under fire conditions is on the slow boat to China, perhaps never to be seen again in America until you buy your next car. [...] *Fire Engineering* has good reason to believe that the "official investigation" blessed by FEMA and run by the American Society of Civil Engineers is a half-baked farce that may already have been commandeered by political forces *whose primary interests, to put it mildly, lie far afield of full disclosure.*

An Iranian engineer Hassan Astaneh, who was trying to understand how the Towers had collapsed, said in March 2002 [11]:

³⁴ «That thermitic reactions from the red/gray chips have indeed occurred in the DSC [=Differential Scanning Calorimetry] (rising temperature method of ignition) is confirmed by the combined observation of 1) highly energetic reactions occurring at approximately 430 °C, 2) iron-rich sphere formation so that the product must have been sufficiently hot to be molten (over 1400 °C for iron and iron oxide), 3) spheres, spheroids and non- spheroidal residues in which the iron content exceeds the oxygen content. Significant elemental iron is now present as expected from the thermitic reduction-oxidation reaction of aluminum and iron oxide. The evidence for active, highly energetic thermitic material in the WTC dust is compelling» ([38, p. 21]; see also [47]).

"When there is a car accident and two people are killed, you keep the car until the trial is over. [...] If a plane crashes, not only do you keep the plane, but you assemble all the pieces, take it to a hangar, and put it together. That's only for 200, 300 people, when they die. In this case you had 3,000 people dead. You had a major machine, a major manmade structure. My wish was that we had spent whatever it takes, maybe \$50 million, \$100 million, and maybe two years, get all this steel, carry it to a lot. Instead of recycling it, put it horizontally, and assemble it. You have maybe 200 engineers, not just myself running around trying to figure out what's going on. *After all, this is a crime scene and you have to figure out exactly what happened for this crime*, and learn from it. But that was my wish. My wish is not what happens".

It is hard to disagree with Griffin when he sums it up as follows: «*This removal of an unprecedented amount of material from a crime scene suggests that an unprecedented crime was being covered up*» [33].

A planned demolition requires explosives and incendiaries to be installed in strategic locations within a building, thus ensuring that the building will collapse in a predictable, regular, symmetrical fashion – rather than toppling over on a side. If WTC 7 came down due to the use of explosives, then these explosives were likely already placed in the building prior to September 11,³⁵ and this raises a number of logistical questions: who could have placed such explosives in the buildings?; who would have access?; could security have been breached?; were explosives placed by architects during construction of the building to make eventual demolishing of the buildings easier?

Whatever the answers, the fact that these very high buildings did not fall over but rather fell downwards, nearly

³⁵ As Jones explained, «I've had people say, "well maybe Al Qaeda ran into WTC7 that morning and planted explosives..." This is unsupportable since this was a highly secure building: WTC 7 housed a secret office of the CIA, as well as a Department of Defense office and so on. (It is worth noting that records of ENRON and other businesses under investigation were destroyed when this building collapsed.) Furthermore, it takes time and considerable skill to do a demolition of a skyscraper in the manner we observed» [46, p. 64].

on their own footprints, suggests the intention to destroy them without causing further damage to other buildings and people nearby. This is not the kind of outcome that is likely to have happened *by chance*: in fact there are only a few demolition firms *in the world* which can be relied upon to achieve it [36, p. 44]. To admit that a symmetric fall which normally requires a very careful and competent preparation might have occurred as a result of buckling of steel columns provoked by casual and asymmetric fires amounts to believing in something very close to a miracle (like, say, a monkey typing a Shakespeare's sonnet).

9.3 Free-fall?

A metaphorical collapse which, as physicists, we consider as particularly worrying is that of scientific literacy induced by the mainstream media and government committees insisting on a very peculiar, to say the least, account of the destruction of WTC 7. Almost all persons have been taught at high school that the acceleration of falling bodies is approximately equal to the gravity acceleration (9.81 m/s^2) only when the bodies are near the earth's surface and all forces acting on them, other than the earth's gravitational field, are negligible. Now a vertically collapsing sky-scraper is by any criterion *not* an example of a freely falling body, so it would be exceedingly strange if such a collapse occurred, *even for a short time span*, with gravity acceleration, *unless other energy sources were involved*.

To put it in another way, free-fall means that the gravitational energy of the falling body is gradually transformed uniquely into its kinetic energy: so where did the energy needed to win the resistance of the lower structural elements come from?

NIST tried to deny until a few months before the publication of their final report that WTC 7 had collapsed in free-fall for any span of time. The preliminary Draft for Public Comment of their report they put forward in August 2008 stated that the time of fall for WTC 7 «was approximately 40 percent longer than the computed free fall time and was consistent with physical principles». A high-school physics teacher, David Chandler [VII], challenged NIST at a "WTC 7 Technical Briefing" on August 26, saying that the "40%

longer” estimate was refuted by a «publicly visible, easily measurable quantity» from the WTC 7 collapse videos, which showed that «for about two and a half seconds [...] the acceleration of the buildings is indistinguishable from freefall». In the final report [57] issued in November 2008, NIST modified its previous account by distinguishing three different stages in the 5.4 seconds of the collapse of WTC 7 which can be observed in the videos:

The analyses of the video (both the estimation of the instant the roofline began to descend and the calculated velocity and acceleration of a point on the roofline) revealed three distinct stages characterizing the 5.4 seconds of collapse:

- Stage 1 (0 to 1.75 seconds): acceleration less than that of gravity (i.e., slower than free fall).
- Stage 2 (1.75 to 4.0 seconds): gravitational acceleration (free fall)
- Stage 3 (4.0 to 5.4 seconds): decreased acceleration, again less than that of gravity

This analysis showed that the 40 percent longer descent time—compared to the 3.9 second free fall time—was due primarily to Stage 1, which corresponded to the buckling of the exterior columns in the lower stories of the north face. During Stage 2, the north face descended essentially in free fall, indicating negligible support from the structure below.

Thus NIST eventually admitted that for 2.25 seconds (Stage 2) WTC 7 had collapsed in «essentially free fall» – hundreds of tons of concrete, steel and other materials falling as if they met *no resistance* for about 25 meters or 8 stories! –, thus confirming Chandler's objection (apart from the trivial difference between «about two and a half» and 2.25). However NIST added that «This is consistent with the structural analysis model which showed the exterior columns buckling and losing their capacity to support the loads from the structure above», which is at least disingenuous.³⁶ In fact:

³⁶ Notice that NIST did not say “consistent with physical principles”, as in their previous draft; all three occurrences of this phrase have been deleted in the final report [36, p. 48].

(i) the supporting capacity due to the buckling of the exterior columns (for its very nature a gradual process) is very unlikely to have *suddenly vanished*;

(ii) even under such an assumption, the reduced capacity of support would be not enough to explain why the upper, falling section, whose mass increased by accretion of floors during the fall, should have reached and maintained for 2.25 seconds a free-fall acceleration.

As to (ii), standard Newtonian physics, namely the *second principle of dynamics* applied to a varying mass system, implies that the progressive increase of mass of the falling section should have produced a *deceleration with respect to free fall*, no matter what the supporting capacity of the lower structure had become. This is a basic result which we explain more in detail in the Appendix.

As a second example of violation of laws of classical mechanics which is implied by the official version, one may cite the collapse of WTC 2: in the initial part of its collapse WTC 2 can be seen to stop the initial rotation of about 34 of its upper floors, which all of a sudden are turned into dust [III]: a very enigmatic phenomenon which, if we refuse to accept that explosives were used, comes very close to *an empirical falsification of the law of conservation of the angular momentum* [45].

9.4 Educational implications

One reason that prompted us to write this article is that as scholars working in the fields of physics and physics education, we are disturbed by the fact that believing in the official version amounts, from a physical point of view, to nothing less than renouncing one's laboriously developed physical sense in favour of an act of faith in an unprecedented and virtually miraculous series of events. In view of the energy that many self-styled free-thinkers put into dismantling religious dogmas, creationism and such like, it is surprising that no comparable assault has been made *by those same writers* against what is in effect only slightly different from a new cult – indeed, most of them have become *apologists* of this cult, under the cloak of “debunkers”.³⁷ In fact during the last few decades the term

³⁷ See for instance [75].

"debunker" has increasingly come to signify the exact *opposite* of its natural meaning. A debunker should be a writer showing the inconsistencies or mistakes of official accounts; today a self-styled debunker is as a rule a writer trying to *defend official accounts from legitimate and sometimes cogent criticism*. From this point of view, 9/11 is a very good litmus test to tell apart fake from true sceptics.

We think it important to confirm as sound the common-sense physical explanation of what occurred at the WTC (that is, the existence of further energy sources apart from fire and gravity), until any really stronger alternative hypothesis is put forward. The risk for the public understanding of science is that people may get the misleading and depressing message that one thing is what they are taught in the physics classes, and quite another what happens in the ordinary world – a very dangerous doctrine, which, if unimpeded, will eventually destroy all confidence in schooling and textbook science.

It would be useful to make a poll among eminent physicists all over the world (including, but not restricted to, Nobel laureates) as to the physical plausibility of the official explanation of the WTC's collapses. The results of such a poll, whatever its outcome, would give much food for thought to both sociologists of science and lay people. In fact it is puzzling that while physicists boast of being able to fathom – by very tortuous routes, admittedly – the mysteries of the universe or to classify and measure the ultimate blocks of matter, they might be divided concerning the real cause of those very accessible events and/or the compatibility of their official explanation with the known laws of physics. Our best guess is that most eminent physicists are loath to be involved in a politically sensitive controversy which is likely to damage their public persona.³⁸

³⁸ [XIII] shows the 2001 Nobel Laureate for physics, Carl Wieman, having no better answer than «No opinion» to an interviewer asking him about 9/11 in 2009. It is amusing that Wieman, in his autobiography for the Nobel Foundation, writes: «Over the past several years I have become increasingly involved with trying to improve undergraduate physics education and have been balancing my time between that and my research. I have been examining alternative curricula and learning

And as shown in the way Steven Jones has been wronged by his own university, their fear is far from groundless.

Another reason which may promote “not taking a stand on 9/11” may be the way scientists are professionally trained not to thread on ground outside their speciality, lest they be charged with infringement of disciplinary divides – which have been effectively transformed into sacred boundaries. Now 9/11 is a very good example of an historical episode which needs a multidisciplinary approach for a proper weighing of the evidence. Conversely, it indicates that the standard training of scientists can work as a tool, enforced in different ways by the power system, to prevent scientific understanding to be freely applied where it would most enlighten and count.³⁹

10. Who planned 9/11 and the identity of the hijackers

Two days after the attacks it was clear that the Bush administration was at the same assuring the world that Osama bin-Laden had planned them, and unable to substantiate this claim with any evidence that could be accepted in a court for much lesser crimes.

10.1 Osama bin-Laden?

The following is a transcript from the ABC News television show, “This Week”, on September 23, 2001 [2]:

Sam Donaldson (ABC News): All right. Let me show you something you said the other day, and just see whether you've changed your view on it, concerning proof. You said, “We are assembling the evidence that will tell us, in a way

about the research in physics education as to how students do and do not learn. A particular concern has been improving how physics is taught to students who are not planning to become physicists, in the hope of one day making physics understandable, useful, and interesting to a large fraction of the population» [82]. Indeed: what about making the WTC collapses understandable in terms of undergraduate physics? A good illustration of how fruitful 9/11 can be in a philosophy class as a discussion topic is given in [79].

³⁹ See chapter 1, section 4.

that the world will fully confer with us – concur with us, who is responsible for this." Are we going to present before the world evidence of Osama bin Laden's guilt?

Secretary of Defense, Colin Powell: Yes, and I think his guilt is going to be very obvious to the world. I mean, he has been indicted previously for terror activity against the United States, and so this is a continuing pattern of terrorism, and we are putting all of the information that we have together, the intelligence information, the information being generated by the FBI and other law enforcement agencies. And I think we will put before the world, the American people, a persuasive case that there will be no doubt when that case is presented that it is al- Qaeda, led by Osama bin Laden, who has been responsible for this terrible tragic [inaudible].

Donaldson: So you're talking about something beyond simple assertions by US leaders. You're talking about assertions backed up by the evidence.

Powell: Yes.

Donaldson: OK.

The very same day, US National Security Advisor Condoleezza Rice was interviewed on CNN. The following is an excerpt of that interview, in which Rice explains the US response to Taliban demands for evidence showing Osama bin Laden is behind the September 11 attacks [14]. A video clip was first shown the full transcript of which is:

Sohail Shaheen, Taliban Deputy Ambassador to Pakistan: There are many probabilities who are the real culprits behind this. There is no evidence and proof given to us. We will not be ready to give Osama bin Laden without proof.

Then the following exchange followed:

Wolf Blitzer, CNN host: And just to nail down the point, he says he needs proof, he needs evidence, before they hand over Osama bin Laden. Will you give the Taliban regime in Afghanistan any evidence, any proof behind what is in the public domain out there?

US National Security Advisor Condoleezza Rice: Well, again, let's be realistic. This is not a government given to western jurisprudence. So these calls for proof are somewhat misplaced. But clearly, we do have evidence, historical and otherwise, about the relationship of the al-Qaeda network to

what happened on September 11. We will begin to lay out that evidence, and we will do it with friends, allies, the American people and others.

In fact, unbelievable as it might appear to newcomers to the 9/11 issue, the FBI *has never named Osama bin-Laden as responsible for the 9/11 attacks*. Moreover Osama bin-Laden from September 12 to October 7 consistently denied having anything to do with 9/11 (although he implied to be happy about the outcome), and surely the uncommon way the towers fell (that is, nearly on their footprints) seems to suggest a desire to *limit* suffering. Neither behaviour fits the picture of bin-Laden as the main culprit of 9/11: usually terrorists are more than willing to *claim* successful actions (sometimes even actions they are *not* responsible for!), and most certainly they are not careful to spare their targeted enemy's lives.

When on May 2, 2011 president Barack Obama (recipient of the 2009 Nobel Peace Prize) announced that a US military team had killed Osama bin-Laden in Pakistan that same day, he said, with reference to bin-Laden's supposed responsibility as regards 9/11: «[J]ustice has been done». Apart from the many doubts on the whole CIA-directed military action, including basic uncertainties as to the very identity of the person murdered by the Navy SEALs (Navy Sea, Air and Land forces), let alone the ethical value of killing an unarmed person, the judicial absurdity of Obama's claim should be clear.

10.2 Hijackers?

Most people believe the planes used on 9/11 were flown into their targets by hijackers. If true, their identity is crucial to know.

On September 14 the FBI published a list of 19 hijackers (none of them coming from Iraq or Afghanistan) [24], but neither the FBI nor any other branch of the US government has ever provided any evidence to justify how they came to that list. At the time, FBI director Robert Mueller first stated that he had «a fairly high level of confidence» that they knew the true identities of the hijackers. Subsequently, on September 20, Mueller stated that «We have several others

that are still in question. The investigation is ongoing, and I am not certain as to several of the others» [50].

Despite the seeming initial uncertainty over the real identity of the hijackers, the FBI list has never changed. It has been published and cited as complete, not tentative. However, what makes the list problematic is that several of the accused hijackers are alive: the *Los Angeles Times* [24] lists six; the BBC [7] lists four. If some (or all) of the hijackers stole the identity of innocent citizens, who are the real hijackers? The story told by the FBI of the passport of a terrorist in Plane 1 being discovered on the ground *after* the destruction of WTC 1 is much too incredible to be worth a detailed refutation (see, however, [36, pp. 26-7]).

But what is worse is that, contrary to what anyone would suppose, *none of the names in that list, and not even any other Arab name, appeared in the passenger manifests for any of the four flights!* [36, p. 28]. The fact that the mainstream media have succeeded in making such an outrageous inconsistency invisible is evidence enough of their magician's ability to substitute reality with fiction in the public awareness.

In the 9/11 Commission report Khalid Sheikh Mohammed, who had been arrested in 2003 in Pakistan by CIA and Pakistan intelligence agents, is described as «the principal architect of the 9/11 attacks», and is quoted 211 times. He is the main source of the reconstruction contained in the report, and yet the reliability of his alleged revelations is more than doubtful, as they have been elicited by torture⁴⁰.

⁴⁰ «In the wake of the September 11, 2001, attacks, the US government authorized “enhanced interrogation” techniques (EITs) (i.e., prolonged sleep, sensory deprivation, forced nudity, and painful body position) that were routinely applied to detainees in US custody in at least three theaters of operation and an unknown number of secret “black sites” operated by the Central Intelligence Agency (CIA). They did this despite the fact that each EIT was considered torture by the United Nations, and the United States recognized them as such in its reports on human rights practices. Although legal sources and trained interrogation experts warned of the unreliability and questionable legality of coerced confessions, EITs were authorized by the CIA in January 2003 and the Department of Defense (DoD) in April 2003» [42].

Another serious piece of misinformation involves the cultural identity of the terrorists: they have been systematically described as «devout Muslims» and yet they have been reported by several reliable sources as having patronized lap dancers, gambled, got drunk, and used drugs like cocaine. Not even the most extreme anti-Islam prejudice might suggest a compatibility between these behaviours and Muslim devotion, particularly if we assume that the terrorists were so keen on their religious creed as to be ready to sacrifice their lives to honour it.

11. The Pentagon

The whole official account of the Pentagon attack is worse than paradoxical: it is substantially meaningless, starting from the very fact that *the Pentagon* – that is, «probably the best protected building in the world» [36, p. 189], surrounded by an airspace where «civilian flying is prohibited at all times» [34, p. 77] – should have been chosen as one of the targets. In other words, the terrorists are supposed to have aimed at a building against which the probability of a successful exploit was *infinitesimal*. Here is how Griffin describes, quite accurately, the official account of the Pentagon attack [36, pp. 195-6]:

[T]he al-Qaeda “mastermind” behind the attack on the Pentagon would have been the stupidest mastermind conceivable: besides selecting a completely incompetent pilot to attack the Pentagon, he ordered [Hani] Hanjour [the supposed terrorist pilot] to attack Wedge 1, thereby forcing him to fly an impossibly difficult trajectory, to get through an obstacle course, and to spend extra time for the approach, during which his plane could have been shot down. The choice of Wedge 1 also resulted in the least damage and the fewest deaths, including no deaths whatsoever among the Pentagon's leadership.

In other words: too much even for a work of fiction. Whatever hit the Pentagon (Plane 3, or a missile, or a bomb), virtually nothing of any importance in the official version comes even close to making sense. Let us consider two main issues.

11.1 How could the Pentagon be hit by Plane 3?

Griffin says the manoeuvre that Plane 3 should have done to strike the Pentagon the way it supposedly did was «impossibly difficult». In fact here is what Russ Wittenberg, first a military and then, for 35 years, a commercial pilot was reported saying in 2005 [73]:

Knowing the flight characteristics of the “big birds” like the back of his hand, Wittenberg convincingly argued there was absolutely no possibility that Flight 77 could have “descended 7,000 feet in two minutes, all the while performing a steep 270 degree banked turn before crashing into the Pentagon’s first floor wall without touching the lawn.”

Wittenberg claimed the high speed maneuver would have surely stalled the jetliner sending it into a nose dive, adding it was “totally impossible for an amateur who couldn’t even fly a Cessna to maneuver the jetliner in such a highly professional manner”, something Wittenberg said he couldn’t do with 35 years of commercial jetliner experience.

“For a guy to just jump into the cockpit and fly like an ace is impossible – there is not one chance in a thousand”, said Wittenberg, recalling that when he made the jump from Boeing 727’s to the highly sophisticated computerized characteristics of the 737’s through 767’s it took him considerable time to feel comfortable flying.

“I had to be trained to use the new, computerized systems. I just couldn’t jump in and fly one”, he added.

Wittenberg is not alone in this claims. Another former 757 pilot, Ralph Omholt, said: «The idea that an unskilled pilot could have flown this trajectory is simply too ridiculous to consider» [34, p. 79]. Other aviation sources commented upon that manoeuvre as being the work of a «great talent», that should have flown with «extraordinary skill» [36, p. 190].

Now the unexpected fact is that Hanjour did not simply lack a “great talent” in flying, but was «a trainee noted for incompetence», who, according to one of his instructors, «could not fly at all» [19].⁴¹ So we have an unbelievable

⁴¹ Compare with the following old joke. There are two people. One asks: “Can you play violin?”, and the other replies: “I don’t know, I have

fairy-tale, which the 9/11 establishment would have us to swallow unreflectingly as historical fact.

11.2 The official video of "Flight 77 hitting the Pentagon" does not show Flight 77 hitting the Pentagon

There are many other very basic, commonsensical questions on the attack on the Pentagon which still wait for an answer. Here are a few:

- Why no damages have been caused by the wings and the tail of Plane 4 on the external walls and windows of the Pentagon?
- Why did the plane that supposedly impacted the Pentagon not leave some wreck of the right form?
- How could a fragile plane like Plane 4, mainly in aluminium, break a hundred columns and perforate all three walls of three other buildings, making a hole of 2 meters of diameter in the third building?
- Why, in contrast with what happened with the Twin Towers, when the plane remained virtually inside the building, did the plane that impacted the Pentagon (a building built in a much more robust way, with more concrete columns) spread out all over the other three buildings?
- Consider what happened in the plane crash [78] of TAM in Brazil on July 17, 2007, when the plane, an Airbus A-320 carrying 187 people, hit the company warehouse building, provoking a fire lasting several hours, and yet all the corpses (199, including those of victims on the ground) were recovered and almost all of them (195) were identified (it took two months, however). Why in the case of the Pentagon no remains of bodies were found inside the damaged buildings?

In May, 2006, a Department of Defense website for Freedom of Information Act requests (FOIA) listed the following headline: "Videos of American Flight 77 striking the Pentagon on September 11, 2001" [IX]. Nearly five years after 9/11, this was the first official release of any videos in conjunction with the 9/11 Pentagon attacks.

never tried".

Despite the Defense Department's title, the videos do not show Plane 4 (or any other plane, for that matter) hitting the Pentagon. What can be seen is ambiguous, and cannot be said to confirm what struck the Pentagon. See the videos for yourself to confirm this – or just consider that if the videos did show the plane approaching the building, a still frame from the video would have been captured and printed in newspapers across the world. But no such still photographs have ever emerged. If Plane 4 did indeed strike the Pentagon, surely security cameras watching the headquarters of the world's most formidable military would have caught the plane on tape. Under what conditions would the Pentagon release videos alleging to show a plane that in fact do not show a plane? And if the Department of Defense has no video of Plane 4 hitting the Pentagon, why would they simply not say they have no such video?

Whether Plane 4 really hit the Pentagon is an interesting and important question, but it is not the question we wish to raise here. Rather, the question is: how can the Department of Defense claim to release “Videos of [Plane 4] striking the Pentagon” when the videos show no such thing? Did they forget to review the videos before releasing them? Did nobody realize the videos lacked a key element – a plane? Or did they make an heroic attempt to exploit the mass-psychology effect famously described in Andersen's story on the Emperor's New Clothes?

Considering the importance of 9/11, it is surprising that the release of a mislabelled video has not triggered an investigation.

13. Some general remarks on 9/11 and the power system

It might be said of 9/11 what has been said of a famous result in the foundations of quantum mechanics: that those who are not bothered by it must have rocks in their head. This article has argued that believing the official version is very close to believing a number of miracles, including the trustworthiness of government members that have already been proved to be liars in matters criminally comparable to 9/11 (section 5).

On the positive side, if we can call it so, the propaganda effort around 9/11 is a global, and so far substantially successful, sociological experiment in passing off to the world's peoples as historical reality what is essentially a piece of *bad fiction*, in order to justify a criminal domestic and international political project. We say "bad fiction" because of the too many inconsistencies and unbelievable assertions contained in it, and which would defeat any literary ambitions in a real work of fiction.

A natural question is: given the implausibility of the official story, is it plausible that the US government has ever been truly committed to investigating the biggest crime scene in American history? We have seen (sections 2, 9.2) that there is ample direct evidence for a negative answer. The 9/11 affair shows that no amount of contrary evidence is sufficient to dismount an establishment claim on sufficiently sensitive political matters. To be more precise, while obstinate independent researchers and journalists may succeed in convincing most of the world population that the official version is untenable, this is not enough to provoke a formal retraction by, let alone indictment of, the liars. While the nature of the conspiracy behind 9/11 is contentious, the conspiracy of the mainstream media supporting unanimously the official version is rather easy to see through, as regards both means and ends.

Eleven years have passed since 9/11. With each passing day, fewer people may feel that the truth regarding 9/11 is important, its political relevance being diminished in the myriad of events that have occurred since. With more current concerns, such as the Middle East political instability and a nuclear North Korea, people may feel that attention should not be diverted to past events like 9/11, especially since they have already been addressed by the 9/11 Commission (or haven't they?). Thus, people who want to know what happened on 9/11 may increasingly find themselves not taken seriously.

It has happened before. Knowing who killed President John F. Kennedy on November 22, 1963 was considered critically important at the time – a matter of national security. Decades later, three quarters of Americans believe that there was a government cover-up of the truth [56] – yet

majority views hold little sway over officially sanctioned truths.

14. Epilogue

We close by reporting two news that have been ignored by mainstream media, and that suggest there may be some room for hoping that one day the official version will be openly rejected.

A very strange coincidence in the thoroughly strange story of 9/11 (at least in its official representation) is the fact that the BBC reporter in New York, Jane Standley, announced the fall of WTC 7 *over 20 minutes before the event*.⁴² You need not be unduly prone to suspecting the integrity of the mainstream media in order to be puzzled by this feat of clairvoyance. Five years and a half later [63], on the BBC website a very lame explanation of this was published, including the statement that they had *lost* the original tapes of the broadcast – of course «for reasons of cock-up, not conspiracy»...

At the beginning of 2013 a British citizen, Tony Rooke, was tried for not having paid the TV license [21]. Speaking to the district judge he declared that the reason for this evasion was the following:

"I believe the BBC, who are directly funded by the licence fee, are furthering the purposes of terrorism and I have incontrovertible evidence to this effect. I do not use this word lightly given where I am".

Rooke had with himself a video that he wanted to show in court as evidence, but the judge «said it was not relevant to the trial». So Rooke went on explaining:

"The BBC reported it 20 minutes before it [i.e. WTC 7] fell. They knew about it beforehand. Last time I was here I asked you [the judge]: 'Where you aware of World Trade Center 7?' [...] You said you had heard of it. Ten years later you should have more than heard of it. It's the BBC's job to inform the public. Especially of miracles and laws of physics

⁴² In [VI] you can see WTC 7 (or «Salomon Brothers Building», as both BBC journalists call it) standing behind Standley, while she talks of its collapse *as having already occurred*.

become suspended [...] They have made programmes making fools of and ridiculing those of us who believe in the laws of gravity”.

During the trial the judge replied: «Even if I accept the evidence you say, this court has no power to create a defence in the manner which you put forward». There were a hundred supporters who had come to attend the trial, although only about 40 could come in; it is reported that «[t]here was cheering and applause as Rooke put his case forward in court».

In September 2012 Ferdinando Imposimato, the Honorary President of the Supreme Court in Italy and a member for three administrations of the Italian Parliament Anti-Mafia Commission, wrote [41]:

The only possibility for achieving justice is to submit the best evidence concerning the involvement of specific individuals in 9/11 to the Prosecutor of the International Criminal Court and ask him to investigate according to the articles 12, 13, 15 and 17, letters a and b, of the Statute of ICC [...]

The truth about September 11, 2001 is vitally important, but unless discussion and debate over the plausibility of the official story is taken seriously up to and including prosecution for international crimes of those held responsible, 9/11 – the geopolitical watershed of our time – will become another Kennedy Assassination, a piece of trivia, a cultural category which is not taken seriously, no matter how many people may not believe the government. In other words, in the case of 9/11 as in several others it is up to us, the citizens – both laypeople and scientists –, to prevent democracy from dissolving into a rhetorical trick masking the vested interests of a rapacious and ruthless minority.

Appendix – Conservation of Momentum and Variable Mass Systems

The following account agrees with some remarks in [12, 65, 46]. In elementary physics the 2nd principle of dynamics for a point particle is commonly expressed in the form

$$(1) \qquad \mathbf{F} = m\mathbf{a} ,$$

where \mathbf{F} is the force acting on the particle, and m and \mathbf{a} are, respectively, the mass and the acceleration of the particle. However, this is not the more general form of the principle, insofar as it assumes that the mass of the particle does not vary with time. Even in very commonplace situations this is not necessarily the case. (Take for instance a bucket of water with a hole at the bottom: the more natural assumption, if we want to model it as a particle, is to give it a variable mass). In these cases (1) must be substituted by the more general momentum law:

$$(2) \quad \mathbf{F} = d(m\mathbf{v})/dt$$

where \mathbf{v} is the velocity of the particle. By computing the derivative we obtain

$$(3) \quad \mathbf{F} - (dm/dt)\mathbf{v} = m\mathbf{a}.$$

Now let a point particle with variable mass model the system of all floors in WTC 7 which are reached by the progressive collapse of the building: the more floors are reached, the bigger the mass of this *upper section*. We can consider only the component along the vertical direction. Assume, according to the official version, that the only forces acting are two: 1) gravity (with free fall acceleration g), 2) the resistance R of the lower structure (which may also be non-constant, but is always directed against gravity). By substitution in the vertical component of (3) we have:

$$(4) \quad mg - R - (dm/dt)v = ma,$$

all quantities involved being positive. Therefore:

$$(5) \quad a = g - (R/m) - (dm/dt)(v/m),$$

which shows that even under the official (and hardly believable, unless explosives had been used) hypothesis that the resistance of the lower structure be negligible ($R = 0$), we should have *always* $a < g$.

In particular the transition from NIST's "Stage 1" ($a < g$) to the more-than-2-seconds- long "Stage 2" ($a = g$), that is, an *increase* in the acceleration up to essentially free-fall acceleration, cannot be understood unless some other force was acting in the direction of gravity.

One might object to assuming m to be a differentiable function. However, by using a discrete model of progressive

collapse, and exploiting the law conservation of momentum (under the hypothesis of a totally inelastic collision of the upper section with every single lower floor) in the form of

$$(6) \quad m_{n+1} v_{n+1} = m_n v_n$$

where m_n is the total mass of the upper section up to and including the n -th floor from the top, and v_n is its velocity, one finds immediately that

$$(7) \quad v_{n+1} = (m_n/m_{n+1}) v_n < v_n,$$

which means that a sudden deceleration must occur every time a new floor is reached, which is incompatible with the gravity acceleration being ever reached and maintained (cf. [52 (a)-(b)]).

Needless to say, by computer simulations based on ad hoc assumptions one can mimic some part of the process as documented in the videos, but the issue of the compatibility with physical principles was not tackled by NIST, since NIST's «"probable collapse sequence" [...] does not actually include the structural behavior of the tower after the conditions for collapse initiation were reached [...]» (NIST report as cited in [45]). In other words ([57, p. 142], cit. in [45]):

The results were a simulation of the structural deterioration of each tower from the time of aircraft impact *to the time at which the building became unstable, i.e., was poised for collapse.*

As so often with the official statements on 9/11 you have to read it twice before believing that you have not misunderstood it. Yes, the NIST experts are just saying that they did not bother with the details of the actual collapse: they stopped when they had succeeded in simulating the «conditions for collapse initiation»! As to the computer software used by NIST, here is what «a leading US structural engineer» said to *New Civil Engineer* in 2005 (cit. in [46]):

A leading US structural engineer said NIST had obviously devoted enormous resources to the development of the impact and fire models. "By comparison the global structural model is not as sophisticated", he said. "*The software used has been pushed to new limits, and there*

have been a lot of simplifications, extrapolations and judgement calls. [...]".

Is this science?

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16. Anthony Livversidge
Serge Lang Interview (April 26, 1993)*

Exploring ideas with Yale mathematician Serge Lang is anything but dull. Lang's ruling passion is accuracy, in words as much as in mathematics, and woe betide the clumsy interviewer. "That's not what I said!" he will scold, his sharp nose quivering and his brown eyes shining with righteous indignation. "Don't use your words, use mine!"

Then he will laugh to relieve the tension and make sure his purism is not taken personally. For Lang's overriding aim in public debate is to improve standards of accuracy, not to provoke personal reaction.

His establishment colleagues are indeed often disconcerted by Lang's outrage at inexact and self-serving formulations of issues in academic debate and journalism. For his targets are mighty names that have grown unused to challenge: powerful scientists, heavyweight academics, editors of scientific journals, university deans, and other high ranking members (or prospective members) of prominent institutions, in particular the National Academy of Sciences. A one-man strike force in the cause of honesty and accuracy, Lang is ready to take on any of them, if he feels the issue being distorted is sufficiently important.

These modern mandarins must be shocked at what happens when Lang feels they are abusing their trust. Instead of the cosy exchanges behind the scenes that intra-establishment politics is normally confined to, they are, as Lang terms it gleefully, "put through the meat grinder!"

A top mathematician and a member of the exclusive National Academy of Sciences since 1985, Lang himself is praised by Yale colleagues for what they call his "enormously energetic teaching devoted far beyond the call of duty", as well as the thirty four books he has written expounding mathematics up to the frontiers of research in a variety of fields, and his talent for grand synthesis.

* Version edited with agreement with Lang on Saturday, March 31, 2001.

What they call Lang's "pedagogical genius" has led him, unlike most other leading mathematicians, to write math books for high school students to help improve the state of elementary math education in the US.

Born in Paris in 1927, Lang came to live in the States at the age of 13. Graduating from Caltech, he spent a year and a half in the army, and then a year as a philosophy graduate student at Princeton before switching to mathematics and receiving his Ph.D. He taught mathematics at Columbia for fifteen years and then briefly at Princeton and Harvard before settling in at Yale in 1972.

He has published more than 70 research articles. His latest paper is on "explicit formulae" in analytical number theory. What one colleague calls his sometimes "stupendous" results have won the Cole Prize, America's top algebra medal, and the French Academy's Prix Carriere. He won the Humboldt Award in 1984.

What makes Lang unique, however, and what has put him in the limelight is his fierce determination to keep facts straight and intellectual behavior proper in academic circles and the media when disputes arise. Unlike most Ivy League academics, he is an activist willing to survive being perceived as a troublemaker.

His best known intervention came in the mid-eighties, when Harvard professor of government Samuel Huntington was nominated for the National Academy of Science. Lang, himself elected only the previous year, objected there were serious flaws in the political scientist's works, including a textbook then used at Yale and elsewhere. He sparked a battle royal over the nomination which lasted two years, and in the end Huntington never made it into the most exclusive science club in US academia.

Notable interventions for Lang also include spiking a Federal government attempt to get professors to fill in "effort reports" to detail the "per cent of time and effort" a professor spent on various activities, a demand which Lang found quite absurd. His stand as a national leader against this encroachment of bureaucracy cost him his National Science Foundation grant. Yale turned it down, even though Lang had the support in writing of the director of the NSF

and Yale's own Deputy Provost. But he won. The government gave up on the idea.

In another victory, he derailed a national survey on the attitudes of thousands of American professors, written by prominent sociologists Everett Ladd and Seymour Martin Lipset, and backed by major foundations. When Lang received his questionnaire in the mail, he was infuriated by what he characterized as its misleading formulations and he fought to discredit the project.

Much of Lang's influence has been won by a novel and fearsome weapon he has developed: the notorious Lang "File".

In this unique strategy Lang moves against an alleged information polluter by engaging him or her in correspondence, and building up a large File of letters, press clips, congressional testimony, and similar documentation on the issue. He may then mail this substantial "File", which can reach a hundred pages or more, to several hundred academics, members of the National Academy of Science, government officials, influential journalists and the like.

The recipients get an inside look at the complete details of an affair, the correspondence that has been written as well as published material, a rounded view not normally available even to participants. They can see for themselves the truth of Lang's strictures, and the level of cooperation or resistance he met with.

His 700 page File on the Lipset questionnaire was published by Springer Verlag as *The File* in 1981.

Another huge File of Lang's offers exceptionally extensive coverage of the recent David Baltimore affair, a now famous case in science politics. In this extended scandal, biology postgraduate Margot O'Toole's challenge to a paper that Nobel laureate Baltimore had coauthored resulted, after Baltimore stonewalled university, NIH and congressional investigations, in the prominent scientist resigning as president of Rockefeller University. Few if any outsiders had access to the full details of the case until Lang compiled his comprehensive File, which included his own involvement, published articles, and any and all other correspondence.

The editorial board of the journal *Ethics and Behaviour* were so impressed with Lang's "highly novel and fascinating means to approach a complex case" that editor Gerald Koocher published Lang's article on the Baltimore File in his January 1993 issue, even though it was 70 pages long.

Kindred spirits praise Lang's efforts as an invaluable counterweight to the power politics distorting modern science. Walter Stewart and Ned Feder, the science fraudbusters who were recently closed down by NIH bureaucrats, say Lang's File on their predicament has been "extremely helpful". Lang's File on Baltimore was a "spectacularly good job", says a Berkeley historian.

Yale colleagues call him 'heroic' for his defeat of 'effort reporting'. But even some admirers say Lang may be too strongminded for his own good. His 'inflexible polemics' are often 'counterproductive', says one.

I drove to Yale to talk to Lang in his Yale office and over lunch. At first I found him rigid to the extent of seeming uncooperative in rejecting misleading formulations of his activities. After all, that journalistic trick is standard for eliciting an interviewee's vision in his own words. But I also saw that exactness was not an unreasonable request. For Lang's core issue may be that in the politics of being collegial, maintaining face and avoiding conflict, standards do unravel. In professional discussion, Lang insists on precision before agreement, not vice-versa.

And when Lang stepped out of his public role as the fire breathing watchdog of intellectual standards, he was cheerful and friendly. I left his office with my arms full of unique and fascinating insider documentation of scientific politics. - Anthony Liversidge (April 26, 1993).

AL: This interview is not the kind of exchange you usually do, is it?

Lang: No, I usually provide documentation. I have accepted because I want to draw some readers' attention to the existence of my documentation. but I don't want to shift the emphasis from the documentation to talking about it. The danger of such a shift in emphasis is ever present, and I warn readers strongly against it. Talking about my Files

and Filmmaking is not a substitute for the documentation itself.

AL: Can you tell us about your math career?

Lang: I never had one! As a mathematician you prove big time theorems, or pretty good theorems, at a relatively early age, and you become a full professor, and that's it! That's how we think. We just keep on doing mathematics. You get to be a professor by the time you are 30 or 32, and there's no higher position. Some people want to make it on committees and academies and all that sort of stuff. but the math community is set up so we mostly admire those that go on producing theorems. I think that's pretty healthy.

AL: So what do you want to teach people outside mathematics?

Lang: One thing I want to teach people is that if they are asked a question, the first thing they have to decide is whether to accept the terms of the question, or whether to challenge them. I also want to explain how I regard certain works as defective, and that I reject three items – excessive generality, attribution of motivation and speculation – in trying to correct the defects.

AL: What is the general problem you are addressing?

Lang: One basic problem that is common to practically all the issues that I have got involved in is the problem of processing information, and disseminating information accurately. What I have found is an overall failure in the establishment media and also within the universities.

I emphasize this point explicitly at the end of my book on the Huntington case, where I list sources of misinformation, ways misinformation is spread, through the academic world, through the media and through the government, ways misinformation is accepted, ways critical thinking is inhibited, and then the decisions we have to make on how we can make corrections, and how the corrections are obstructed.

AL: How are your corrections received?

Lang: What is remarkable is the way people react in the face of this operation. In each case in which I have been involved, there has been some question raised in some

fashion about the legitimacy of my questioning and of the corrective action I was trying to induce.

But I was not interested merely in a theoretical discussion, as some people like to phrase it. I was interested in corrective action. To get corrective action one needs correct information to be passed on to people.

AL: What led you to intervene in the case of Robert Gallo, for example?

Lang: The [National] Academy [of Sciences] last year nominated a panel to oversee the NIH review of Gallo's research practices, following the allegations by John Crewdson in the *Chicago Tribune*. The higher-ups at NIH, especially NIH director Bernadine Healy, were covering up for Gallo. I had a big mailing documenting that cover up.

I wrote to the council of the National Academy of Sciences that they should investigate the merits of Gallo's election to membership, since some people take this seriously as certifying scientific achievement and credibility. They refused to take action.

I also objected to the way in which the scientists on the panel were treated by the NIH.

On the other hand, they themselves used certain techniques of obfuscation instead of clarification when asked about their activities. They refused to give precise information publicly, they signed a "confidentiality agreement", they made ambiguous statements to the press, they left out certain points documented by Crewdson, they defined the responsibilities ambiguously, and so on.

AL: Can you suggest a model of how scientists should behave politically?

Lang: I would pick [the physicist] Richard Feynman. When he was asked to be a member of the commission investigating the Challenger disaster, he gave us a model of scientific responsibility.

He resisted attempts by [commission chairman William] Rogers to inhibit his investigation. He interviewed engineers and others at Morton Thiokol. He explained the scientific facts to the public. He bought pliers and screwdrivers and a

clamp in a hardware store and showed publicly in front of the video cameras how rubber O rings lose their elasticity at low temperatures. He resisted being railroaded into modifying his report. He insisted it was published intact and he took full responsibility for it. He wrote about all this in his book, *What Do You Care What Other People Think?*

Unfortunately over the last few years I haven't found many instances of the Feynman model in the politics and policing of science. But I have found plenty of instances of another model, which consists of evasion, fudging, and obstruction of information, if not outright disinformation.

My question is how long the scientific community is going to tolerate such deterioration of scientific standards.

AL: What do you hope to do with your interventions?

Lang: To give accurate information to people, and teach them how to process information and teach them the different ways of formulating issues, some of which I regard as defective. Some of these are illustrated in my critique of the Lipset Survey of the American Professorate.

For instance, in one question in the survey they ask: «Do you strongly agree, agree with reservations, disagree with reservations, or strongly disagree, with this statement: "Economic growth, not redistribution, should be the primary objective of American economic policy?"»

I reject the way the question is formulated.

AL: Why is that?

Lang: First, the question is formulated with an alternative which smacks of left wing-right wing rhetoric. I don't see the alternative as being between growth and redistribution. Second, I don't see either as being a primary objective of American economic policy. I don't see any single objective as being the primary one. There are many simultaneous ones.

One has to do with dwindling resources - minerals, forests, oil - and how we adjust to that by changing the tax laws, by changing how we consume, by taxing gasoline or energy, or by directing the production of automobiles through tax laws, whether we build highways which enhance the

automobile at the expense of trains and public transportation, and so on.

That issue, how to deal with diminishing resources, is not a question of economic growth or redistribution. But I certainly view it as a major objective of American economic policy.

AL: You mean the question is poorly worded?

Lang: The question is defective in the precise way I describe. I'll give you another example. «Do you strongly approve, approve with reservations, disapprove with reservations, strongly disapprove a) the use of marijuana b) swinging [the swapping of sexual partners among married couples]». (There you have a bit of cheesecake for your magazine!) «c) pornographic motionpictures and magazine. d) premarital sex e) the use of such drugs as heroin and cocaine f) extramarital sexual relations in the absence of the spouse's consent. g) the level of violence prevailing in current tv programming».

Whether someone has extra marital relations is none of my business. It's between spouses and whoever else is concerned. Who am I to interfere with their lives? What of it if a lot of people want to watch pornographic pictures? My choice of answer for such items is that it's none of your business! But that alternative was not proposed.

AL: Why was it important to point out the defects of the questionnaire?

Lang: Lipset is an influential member of the National Academy of Sciences. He is a famous professor who was at Stanford and who now has a name professorship at George Mason university. The survey was financed by the National Science Foundation, the Carnegie Foundation and the Spencer Foundation. It went to 9000 professors, and it was being published in the *Chronicle of Higher Education*, and discussed in *Time* and *Newsweek* and the *Manchester Guardian* and the campus report of Stanford university.

The authors of the survey stated that "The primary reason for this faculty survey is to collect information useful to the formation of sound education policy". I didn't see what my attitudes toward pornographic motion pictures and extramarital sex have to do with sound education policy.

What I have noticed in the production of Lipset and others, not only in these works but previous works, is major incompetence in formulating social issues and political issues, and giving information about them - professional incompetence as a person involved with teaching and dealing with social matters.

It's not my professional responsibility to make up a survey. He's the one who calls himself a political scientist. I see my responsibility as educational towards students, and towards the public at large, in perhaps teaching them different standards which they then may choose to adopt or not adopt. And in that I see myself as quite effective. I think I taught a lot of people something about how to recognize a defective way of presenting issues. That is an educational function.

AL: This was a success for you, then?

Lang: In a limited sense, because the whole problem has also to do with what is done and will be done in the classroom by the academics who "pretested" that questionnaire and didn't perceive its flaws. The whole establishment around Lipset.

So it was successful only in a very limited sense. I am never exclusively after the immediate objective. The fact that the *Chronicle of Higher Education* stopped publishing articles by Lipset on the survey is a sign of success but a limited sign. Because what I want to affect at the least, in addition, is how things occur in the classroom, what books are used and how they are used, how questions are formulated in the media, in the classroom, and in the government.

AL: How do you aim to intervene in issues?

Lang: When I intervene I ask opponents to put certain things on the record. Then I can document contradictions. At one point they have created one type of reality, and at another they have created another type. These contradict each other. I show them the contradiction and at that point they begin stonewalling or accusing me of McCarthyism.

AL: They are never motivated to cooperate?

Lang: I can't say. I won't use that word "motivation". I register a fact that once I point out and try to establish a written record, and make them come out in the written record, which points to certain contradictions, then I meet with either stonewalling, or insults, like calling it "McCarthyism". Or people talking behind my back saying I am "crazy". That is the type of response.

AL: So what reason do you imagine they have to stonewall?

Lang: I don't want to go into the pop psychology of reasons. My mind does not run that way. I register a fact. It is for them to give the reasons.

If you forced them to give reasons, on the basis of my past experience my prediction is that you will pick up contradictions quickly enough. When they realise what is being done to them they will start stonewalling. That is part of the dynamics of the exchange in Filemaking.

AL: Is there a philosophical basis for your method?

Lang: I thought of this way of operating and thinking when I was a graduate student of philosophy in 1947.

I was technically trained in French schools until the age of thirteen in writing and in organizing thought, and I read a lot of philosophy and literature. As a graduate student in philosophy I studied the development of Western thought at a professional level, and arrived at a mode of operation for myself to use in journalistic, political, and academic intellectual discourse.

I first tried it in public confrontation and political engagement in the Sixties, and I have used it since against whoever comes up. It is a very powerful tool - philosophy put into practice in daily life.

So I claim I belong in philosophy's history books. There is a certain thread in the history of philosophy from Socrates to Hume, to Bertrand Russell, to the physicists of relativity and quantum mechanics, to the Vienna circle, to Lang, that says that before you can agree or disagree with a statement, you have to determine what the statement means.

In Huntington's and Lipset's work they claim meaning in the scientific sense, in the verifiable sense. They claim factuality. But they give no evidence they can tell the

difference between a fact, a perception of a fact, an opinion, and a hole in the ground. That's where I catch them.

Obviously this philosophical claim will sound rather pretentious before people see the filing cabinets of documentation about how it is put in practice.

And I don't want to shift the focus from the defects of the works I criticize to something else, where no one is correct or incorrect. That is, to states of mind. I have had it with states of mind. I am trying to avoid discussion which deals only with states of minds.

AL: Would you say that many of today's periodicals only project states of mind?

Lang: It is difficult to get anything but pieces of states of mind published in this country. Many periodicals give precious little information, if any at all. A state of mind is neither true nor false, correct nor incorrect. What I want is to teach people how to process information correctly. Of course I am not saying states of mind are unimportant. If other people want to wallow in states of mind, let them. I don't pretend my personal preferences are universal laws. I and the founding fathers prefer a certain type of society, that is all.

AL: How did you begin taking this kind of action?

Lang: I came out of the woodwork of mathematics in 1966, and until 1969 I was very active, socially and politically in the broad sense.

The Sixties considered very many issues simultaneously, not only the Vietnam war. There were issues of liberation of women, of blacks, of other minorities, and of ecology. There were issues of journalism, such as to what extent you let people speak with their own voice, what goes into the regular media, and does one have to have new media to have what you want to say printed because you can't get it seen in the establishment media?

There were issues of personal relationships, and issues of to what extent the universities were subjected to political pressures, the student protest movement, and so on. All of that was brought to the fore in the Sixties.

So in the Sixties there were all these kinds of issues and to the extent they affected the universities I was involved in trying to get accurate information spread, rather than disinformation. One issue arose in questioning the involvement of universities with secret agencies like the CIA. To the extent the universities have a privileged position in society for seeking the truth, then they should stay away from getting involved in secret arrangements.

AL: But then you withdrew for a time?

Lang: My involvement in a lot of questions was seriously interfering with my mathematical production and I went back into the mathematical woodwork in 1970. I stayed there till 1977 when I got the survey called the 1977 *Survey of the American Professorate* in the mail.

Even then nothing would have happened if they hadn't answered a letter I fired off telling them to lay off. But Lipset answered, and prodded by some friends of mine and the fact that Lipset was mixed up in certain important scientific and social organizations and agencies, my involvement escalated until I became fully involved in discrediting the survey, which was to be used for policy decisions for the country, for the universities, for education.

The high point was when I published an article in the *New York Review Of Books*, discrediting that survey. The manner in which the questions were asked prejudiced the issue to the point where I didn't want to deal with the issues on the terms proposed by that survey. And it went beyond the questioning of surveys.

AL: How so?

Lang: It had to do with the general reaction: if I am presented with a question, do I accept the terms of the question or do I reject the question? I applied it to Lipset since Lipset was involved with the Carnegie and other important foundations, and the National Academy of Sciences, and could get the results of his so-called survey printed in *The Chronicle of Higher Education*, where he had thirteen articles. It was of considerable national importance.

So I escalated the fight to discredit that particular concrete case of disinformation. My involvement has been continuous

since then, one way or the other, especially on issues which concern the universities and science.

AL: What provoked your File on the Baltimore affair?

Lang: It was a concrete instance of questions of scientific responsibility I wanted to raise. I saw the scientific establishment illegitimately attack [Congressman John] Dingell, and back up some scientists who refused to answer questions about their work. One doesn't need technical competence in a particular field, such as biology, to evaluate the ways in which questions were raised about experiments, or how they answered. There were extraordinary forces and pressures at work, including the courage, stamina and clearheadedness of Margot O'Toole. But the case provided one concrete illustration of larger problems of responsibility. In the case of challenges, sometimes those in power leave no choice but to submit to authority or escalate the challenge. Usually the process stops early because those raising the challenge lack resources to continue.

On the basis of the Baltimore case and other cases I conclude that to uphold the traditional standards of science, scientists cannot rely on authority, on panels, on big time certifications such as Nobel prizes or membership in the National Academy of Sciences. They cannot count on the press or on congressional committees to police the scientific community. They need to rely on individual responsibility.

Scientists need to create an atmosphere without fear of retaliation, where young and established scientists can exercise this responsibility without fear for their careers, or their funding, or their publications.

AL: Perhaps the publication of part of your Baltimore File will help this come about?

Lang: I can never tell what effect something will have. Maybe I have made some people change their minds on certain issues by giving them proper facts and documentation. I cannot tell. Some effects are only visible decades later. It's very long range.

Sometimes I have to sacrifice having an immediate effect for having a more profound effect in the long term. I am never sure of getting it. So rather than adapting a piece for

an immediate effect I adapt it ad hoc for a possible long term effect. I have to make a judgement on every piece I write.

AL: Your most famous intervention is the Huntington affair. Did you win your point completely?

Lang: That is going too far. He is not in the Academy. I expect that he is not about to be in it, and a lot of people's consciousness has been raised.

But there is no such thing as winning completely in this game. Huntington served only as a focus for a wider attack on the deficiencies of a large part of the social sciences establishment, and of the certification system in the US via, for instance, the National Academy of Sciences.

So there is no such thing as winning completely. No such thing.

AL: What did you object to in Huntington's works?

Lang: Huntington has fantastic credentials. He was director of the Center for International Affairs at Harvard at the time. He has consulted for the National Security Council, the Defense Department and the CIA. He has been on national commissions.

But when I looked at some of his work - specifically his book, *Political Order In Changing Societies* - I found it deficient from beginning to end. The book purports to deal with changing societies throughout the world and these societies are exceedingly different. You have some Western societies like France and Belgium, places like South Africa and North African countries, and others throughout the world. and he purports to describe whether a country is satisfied or not. And one of the studies he was quoting in that book classified South Africa as a satisfied society.

Now a Yale undergraduate and I raised questions about that. Instead of answering those questions in a scholarly fashion, Huntington and the establishment around him either didn't answer, or when they finally answered, they answered through the *New Republic*. They had a graduate student at Harvard who was not identified in the *New Republic* as such, write an article claiming that I didn't know

what I was talking about and claiming that I hadn't read Huntington's work and couldn't evaluate it.

Instead of answering the question about South Africa as a "satisfied society" in a scholarly way, Huntington was quoted by Fareed Zakaria in the *New Republic* as follows: «The term "satisfied" has to do with whether or not there are measurable signs that people are satisfied or not with their lot. That lot may be good, fair or awful; what this particular term is describing is the fact that the people for some reason are not protesting it. When this study [...] was made in the early sixties, there had been no major riots, strikes or disturbances in [South Africa]».

But that is completely false! Throughout the decade of the Fifties there had been riots, protests, strikes and police firing on crowds reported systematically in the *New York Times*. Someone made a search for me, and found fifty pages worth of articles about protests throughout that decade, culminating with the Sharpeville massacre of March 1960, where fifty people were killed. It was headline material in newspapers throughout the world for a week.

So Huntington is professionally incompetent in not knowing the history of South Africa, and the *New Republic* is editorially incompetent also in not knowing that history and printing what that graduate student at Harvard passed off as a fact and in misinforming their readers. That is a very concrete and very good example of misinformation.

Not only does Huntington not know the history of South Africa, but he also misrepresents on what basis South Africa was classified as a "satisfied society" in the study he mentions in the book. But it's even worse than that. In the study quoted by Huntington, the authors set up a way of evaluating countries on the other side of the world by making up a "Frustration index", which they said was a country's combined coded score on the six satisfaction indices: GNP, caloric intake, telephones, physicians, newspapers and radios. This was «divided by either the country's coded literacy or coded urbanization score, whichever was higher».

This study received a prize from the America Association for the Advancement of Science. So the AAAS is also implicated in the certification of the "frustration index" as science.

So Huntington is ignorant of the "measurable signs" used in his own book (GNP, caloric intake, etc.). These signs are merely political choices, reflecting his outlook on the world, or that of the authors of the original study, but passed off as science.

Academics in Huntington's establishment use this type of approach in consulting for the government. They put it in textbooks and teach it in schools.

But the whole approach is cockeyed. It's insane! There is no way you can find out about the rest of the world if you take that approach! To try to determine in some country whether the people in that country are satisfied on the basis of GNP, caloric intake, telephones, physicians, newspapers and radios!

Because if you do that you won't find out how countries and regions as diverse as Belgium, South Africa, South America, Middle East or Vietnam react and what issues are important to them. And it will grossly misinform undergraduates who read that book as a text as to how to study people and determine what is important to them.

To find out about the different ways of thinking and reacting in South Africa, and the Middle East, in Vietnam, in the US, in France, in Belgium, one must take into account the conditions and ways of thinking specific to each society. And if you formulate your question in universal terms like caloric intake, newspapers and radios, you are not going to find out what is going on in Vietnam, or even France or Belgium.

The problems in South Africa with apartheid are completely different from the problems in the Middle East with oil and the Israelis and the Muslims. They are different from the problems of the French and the Flemish in Belgium. When these political scientists called South Africa a satisfied society, did they ask the blacks if they were satisfied?

These political scientists didn't find out the essential political feature that causes problems in South Africa, namely apartheid. That's it. Anybody who reads a newspaper can figure it out. Huntington's approach was cockeyed and

promoted disinformation. It brought undergraduates to think in a certain way, people who are later going to be influential in education, journalism and politics, and who will make policy decisions about the world.

That's why I regard it as serious and important to stop the spread of that disinformation.

AL: So it did not hinge, as some suggested, on doubts that political science is truly a science?

Lang: I don't know what the word "is" means! It depends how you wish to use the word "science". I don't want to get into that particular argument. The extent of the issue I wish to get into and have gotten into is this: are those who claim to be political scientists providing accurate information concerning political structures and situations or are they passing off political opinions as science?

AL: Have you ever won the cooperation of a victim?

Lang: It is relatively rare! Gerald Feldman, a professor of history at Berkeley became a friend. I got to know him because he and another professor at Yale got into a well publicized controversy with other historians, especially Jon Wiener who wrote things up in a very tendentious way for the *Nation*.

After I got acquainted with the documentation, I fully supported Feldman in this case, and got myself into a confrontation with the *Nation* and its editor Victor Navasky about their defective journalism. So there is a "*Nation-Wiener*" File which I have passed around.

Then I found out that Feldman himself in the Sixties signed a public letter with a number of other professors against the Vietnam Day Committee in Berkeley. I picked that letter apart for its misquotations and misrepresentations and for the way he handled political responsibilities. I made a File, and he agreed to be a Filee, he cooperated with his own File, and he had to issue a retraction and an apology for something he did 25 years ago. I asked for a retraction and an apology and I got it because Feldman is honest and fairly lucid.

One can make friends with a guy like that. And I did!

AL: Maybe he should have kept quiet and not replied to you, since you say that results in no further correspondence!

Lang: It was his choice. Either he issues the retraction and apology, and stays friends with me, or he doesn't, and then he is just another guy I make a File on. Well, as it turned out, he was another guy I made a File on, but he cooperated with the File, so we stayed great friends! Isn't that something?!!

AL: So a Filee is not necessarily an adversary or an enemy?

Lang: No, and Feldman is there to prove it. A very nice case. [President of Yale A. Bartlett] Giamatti is one too, from just before he became president. Sure.

I had a File on an article he wrote in the *Yale Alumni Magazine* which was totally defective – misrepresentations, misquotations, defamation, slander. I had a big confrontation with him, but he saw he had goofed, and although he never admitted it in writing, he did verbally, and we stayed fabulous friends forever after.

He was smart enough never to write. He didn't try it. The guy who answered and got caught in the meat grinder was the editor of the *Yale Alumni Magazine* called William Zinsser. So it is called the "Zinsser File" and not the "Giamatti File".

If he had not written anything, there would be no File. You see, the only safe thing is just don't write, don't talk, don't send letters, just disappear – that's relatively safe! Nothing is completely safe! But it is the safest. The moment they write they get caught!

AL: So it seems!

Lang: The whole idea is that you can apply systematically in daily life in political, intellectual and journalistic confrontations a well thought-out manner of discourse, rooted in the history of philosophy and literature.

AL: Do people's reactions vary a great deal?

Lang: One of the most interesting things is the psychology of these people. I can never comment explicitly on their personality but like any theatre – Shakespeare or Shaw or

anybody – personality comes out in the scenario, and how they express themselves.

I can never myself comment on that aspect. It has to come out from them. It's drama. It's theatre! They are on the stage. I provide a stage and they act out themselves!

AL: Are you the director?

Lang: I am both producer and director and one of the principal actors. On the other hand I cannot write their script. I can only provide the stage for them. Their script they write themselves. But then I hold them accountable for what they have done. But it's in a professional capacity. I couldn't do it in a personal relationship. I wouldn't do it. It's off limits. But Feldman joined in a public letter, so I could hold him accountable publicly for what he did. We remained friends but I lost none of the sharpness in criticizing him publicly.

AL: Isn't that the way academia is meant to work?

Lang: Well it's certainly the way I would like academia to work. It's the official rhetoric. But I have found that in practice it does not work that way. To have an exchange as I had with Feldman is practically impossible in academia. Exceedingly rare.

What I have found is just stonewalling, coverups, evasions. Whereas with Feldman it worked to have it all out with his cooperation. It's very nice when it works out like that.

AL: How did you get involved with Peter Duesberg, the member of the National Academy who argues that the HIV is not the cause of AIDS?

Lang: Somebody showed him a mailing of a File I had on Robert Gallo, the US scientist who first made the claim that HIV is the cause of AIDS. Then he sent me half an inch of stuff, and his carelessness was sufficiently low and the defectiveness of the people opposing him was sufficiently high that I decided it was worth helping him to prepare his case in the most efficient way.

AL: He was careless?

Lang: Oh, sure. Carelessness or incompetence in the use of language where he overdoes generalities and absolute statements. Once I point it out, he says you are right and

corrects it. But his opponents were so fundamentally defective in what they wrote it really got to me.

The problem of HIV and AIDS is a complicated one, too complicated for me to comment any further here, except for one brief statement. I have seen misinformation about HIV and AIDS passed out by official agencies, such as the Centers for Disease Control, the National Institutes of Health, certain scientists involved in studying HIV, and the scientific press.

Because of that misinformation, I question as a whole notions which are generally accepted concerning HIV as "the AIDS virus". As far as I am concerned, I have seen no evidence which I find convincing as to what causes AIDS. Even the definition of AIDS has been mismanaged by official organizations, some scientists, and the press, scientific and otherwise, to the point where I see a morass and a mess which is in itself very difficult to disentangle. To document how I arrived at this conclusion cannot be done here.

AL: Do you enjoy proving others wrong?

Lang: Not at all. I may enjoy doing something that enhances discourse. If it happens to prove someone wrong that is incidental. In asking me whether I enjoy proving someone wrong, you question my motivation. I object.

AL: Your approach seems to tackle and block many ways people avoid the point.

Lang: Certainly it is an essential aspect of what I do. I don't know how successful I am, because the approach causes opponents to disengage and stonewall. But with my approach, they cannot simply shift the focus of the issue from the factual defectiveness of their work to the question of motivation, which cannot be settled by simply saying someone is correct or incorrect.

On the subject of motivations you can go on and on and on with what I call big time bullshitting, and that is what I eliminate from the discourse. That is not to say motivation is not important. It is important to many people at many times. But I do not want to deal with it in discussing the merits of a piece written in the line of professional and institutional responsibility.

I try to maintain certain standards in the manner of discourse. I try to prevent shifting the focus of a discussion from the merits of a piece at hand to motivation. Just as I try to avoid generalizations, and speculation.

AL: You avoid the diversionary traps that other people fall into?

Lang: I don't call them traps. I say some people fall into manners of discourse with which I don't wish to deal. I wish to deal with the actual merits of the piece at hand. If I use your word "traps" I have already gone along with something I wish to eliminate. I resist such formulations. I want to use language much more precisely.

AL: Your approach seems to work pretty well.

Lang: The approach is foolproof. After 25 years of academic, intellectual, journalistic, and political confrontations I have never seen my way fail. People have simply not been able to answer.

AL: You go after only certain targets?

Lang: My opponents are those who have chosen to take on institutional and professional responsibilities. It is Huntington who chose to advise the government and become that kind of professor, and who throws his weight around. His books are used in the classroom. Editors of influential journals have institutional and professional responsibilities and I hold them accountable.

AL: Is it right to say that you are fighting the flow of misinformation from the academic world into government and the media?

Lang: Wherever it comes from. Misinformation can come from many places such as radio stations, newspapers, television. Since I myself am in the academic world I am especially interested in the area where the academic world meets the world of journalism and world of politics in the broad sense, where it concerns the nature of social organization, our relationship to authority and how you structure social organizations and the educational system. Politics in the broad sense.

AL: Do you see much misinformation these days?

Lang: All over the place, starting with the *New York Times*, but also in the *Nation*, and the *New Republic*, and the *Washington Post*, and the television stations, and courses in the universities.

There is enough to go around. Most places I look I find a defective flow of information. There is suppression of information, and the tendentious organization of information.

It's got nothing to do with left wing, right wing or any wing - nothing to do with ideologies. It just happens. The *New York Times* is not particularly left or right, but it is full of misinformation. So is the *Nation*, the *New Republic*, and the *Washington Post*.

On certain scientific issues, the scientific magazines haven't done very well either, whether *Science* or *Nature*. And the *Scientist* - you can throw that in too. I obviously can't reproduce here the documentation for my low opinion of these publications, but I have drawers full.

AL: On what basis do you feel so strongly about fighting misinformation?

Lang: It is not for me to tell other people what they ought to do, but if they peddle disinformation I hold them accountable for it if they hold positions of authority or influence. Huntington is both an eminent professor at Harvard and a consultant for the government. As a person of authority in the classroom I hold him accountable for the information or disinformation he puts out there. He took on the responsibility by being a professor with tenure, and in advising the government to take certain policy decisions. I hold him accountable for the information or disinformation he gives to the government, just as I hold the government accountable for evaluating that information.

The president of the United States is accountable. If he screws up, we don't re-elect him, that's all. And I don't see why we shouldn't hold professors accountable for whatever they are pushing in the classroom, protected by tenure. They are accountable for the information or disinformation they peddle in the classroom. I hold them accountable. I point out the misinformation and then I leave it open for the community to decide what they want to tolerate.

As a matter of fact at Yale they stopped putting Huntington's book on the required reading list in political science 111b within two years after I raised my objections. But it is still used elsewhere. Mind you, I am not for burning Huntington's book. It might very well be used as an example of what not to do in political science. But from what I have seen, it is used uncritically. It is for the academic world to decide what to do by open public discussion and if possible publication.

In the Huntington case I was prevented from publishing pieces I offered both to scholarly journals and to the national press. *Discover* magazine, and the journals of the American Political Science Association, and the American Sociological Association, published articles which misrepresented my criticisms, but they did not accept for publication corrective pieces I offered in response.

At least three other people wrote letters to the editors of *Discover* supporting my point of view and their letters were not published either. I know, because the authors sent me copies directly.

AL: But wasn't your piece in a very different style from the *Discover* magazine style?

Lang: You are suggesting that as an excuse. I don't know. The editors didn't give any reason. They just rejected it out of hand. It's not for me to guess at the reasons. I would regard that as improper. I note the fact I was misrepresented in the magazine and not allowed to publish a rebuttal. That's the fact that I regard as important.

In any case, I don't regard the reason you suggest to be valid. Their "style" as you call it was tendentious and defamatory. So of course I would write differently.

AL: Is it true to say that your method is to stick to the facts and avoid being political or personal?

Lang: I am highly political in the sense that politics have to do with social organization, relationship to authority, and how information is distributed and used in making policy decisions. Mostly I am interested in the educational side of politics and how people formulate and evaluate issues having to do with society. Certainly it's political. But I don't use the word political as a rhetorical thrust.

AL: What about your own motives. Will you say what they are?

Lang: It isn't for me to explain my activity in trying to maintain standards of accuracy in the academic or journalistic world, following the standard rhetoric of universities. It is for others to explain why they do not maintain these standards. The rhetoric of the universities is dished out continuously by their presidents making speeches to alumni, to students, or at other universities. That rhetoric is standard. Get those presidents or the National Academy of Sciences to explain the discrepancy between uttering the big time rhetoric of truth and standards and then allowing around them transgressions of that rhetoric without doing anything about it. Ask them. Don't ask me.

AL: While you obviously feel very strongly about misinformation, it seems that many people don't.

Lang: Then I point out the consequences. Students are trained in misinformation which they don't recognize as such. It leads them later to make decisions in journalism and in politics and lead the country astray in dealing with its own problems and problems on the other side of the world.

I point out those consequences and that's it. If you want to live with those consequences, OK, that's the nature of a social organization. Different people have different opinions as to what is important. But the official rhetoric is that we are supposed to make policy decisions based on correct information.

AL: You are simply asking people to live up to their rhetoric, are you?

Lang: I would not formulate it that way. I hold people accountable for the rhetoric they utter because they have put themselves in a position of influence or power professionally and institutionally. I hold professors accountable for the way they condition students to think. A journalist has some influence in controlling what gets into a magazine, and I hold the journalist accountable for what information goes into the magazine. Politicians I hold responsible for the decisions they make in the professional positions they put themselves in.

AL: But even in high positions aren't people always limited in their power to do things as they wish?

Lang: I don't hold anyone accountable for what they don't have any power or influence to affect.

AL: If university presidents fail to live up to their own rhetoric, will you always challenge them?

Lang: Not always. It depends on how important the particular instance is, what else I have on hand, how many math papers I am writing. I can't predict in advance when or how much I get involved. I do not deal in hypotheticals.

I do not deal with principles. I am not a man of principles because for every principle there is a counter-principle, so if you talk "principles" you have to choose which principles you want to follow at different times with different people under different circumstances. That is a definite individual choice which you make at any given moment in your life. So I don't talk "principles".

AL: It seems that you choose not to include people's motivations in your operation, and this clears personal politics out of the way so you actually get something done. Most people don't manage this because they get entangled almost immediately by diversionary tactics, defending themselves against smears and so on.

Is that right? You are able to push those red herrings aside and expose the actual problem?

Lang: Now, don't spoil what you have just said by saying "the actual problem". Stop just before that, and I will remain silent.

AL: What did you say to those who charged you with "McCarthyism"?

Lang: I don't know what the word means. Different people perceive me in different ways. Some have perceived me as having "McCarthyite tendencies", some have not. When (economist) Kenneth Arrow accused me of this, he specified he was writing as a member of the National Academy of Sciences, and as a sponsor of the Federation of American Scientists. So the NAS and FAS, and people at large, are entitled to know about his judgement in those capacities. It is for each person to make up their mind on the basis of the

documentation I provide for them. It isn't for me to decide what I am.

AL: But how do you perceive yourself?

Lang: I pass out documentation. That documentation has not been faulted.

AL: You prefer not to defend yourself against such an accusation?

Lang: Why should I put myself in an inferior position by arguing about such a word? I present people with documentation. Let them make up their own mind if my documentation is valid and what is its relative importance. Different people react differently at different times about different issues.

AL: Does your anti-misinformation campaign cost you money personally?

Lang: A substantial amount. Sure. It takes capitalism to run the revolution!

AL: And no one helps you do it. It is a one man operation?

Lang: Yes. It is. I have control.

AL: Do people support you?

Lang: In Huntington's case I got explicit support in letters from some seventy members of the National Academy of Sciences. I have other letters, from within Yale and without. Here is one from a Yale biochemist asking the director of the Whitney Center for the Humanities to give me a forum there to talk about the Huntington case. The director refused. I bet the scientist ten cents to a dollar that he would refuse, and I won the ten cents. I felt like an inside trader at that!

AL: Do you get many letters of support?

Lang: What does "many" mean? Anyhow, I don't want to overuse endorsements from others. The documentation I provide and what I write is valid on its own merits, and not because someone else said so. I never want to interfere with that characteristic of the documentation I provide. I don't want to pretend that someone should listen to me because someone else said they should. I don't want to rely on another authority. I am exceedingly wary of using other people's endorsements.

AL: Do the Yale undergraduates support you?

Lang: No, not really. Very few do. The undergraduates mostly became a bunch of dodos in the eighties. They don't relate to an intellectual issue.

AL: You mean they are no longer idealistic?

Lang: I am not looking for idealism. I am looking for an ability to process information, and an ability to tell the difference between a fact, an opinion and a hole in the ground, and to occasionally come into the open with a sensible factual statement.

Instead of that, they wallow in publications that reflect only states of mind. It is part of their culture. Look out there anywhere. That is practically all there ever is. And the scientific press is getting tainted with that also, because of course it is easier to let out with a state of mind. You don't have to make factual assertions, to check facts, to do legwork. The net result is a collapse of intellectual standards.

AL: Do any students listen to you?

Lang: In a decade I have found half a dozen. I made it big with the undergraduates in the Sixties because we were alike in many ways. Then there was an intellectual reaction. It was tolerable in the Seventies. They turned against me in the Eighties. They didn't want to deal with me. I found four in the decade. Otherwise they avoided me like the plague. At least they don't fight me now! In the early Eighties they were fighting me. It was very disturbing. My natural constituency!

The faculty is not going to be that constituency. Mostly they just want to be left alone to do their research. They want to be collegial with the colleagues that they have to live with for the rest of their lives. So the natural constituency for me is the undergraduates and that left me essentially with nobody in the Eighties.

AL: Your long Files are persuasive because they show people the complete picture. But is it not hard to get people to read them? They are so big.

Lang: I have written short pieces to correct misrepresentations of my position in publications like

Discover and the *Chronicle of Higher Education*, and they have been rejected. I had to publish one of them as an advertisement in the *Chronicle*. I am not normally trying to publish the full Files. Everybody knows everyone is busy. However, the *Journal of Ethics and Behavior* did publish a long excerpt of my File on David Baltimore, which took seventy printed pages. The editor first asked me to cut it down but I wouldn't because that would involve cutting essential documentation on which readers could base their own judgement. His publishers let him publish it all.

But he would not publish another much shorter piece explaining how my article had been obstructed previously. I had been invited by the American Chemical Society to take part in a symposium on whistleblowers. I couldn't go, but the organizer of the symposium solicited and accepted my article for publication in a book containing the proceedings of that symposium. Then the ACS refused to publish the book. The organizer tried to get it published by the American Association for the Advancement of Science, and they also refused.

The editor of *Ethics and Behavior* heard of the situation, and he offered to publish my article. But I also wrote up the circumstances and opinions of the AAAS editors and reviewers who rejected the volume, and my write up was not accepted for publication in *Ethics and Behavior*.

AL: Some say that we are too averse to frank public debate in this country. Do you agree?

Lang: Yes. The United States has developed its own way of coding and marginalizing criticism, where it is regarded as bad form to speak straight in criticism. For that there is plenty of documentation.

There is also a step beyond that. The provost of Yale, for example, in the Huntington case, wrote and asked me outright not to "turn upon our own". But there is substance in a well documented confrontation. I accept it. That's one way to get things cleared up! There is one basic aspect of discourse. To what extent do we speak straight with each other without implying we are personal enemies?

AL: In the end, what is important to you?

Lang: What I regard as important is what's the issue, what's the documentation and how can I affect people's thinking about it.

17. Marco Mamone Capria

Serge Lang's Last File and the Suppression of Dissent in Contemporary Science*

Serge Lang died unexpectedly on September 12, 2005, in his flat at Berkeley, a few days after having sent his last message to his mailing list. He was 78 and had taught at the University of Yale for 33 years, where, having taken his retirement in 2004, he was now professor emeritus. He was still very much active, both in mathematics, and, as the visitors of the Science and Democracy web site know well, also on political, epistemological, and ethical issues.

This is not the right place for giving even an hint of the huge mathematical output – surpassing, it has been said, that of the prolific XVIII century master mathematician, Leonhard Euler – of this world-class scientist, who was among the very few in the last decades to possess a panoramic control of his science, as his many handbooks and specialized monographs are there to show. From complex analysis to elementary geometry, from differential manifolds to abstract algebra, from algebraic geometry to analytical number theory, it is hard to find a single discipline in basic or advanced pure mathematics where Lang has not left his imprint, either by proving new theorems or by systematizing the matter in one of his treatises. And there is hardly one mathematician who had his education during the last thirty years and who has not profited from poring over one or the other of Lang's books.¹

Teaching, research, and bureaucracies

He also published some books of mathematical dialogues with undergraduates, high school students and lay audiences. Lang's pedagogical ability and love of his science at all levels shines through for all to see in these works.

* This essay was presented at the 3rd Science and Democracy conference (Naples, October 20-22, 2005); I have revised it and made several additions for this publication.

¹ An account of Serge Lang's mathematical work and personality, with contributions from many different authors, is contained in [16, 17].

Lang was also very clear as to the importance of teaching, and criticized the emphasis put on research, no matter how irrelevant, in the academic world all . In 1970 he wrote:

In mathematics, even though we don't have the particular problem of "scholasticism", we have another similar one. Under the influx of NSF [National Science Foundation] money for the past 15 years, the total number of PhD's in mathematics in the country has jumped from 300 to 1,000 per year, thus going from a low but stable level to an unstable one, and these PhD's turn out to be too many of the wrong type of mathematicians: for the most part they succeed only in cluttering up the research journals with lousy papers. We have put a financial and sociological premium on research, mainly at the expenses of teaching. This course must be reversed. [...] Our response should be flexible and daring, and we should create an atmosphere which allows young mathematicians to feel that they can make it in the academic world without having to write one mediocre paper every year or two. The enormous rise in the number of PhD's and the shortage of good mathematicians is no more a paradox than the fact that the United States manages to have both inflation and a depression at the same time. It is a problem to adjust the relation between the total number, the type of mathematician that is produced, the needs of the country, and the tastes of the young men concerned by all this. [21, pp. 91-2]

The problem described in this quotation is still with us (in Italy, for instance), and the «daring and flexible» approach advocated by Lang has found very few followers. Indeed, the introduction of so-called citation indices and impact factors in academic regulations during the last decade has encouraged the drift towards giving a greater weight to "research" in promoting a scientist's career. Needless to say, that «the needs of a country» should be taken into account when financing the work of professionals in mathematics or other sciences is something that those same professionals generally fail to appreciate or even hate to consider. However, it should be clear that it is not by enforcing a more "professionalizing" education in the universities that these needs will be fulfilled. As Lang explained:

The so-called "culture" which they [the students of colleges and graduate schools] get in college appears to them irrelevant and obsolescent to a large degree, and the more professional training which they get in graduate schools is not only useless to them if they cannot get a suitable position in accord with this training, but also harmful to them and to society in that it has raised their expectations and makes their ultimate disappointment all the greater. [21, p. 93]

Another common device used by governments to simulate that they want to make the interests of society at large bear upon the universities, and this is by gradually increasing the bureaucratic burden of faculty. Lang was the leader in a national campaign against Circular-21, which asked faculty to fill «effort reporting» forms, divided into a dozen of different «activities», like «Instruction», «Organized Research», «Educational Service Agreements» etc., first in 1966 and then in 1979 [23]. In 1981 his university, Yale, turned down a NSF grant he had received because he had refused to fill and sign the effort reports; as a consequence he lost 2/9th of his academic salary (the same loss was *not* suffered by others who had followed his lead and acted similarly).

Lang's determinate opposition to «bureaucratic encroachment» has to be kept in mind when evaluating his overall positive opinion of some of the committees (like the Dingell Subcommittee, see *infra*) that in the last fifteen years have investigated in the United States reported cases of misconduct in scientific research.

A scientist engagé

As suggested above, a scientific production which could have easily filled several mathematician's lives was not enough for Serge Lang. He also felt more strongly than it was and is common among his colleagues that it was his duty to be active on political and ethical issues.

His «political consciousness» had been awakened during his sabbatical year at the University of California at Berkeley, in 1965-6; he had just published one of his most famous treatises, *Algebra* [18]. Those were the years when Berke-

ley, with 27,000 students, was the epicentre of the student unrest, culminating in the rise of the Free Speech Movement (1964) and the Vietnam Day Committee (1965). Lang's perception that he had to do more than just minding his own mathematical business increased «as the escalation of the Vietnam war and the domestic crises of our cities and of our minority groups were becoming increasingly alarming» [19, p. xi].

He was forty when he published his first non-mathematical book (his 15th book, incidentally!), describing the campaign for Robert Scheer, a candidate in the primary election, 7th Congressional District of California (including Berkeley and most of Oakland). Lang participated in the campaign, going as far as distributing leaflets door to door, though, he remembered, he «was still too preoccupied with academic pursuits» [19, p. xi]. Scheer ultimately lost, though with a surprisingly high percentage (45% of the votes). With his book Lang wanted to leave a testimony of a genuinely grass-roots political campaign, concentrating on real issues (Vietnam, poverty, unemployment, housing, racial discrimination, police brutality etc.) and where its supporters were welcome to take initiatives without having to ask for permission.

In 1971 Lang contributed an article to an edited book [2], based on lectures presented at the University of California at Berkeley in the spring of 1969, entitled *The social responsibility of the scientist*; his article was: "A Mathematician on The DOD [Department of Defense], Government, and Universities" [20] and had to do with the «sad record of involvement [of U. S. universities] with institutions like CIA, IDA (Institute for Defense Analysis), DOD over the past 15 years». He abandoned his chair at the Columbia university to protest against the way its administration was dealing with the anti-war movement. He never "repented" of his political engagement (in the wide sense of the word), and in fact he went on as a critic of the political and academic establishment during all his life.

To those who found his activism surprising or strange, Lang replied thirty years later:

As to my activism, some people have asked what it has to do with mathematics, which is my main activity in life. They seem surprised by a mathematician who shows some professional interest outside his narrower scientific commitments. But why should I not be interested in other aspects of intellectual or social activity? Why be puzzled by the disparity between a standard label ("mathematics") and the existence of another activity not closely related to the one usually associated with such a label?

Notice the careful wording: Lang is saying that, after all, there is *not* such a big "disparity" between his educational work as a mathematician and his political activism:

There is something in me that makes me want to make others understand explicitly the assumptions under which they operate. I want to make people think independently and clearly. Is that not part of the educational commitment? [26, p. 8]

But is it not unseemly for a scientist to be "politically motivated"? To this Lang answered:

Of course I am politically motivated! But in what sense? I define "politics" to mean in the broad sense how society is organized, how one deals with social organizations, our relationship to government, how we arrive at decisions affecting the country and the world, the way ideas and information are disseminated in the media, the role of education, the way ideas are taught in schools and universities, how information is processed (by the press, by individuals, by the educational system, by the government etc.). I understand politics in that broad sense, and in that sense I am politically motivated. But my concern for politics does not mean that I support some faction, or some wing over another wing, say the left wing over the right wing; or that I support some "ism" ideology such as socialism, communism, or capitalism. I totally reject such factionalism. [26, p. 5]

Among his peers (if this word makes any sense here) Lang was politically isolate, but less so than his enemies liked to describe him. He came to terms with having his articles systematically rejected, even by student journals of his own university, because even this, if suitably advertised, could further his political purposes. But there is no doubt that all

this, notwithstanding his contagious enthusiasm, put a painful strain on him.

Philosophical background

At university Lang started following a philosophy course and then switched to mathematics, but his initial passion did not abandon him. Lang saw himself as heir to that philosophical tradition which extolled the importance of using words carefully, a tradition going from Socrates to Bertrand Russell and the logical positivists. He regarded as his main specific contribution to have brought this form of intellectual discipline to bear on the everyday practice in academia and journalism. In fact his cultural activism can best be described as an attempt at introducing the standards of factual accuracy and logical transparency into the ordinary scholarly and journalistic exchanges. He emphasized that the framing of alternatives in a public debate is a basic instrument of power. As he explained:

When confronted with a question, the first decision you have to face is whether to accept the question on its terms, or to challenge the terms of the question. The power to impose the terms of a question, that is, to impose the way issues are formulated and alternatives are posed, is a form of control. On the whole, I find that there are very strong forces in our society which induce people to accept uncritically the terms imposed on them by those in power, wherever this power comes from. There are many forms of power, and many contexts, including social, political, academic, financial, and journalistic power. In my experience I also find that the educational system at all levels fails to teach properly how to respond critically to tendentious questions. On the contrary, I have found that the educational system mostly conditions students to accept unquestioningly the dominant patterns of the society around them. [26, p. 225]

The fact that Lang's writings on scientific research, journalism, and ethics properly belong in the philosophical literature has been recognized, at least, by the inclusion of a sizable portion of them in a recent textbook on the history and philosophy of science [32].

The “files”

Another charge he often levelled at his targets in the establishment was their inability to distinguish between a fact and an opinion or a mere state of mind. It is in this perspective that his main polemic tool, the “file”, has to be viewed. As most of the confusion that plagues the public debates arises from (induced or accidental) oblivion or ignorance of documented evidence and arguments, Lang made a point of collecting in an organized fashion the documents playing a direct role in the controversy he had entered, including the *full* correspondence between himself and the various higher-ups he was taking to task, for the members of his cc-list to evaluate at ease.

Whenever some of his official interlocutors answered by phoning him or meeting him (a common establishment technique to obstruct the compilation of a full documented story), Lang subsequently wrote them a letter describing the content of their oral exchange, so that nothing relevant to the issue at hand could be “off the record”, at least as far as he was concerned.

One issue that often surfaced was that of privacy. Several of Lang’s correspondents rebuked him for making public use of their letters, which were meant, they protested, as private communications. That this criticism was disingenuous was apparent both because Lang’s own letters had a cc-list, meaning that they were conceived as part of a public exchange, and because the officials he addressed had no qualms in answering him. normally, on official stationery.

From one of his campaigns, that against the election of the political scientist Samuel Huntington to the National Academy of Sciences, Lang derived what he called «the Huntington test». It consisted in asking people to write their comments on the way Huntington, in a 1987 interview to *The New Republic*, answered those who – like Lang himself – had questioned his classifying South Africa (in the Sixties!) as a «satisfied society». The relevant passage of the interview was (cit. in [26, p. 30]):

Huntington says, “The term ‘satisfied’ has to do with whether or not there are measurable signs that people are

satisfied or not with their lot. That lot may be good, fair, or awful; what this particular term is describing is the fact that the people for some reason are not protesting it. When this study [...] was done in the early 1960s, there had been no major riots, strikes, or disturbances [in South Africa]. France, on the other hand, had just been through a constitutional crisis and an attempted coup d'état".

Clearly anyone, inside or outside the academic world, feeling comfortable with this way of defining a "satisfied society" is in sore need of a crash course in critical thinking.

What is obvious when reading his files is that at the root of Lang's interventions was no personal animosity, but rather an intense desire to clarify issues, pointing out inconsistencies, and setting the record straight on factual questions. What is also clear and, to the newcomer to the chronicle of this kind of interactions, quite surprising is the utter inadequacy of most of the responses he elicited, and which were very often marred by serious intellectual and/or ethical faults, ranging from evasion of the issue and self-indulgence to sheer factual and logical mistakes.

Sometimes one can understand, though it is hard to sympathize with, the uneasiness of several of Lang's interlocutors, who were upset by his insistence on factual truth and consistency – clearly they had never suspected before that their high position in the hierarchic ladder implied a correspondingly high responsibility with respect to official decisions and statements.

In fact among those guilty of grievous intellectual sins we find presidents of Ivy League universities, editors of journals like *Science*, *Nature*, *Lancet*, *New York Times* etc., world famous scientists in all fields of knowledge – it is the *Who's Who* of U. S. science and journalism that comes up tarnished by Lang's circumstantial exposures. In fact Lang warned not to give an excessive weight to the honours bestowed on a scientist:

In any case, I urge people not to interpret membership in the NAS [National Academy of Sciences] as being more than a certification of narrow scientific contributions. Even such a certification is subject to questioning. [26, p. 763]

After having read some of Lang's files, one is immunized forever from the temptation to rely passively on the opinion of famous pundits and scientific and academic authorities. From Lang's files one learns in a most effective fashion that intellectual minority is not only a base condition in itself: it is also very hazardous.

Suppression of dissent by the establishments

Another source of surprise lies in the very content of the stories documented in the files, exemplifying a consistent pattern of stonewalling and censorship against legitimate and rational criticism. In the utterances of the science establishment there exist, side by side, big-time statements concerning the conventional standards of sciences (critical attitude, refusal of the authority principle, consistency) and an everyday practice which runs directly opposite to them. This contrast between «the rhetoric and the reality» reaches often in the documentation provided by Lang's files levels of comical evidence. Lang outlined his rich record of challenges to the establishment in a humorous fashion, but very seriously as to the gist of the question, by stating his «three laws of sociodynamics» [26, p. 797]:

The first law of sociodynamics

(a) The power structure does what they want, when they want; then they try to find reasons to justify it.

(b) If this does not work, they do what they want, when they want, and then they stonewall.

The second law of sociodynamics

An establishment will close ranks behind a member until a point is reached when closing ranks is about to bring down the entire establishment; then the establishment will jettison that member with the least action it deems necessary to preserve the establishment

The third law of sociodynamics

It's like the video games: one can't shoot fast enough.

Lang's files were circulated by him to all directly involved people and to many interested scholars, so that through his mailings to dozens and sometimes hundreds of recipients a competent public was built that witnessed the development

of the confrontation. But Lang made more than this, by publishing with an important international publisher two books containing material from his files: *The File* (1981, on the Ladd-Lipset survey among US university professors) and *Challenges* (1998).

The first of these books runs to over 700 pages of documentation, in a big format. Lang explained his approach as follows [22, p. 3]:

Many books engage in generalities and attempt to convince the reader by mentioning specific examples (if at all) as secondary to more general statements. I proceed in exactly the opposite way. I present you with very concrete cases, with the original documents, and with a confrontation of outlooks in order to make it possible for you to think through the issues on your own. I hope that you will then recognize analogous situations in your own experience, and will apply to these the same rigorous standards of accuracy and completeness which I have tried to uphold here.

This treatment allows the interested reader (and I wonder how any serious student in the sociology of the academic world could fail to be *highly* interested) to get a much deeper acquaintance than by any other channel with the actual proceedings of more or less famous and/or influential editors, intellectuals, journalists, professors, when directly challenged. The mystical aura surrounding references to the “scientific community” in most literature in the history, sociology, and philosophy of science is likely to dissolve forever after a sufficiently full immersion in this material.² And this material would never had been available to lay people in the first place had it not been for the exceptional persistence, stamina, and clear-headedness of the main character and editor. In fact, as Lang correctly perceived:

Making criticisms whose purpose is to provoke corrective action rather than to utter big time generalities creates tension, and people tend to avoid tension in their personal

² For instance, when one reads the exchange between sociologist of science Robert Merton and Lang ([22, pp. 91-3]; cf. [26, p. 201]), one may be forgiven for a bitter smile over Merton's celebrated list of the supposed norms of science, learnt by rote by generations of sociology students (“Communalism, Universalism, Disinterestedness, Organized Skepticism”).

and professional lives. The result is to inhibit corrective action. [26, p. 201]

As to the second book (over 800 pages), if our academic and media culture will some day reverse its apparent present decline, *Challenges* will be hailed as what it is – a masterpiece in the sociology of science. Alas, we are still far from that day. Lang's obituaries in the main newspapers did not even bother to mention it. Even the *Daily News* of his own university, Yale, failed to cite it and gave a confusing account of Lang's political work [12]. Actually, when *Challenges* first appeared, very few reviews in all kinds of journals were published of this landmark work, and *pour cause*: it is the whole power system of journalism, scientific research and academia that is shown through the documents contained in it to be far below its professed standards and badly in need of reform.³ Even in this book, the force of Lang's analysis is that it does not deal in vague generalities, but concentrates on concrete examples, individual failures, specific errors, and provides a vast amount of empirical data enabling the readers to judge for themselves. Personally, I divide workers in the sociology of contemporary science between those who have read it and absorbed its lessons, and all the others; after 15 years from its publication, I must admit that I take a rather dim view of the latter set.⁴

Is scientific research "basically healthy"?

In several cases, and in three main ones – the Robert Gallo, the David Baltimore case, and the AIDS/HIV cases – Lang got deeply involved into issues of scientific wrong-doing by very famous established scientists. He acutely perceived and decried the drift towards legalistic or psychological

³ My review of [26], among the very first to appear, was published in an Italian journal in 1999; an English revised translation is [33]. Gordon Moran's book [34], a valuable contribution to a most important topic in the sociology of science, discusses sympathetically several of Lang's files.

⁴ Let alone the nonempty subset of those who *did* come across Lang's files and books, read them, and then studiously avoided to refer to them in their so-called "scholarly" work.

notions shown in the investigations made by specifically appointed panels and boards on suspected cases of “misconduct” in scientific research; at the same time he saw these panels as the necessary and, ultimately, beneficial outcome of the consistent refusal by the higher-ups of the scientific community to face squarely the evidence of cases of serious misconduct by prominent scientists.

One typical example (similar statements have been made earlier or later by many other scientists who should have known better) was provided by the editor of *Science* in 1987 (cit. in [26, p. 298]):

[...] we must recognize that 99.9999 percent of reports are accurate and truthful, often in rapidly advancing frontiers where data are hard to collect. There is no evidence that the small number of cases that have surfaced require a fundamental change in procedures that have produced so much good science. To continue the great advances that are being made, we must accept that perfect behavior is a desirable but unattainable goal. Vigilance? Yes. Timidity? No.

To fully savour this statement it is useful to contrast it with the very *titles* of two articles appeared a few years later on the open access journal *PLoS Medicine* (May 2005):

– “Medical Journals are an Extension of the Marketing Arm of Pharmaceutical Companies” [37]

by Richard Smith, the former editor of the *British Medical Journal*; he starts by quoting a statement (March 2004) of the editor of the *Lancet*, Richard Horton: «Journals have devolved into information laundering operations for the pharmaceutical industry» [14].⁵ The other article, by a renowned statistician, is entitled:

– “Why Most Published Research Findings Are False” [15], and contains a very plausible argument substantiating this claim. Things have not improved in the meantime, if the US

⁵ Much as I appreciate this highly quotable and factual statement, I cannot abstain from mentioning Horton's objectionable behaviour as editor and debater as shown in the exchanges with Lang, in 1996 [26, pp. 699-713], and the discreditable role he played in the Wakefield affair (see chapter 12 and [40, pp. 101-31]).

Office of Research Integrity (ORI) has received in 2012 «419 allegations of misconduct at institutions [...] nearly double the number in 2011», thus debunking the myth of the “few bad apples”.⁶

But is it not the case that to evaluate scientific research one needs to be an expert in the specific field investigated? As a matter of fact Lang was often criticized during his campaigns, with the argument that he was a mathematician and as such he could not have independent opinions on the behaviour of specialists in other areas, like biology, medicine, sociology, history etc. To this his answer was:

To address questions of scientific responsibility does not necessarily imply that one needs technical competence in a particular field (e. g. biology) to evaluate certain technical matters. The evaluation of scientific responsibilities can legitimately be done without such technical competence. For example, at no point do I take a position as to whether certain experiments validate a theory or not, or whether the theory is valid or not; but I do take a position about the ways scientific responsibilities were exercised in raising questions or answering questions about those experiments. [26, p. 243]

More basically, in order to detect faults in a scientific or scholarly text (apart from very formalized texts, like those in pure mathematics) a perfect mastery of the technical tools needed to *produce* it is often unnecessary, for two main reasons. First, it is usually much easier and less technically demanding to spot an error in a proposed solution to a certain scientific problem, than to solve it correctly.⁷ Moreover, inconsistencies and sophisms may be

⁶ [3]; articles in mainstream magazines such as [39] provide some evidence that the epoch of official, blunt denial of the problem may be on the wane.

⁷ For instance, suppose that someone, impressed by the discovery of the Pythagorean triple (3,4,5), advances the claim that all Pythagorean triples (that is, the triples of positive integers (a,b,c) such that $a^2+b^2=c^2$) are of the form (n, n+1, n+2), where n is any positive integer. I think that most people with a basic mathematical education would be able to refute effortlessly this claim, and even to prove that in fact (3,4,5) is the *only* Pythagorean triple of that form. On the other hand, though elementary, the correct general solution (which «resulted from the work

found by comparing statements which are meant by their authors to be widely accessible (for instance, to funding agencies; colleagues of other specialities; professionals not engaged in research; or the general public) in the introductory or in the concluding sections of technical papers, in popular magazines, in interviews etc., and spotting such inconsistencies is often enough to raise serious doubts about the technical value of the research which they summarize.

“Misconduct” in scientific research and the paradox of established pseudoscience

The above-mentioned drift is clearly illustrated by the official definitions of "misconduct". In 1989 the Federal Register defined [8]:

"Misconduct" or "Misconduct in Science" means fabrication, falsification, plagiarism, or other practices *that seriously deviate from those that are commonly accepted within the scientific community* for proposing, conducting, or reporting research. It does not include honest error or honest differences in interpretations or judgments of data.

In 2004 the Federal Register gave this recent reformulation of what is officially meant by "research misconduct" [9] (*italics mine*):

Research misconduct is defined as fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results. Research misconduct does not include honest errors or differences of opinion. [...] A recommended finding of research misconduct requires that:

- (1) *There be a significant departure from accepted practices of the relevant research community for maintaining the integrity of the research record;*
- (2) *The research misconduct be committed intentionally, knowingly, or in reckless disregard of accepted practices;*

of mathematicians ranging over thirteen centuries» [25, p. 108]) is probably beyond the heuristic and/or deductive powers of most untrained people (for a fascinating "Socratic" reconstruction of the solution, with some historical information, see [25, pp. 95-109]). For a non-mathematical example I refer to chapter 15, end of section 3.

(3) The allegation be proven by a preponderance of evidence.

The second italicized condition leads the investigators of research misconduct to busy themselves with the intentions and other states of mind of people, not with what has been done. As a result, a panel may conclude that a researcher under investigation is not guilty of "misconduct" even though he or she has published seriously defective and misleading work. Clearly this approach is ideally suited to perpetuate the spreading of false data and results in the scientific literature, and to allow scientists to avoid public correction of unsound or just wrong claims.

On the other hand, both italicized conditions, and particularly the second one, are partly sociological; as Lang sarcastically explained, with reference to the former definition, applied by the HHS⁸ Appeals Board to the Gallo case:

According to the Board's logic, if falsification becomes a universal practice among scientists, then it receives the legal approval of government agencies which are supposed to overview the maintenance of scientific standards for government grants and government laboratories. [26, p. 481]

To expand this objection, one can add that the use of the expression "accepted practice" leads to what may be called the *paradox of established pseudoscience*: if a variety of *pseudoscience* happens to be widely accepted within a certain research community, then to practice that pseudoscience, indeed to build one's career on it, is no "misconduct" – and the citizens have no short-term manner to counter this phenomenon other than by direct action. Clearly to define "misconduct" this way verges on the absurdity. No scientific tenet, "commonly accepted" or not, is beyond public discussion and criticism, and no specialists should feel safe in (tacitly or openly) agreeing between them to act professionally in ways that appear to the citizens staying outside the agreement as irrational or unethical.

⁸ This refers to the US Department of Health and Human Services.

A remarkable case in point is the practice of vivisection or animal experimentation for medical purposes [35, 4]; its departures from scientific standards are so big and at the same time so “commonly accepted”, that in my view it is hardly surprising that the most famous case of scientific misconduct surfaced in the last thirty years turned around a vivisection paper. I am referring to the article co-authored by Nobelist David Baltimore and describing immunological experiments (some of them never really performed) on transgenic mice [41].

Criticism of legalistic definitions of “misconduct”

Lang advocated a completely different approach, based on the ascertaining of facts and full publication of official reports:

Rather than looking into motives and intent, and determining “misconduct” in some legalistic sense, let us raise questions about performance concerning:

- what was achieved, when and by whom;
- the accuracy, truth, or falsity of statements about scientific work or about the history of scientific work; and
- the level and standards of performance in carrying out scientific work.

I urge that questions about conduct concentrate on facts concerning performance, and not on arguments as to what constitutes “fraud”, “intent”, or “misconduct” and how these words are to be used. Once facts are established, the scientific community can arrive at de facto decisions: whether to tolerate certain practices or not, whether to fund certain laboratories or not, whether to rely on claimed results by certain persons or not. [26, p. 526]

As is clear from this passage, Lang thought that, ultimately, self-policing by the scientific community was the key. He went on stating explicitly that one should not necessarily construe cases of bad scientific practice in terms of criminal law:

But even though one does not wish to tolerate a practice, this does not imply that the practice has to be labeled fraud or misconduct. It does not imply that the practice has to give rise to legal or quasi-legal proceedings. Rather, let us

have official reports clearly informing us of the facts in the case. [26, pp. 526-7]

Lang's intent in drawing this distinction was to make it easier for whistleblowers to expose the mistakes and abuses in scientific research than it would be if this led automatically to a prosecution of the wrongdoers and then, necessarily, to an evaluation of the degree the accused were consciously acting against the scientific standards. The experience of the Gallo and Baltimore cases had shown that lawyers and administrators adopted an approach to the transgression of scientific standards which was bound to exculpate even authors of seriously defective works:

Similarly, I object to tying the entire investigative enterprise to a determination of "misconduct" rather than a determination of facts in the case, with the result that if no "misconduct" in the above legalistic sense is found, then "no administrative action is needed". Linking the investigative process to a determination of "intent" or "misconduct" obfuscates the possibility of determining and making clearly known the facts of the case. Actually it has been documented to destroy this possibility in certain important aspects. [26, p. 524]

A particularly impressive example of what Lang had in mind was provided by the HHS Appeals Board in the Gallo case, which, in a document of 6 July 1993 sent by certified mail to Gallo's lawyer and to the Office of the General Counsel, ORI, stated that

In the absence of any specific definition of scientific misconduct in a statute or regulation in effect at the time of the conduct, ORI must prove that the nature of the Respondent's [i. e. Gallo's] violation of applicable standards of conduct was *such that any reasonable researcher in his position would have considered it scientific misconduct at the time*. [...]

The definition [of "misconduct in science", the one quoted above from [8]] cannot reasonably be read as encompassing *falsification or any other [sic!] conduct which does not seriously deviate [underline in the original] from commonly accepted practices within the scientific*

community or which results from honest error or honest differences in interpretations or judgments.⁹

Clearly the first italicized passage asks from the judges that they accomplish a subtle, thorough sociological and historical inquiry before being able to pass judgement on the reported actions. And the second passage is even more outrageous, insofar as the writer is assuming that *also falsification* does not (or may not) «seriously deviate from commonly accepted practices within the scientific community» and therefore is not (or may not be) in need of punishment!

In the Gallo case the NIH Office of Scientific Integrity (OSI) reported that Gallo's laboratory had been guilty of practices like:

lack of laboratory records [...] lack of attention to details which resulted in false representation [...] lack of scientific rigor [...] breached overall responsibility [...] to ensure the accuracy of the paper [...] created and fostered conditions that give rise to falsified/ fabricate data and falsified scientific reports [...]

And yet both the OSI and two out of three NIH scientific advisers concluded that Gallo was not guilty of "misconduct", though they conceded that the actions listed above «merit significant censure» (cit. in [26, pp. 467-8]). Let us be frank: would you buy a used bicycle from these committee members?

Can the scientific community police itself?

What is not very clear is what the alternative is to the judiciary inquiry. In particular, is it reasonable to hold that the only jury a scientist has ever to face for his wrongdoings *qua* scientist should comprise just some subset of his colleagues? On this issue, Lang had serious misgivings, as so much of his documentation proved beyond reasonable doubt that one cannot expect very much from scientists *as a class*. Rather, he emphasized the importance of individual sense of responsibility:

⁹ Cit. in [26, pp. 503, 504]; italics added.

Ultimately, to uphold the traditional standards of science, scientists cannot rely on authority, they cannot rely on panels, they cannot rely on big-time certifications such as those coming from Nobel Prizes or the National Academy of Sciences. They cannot count on the press and they cannot count on Congressional committees to bring the problems of the scientific community to their own attention, or to police the scientific community. They must rely on individual responsibility, and they must create an atmosphere and conditions under which scientists, both young and established, can exercise this responsibility without fear – fear of retaliation, fear for their careers, fear for their funding, fear for their publications, fear of the tension which come from a challenge, fear of being uncollegial, whatever. Will they? [26, p. 309]

The final question was not rhetorical, but anguished. In fact Lang's files provide plenty of evidence that scientific researchers, particularly those at the top of the hierarchy, are all too prone, either collectively or individually, to renounce the "traditional standards of science" whenever status or money are at stake.

At the same time there were a few scientists who had acted in crucial instances in admirable ways. Lang's favourite example was physicist Richard Feynman investigating the Challenger disaster [11].

An example: Baltimore, Dingell, and Gould.

Let us take, as an instance of the opposite kind, the Baltimore case. In April 1988, the hearings of the Subcommittee chaired by John Dingell, titled "Fraud in NIH Grant Programs" [26, p. 275] began, with the aim of preventing the squandering «of precious dollars into meaningless or fraudulent work [...]»; the Baltimore case, among others, was investigated. David Baltimore, who had not been invited to testify, sent a "Dear colleague" letter a month later, where he called the hearings «totally unnecessary» and stated: «What we are undergoing is a harbinger of threats to scientific communication and scientific freedom».

In 1989 the accuser of Baltimore, Margot O'Toole, introduced new damning evidence claiming that the lab

notes presented by Baltimore's coauthor, Thereza Imanishi-Kari, to the NIH panel investigating the case, had been fabricated after her challenge. In April 1989, three weeks before the second Dingell hearings, the Director of the MIT center for cancer Research, Philip A. Sharp, wrote a "Dear Colleague" letter and a "Dear Congressman" letter [26, pp. 275-6], the first one including the following passage:

It seems obvious that the Congressional [Dingell's] Subcommittee has decided to hassle David [Baltimore] and the other authors and this has serious implications for all of us.

The "Dear Congressman" letter said:

It is difficult to fathom the motives behind the Subcommittee's current actions. But I believe that to continue what many of us perceive to be a vendetta against honest scientists will cost our society dearly. If scientists who have been exonerated of all wrongdoing must continue to defend themselves against vague and shifting charges, all members of the scientific community must be afraid.

The passage on Baltimore having been «exonerated» referred to the NIH panel chaired by Joseph Davie, a biologist,¹⁰ which in January 1989 had concluded that «no evidence of fraud, conscious misrepresentation, or manipulation of data was found»; nevertheless, the *Cell* paper, according to the Davie panel, contained «significant errors of misstatement and omission, as well as lapses in scientific judgment and interlaboratory communication» [26, p. 268].

We come across once again the inconsistency of claiming that yes, very serious misbehaviours have been observed... but no "misconduct" occurred!

In fact the Dingell Subcommittee was widely attacked and discredited by many members of the scientific community. Typical of the obfuscation produced in the process is an article in the *New York Times* [13] by the famous paleontologist and science writer Stephen Jay Gould in 1989, where he soberly compared Baltimore case to Galileo, and the Congressional Subcommittee to the Church

¹⁰ At the time, he was president for Research and Development at Searle, a pharmaceutical industry acquired by Monsanto in 1985.

Inquisition! Gould wrote his newspaper article as if the Baltimore case had to do with errors of interpretations rather than with experiments described in a scientific paper without ever having been performed:

First, while we all accept that any beneficiary of Federal funds must be subject to the scrutiny of benefactors, what could possibly be more chilling to creativity than an office of censorship (it would have another name, but the effect is what counts) trying to impose the impossible and the inhuman – freedom from error in thought and deed? We might as well rule that any orchestra receiving a penny in state funds must employ an umpire to tap the conductor on the shoulder every time the principal French horn plays a sour note.

Nice, isn't it, this reference to the «principal French horn»; and I hope you will thank me for sparing you quite a few equally nice comparisons of scientific research to baseball games. And yet, behind this superficially brilliant style, what a deep misunderstanding of what was at stake in the Baltimore case; what a piece of misinformation Gould was serving his readers! There is another interesting passage, where Gould complained that the trouble was that the public was not sufficiently aware of the purity of the scientist's soul:

Fraud is a pathology. I doubt that nonscientists realize how concerned all scientists are to purge any detected incident.

In replying to Gould, the renowned biostatistician Irwin D. Bross wrote in a letter to the journal [1]:

In fact, those at higher levels of the establishment who were charged with fraud usually had numerous colleagues and high-level administrators try to cover up the fraud or dismiss it as "scientific error". This occurred, for instance, in the cause célèbre cited by Professor Gould (and in most other incidents), where few members of the establishment rushed to purge the fraud, while many rushed to condone it.

Overall, very few scientists supported Dingell. Lang was one of those who did. In 1990 Dingell commented [26, p. 279; *italics mine*]:

The Subcommittee expects the community of scientists to police itself. We have, of course, been severely disappointed

by the response of the scientific community on a number of occasions.

This disappointment extends particularly to the present instance. A number of prominent scientists, under a promise of confidentiality, examined the suspect notebook and agreed that it was obviously bogus. *But these same scientists were unwilling to advance their professional opinions in public for fear of the disapproval of their colleagues.* This reluctance by prominent scientists to deal fully and frankly with the problem of scientific fraud and misconduct has greatly complicated not only the present investigation, but others as well.

What is clear from this episode and many others documented by Lang is that the scientific community is far from exhibiting any special degree of ethical integrity in dealing with the bad science and bad behaviour of its members, especially the powerful ones.

Unfortunately even historians of science, instead of acting as the critical conscience of science in its making, often become the apologists of famous scientists, including contemporary ones. This has occurred, as shown by Lang, in a well-known recent book-length account of the Baltimore case [28, 29], but many other cases could be cited, even outside the biomedical sciences, which are obviously a particularly sensitive field from the viewpoint of the defence and furtherance of the mainstream ideology.

Serge Lang's last file

Lang's last struggle was related to his long-standing engagement to ask the biomedical AIDS establishment uncomfortable questions concerning the rational and empirical grounds of the official belief that the astutely named "Human Immunodeficiency Virus" (HIV) is the cause of the "Acquired Immunodeficiency Syndrome" (AIDS).¹¹

On May 13 he sent two articles to the *Proceedings of the National Academy of Sciences*, with an accompanying review by Richard Strohman, emeritus professor of Molecular and Cell Biology at the University of California at Berkeley. This review stated that «their publication in the

¹¹ Cf. chapter 11.

PNAS is not only merited, it is essential». On May 27 Nicholas R. Cozzarelli answered him by rejecting the papers, after consulting with «experts on the PNAS Editorial Board» since «Neither of them are research articles. They are instead opinion pieces». This was the whole explanation of the rejection.

In the Science and Democracy web site the reader will find all the documentation [31] to judge for themselves, and particularly to check whether the grounds for this rejection were even remotely plausible.

Lang replied in detail on June 8, by addressing himself to the President of the NAS, Bruce Alberts:

There are indications that the orthodoxy on "HIV/AIDS" is increasingly challenged. The establishment has functioned in such a way that to raise questions about the orthodoxy amounts ipso facto to raise questions about the credibility of the establishment.

On June 22, Alberts wrote that Lang's request to reconsider his submissions would have been placed on «the agenda for the next meeting of the NAS Council, which will take place on August 7-8»; however, for that time a new president, Ralph Cicerone, was to take his place.

Serge Lang's last letter, dated 6 September, ended by commenting that «it is highly unlikely that I shall hear from Cicerone or any other higher up in the NAS or PNAS». His main statement in this letter deserves to be quoted in its entirety:

I enclose once more the full correspondence dealing directly with my articles, including the latest letters mentioned above. Let scientific history record these dealings and the establishment's refusal to allow, let alone support, the mere existence of a challenge to the HIV/AIDS orthodoxy in a scientific context. One possible result of refusing to deal with scientists on this issue (let alone members of the NAS) is that the scientific establishment will have to deal with the media in a very damaging way – if and when the media stop repeating uncritically what is fed into them by that establishment. There are signs that the curve of journalistic criticisms of that establishment is about to shift from being slowly strictly increasing to a more substantial and rapid attack, beginning this fall. Even with what's coming this fall,

it is of course not clear if and when a critical mass will be reached to topple the orthodoxy. But the scientific establishment has risked its credibility on the "HIV/AIDS" issue in a very big way.

Probably Lang had in mind Celia Farber's critical report on HIV/AIDS orthodoxy [7], which was well on its way to publication, but in fact appeared only in the March 2006 issue of *Harper's Magazine* – an article, incidentally, for which Farber was to suffer in the following years a very intense hate campaign by supporters of the orthodoxy.¹² Too late for Lang to comment on it, and to communicate to his cc-lists any further developments of his last challenge.

Conclusion

Serge Lang's writings on scientific practice are arguably among the most important contributions to the sociology of contemporary science. They are at the same time a poignant testimony of the struggle of a great scientists against the forces that are stifling scientific research today – not from outside but from within the scientific community itself. Lang had realized that science needs a special atmosphere for his thriving, and that the standard rhetoric of science is certainly not enough to create it.

Lang pointed out repeatedly that the proposal of solving the problem of violation of the scientific standards by introducing in the university curriculum courses in scientific ethics for the young is misplaced, as in fact the scientists guilty of such violations have been, prevalently, established scientists, *not* young people:

Courses on scientific ethics are increasingly being taught, but the recommendation to have such courses by various official bodies which have refused to take position in concrete cases is to some extent hypocritical, because the evidence shows that it is not students who need such courses, but senior scientists who have provided recent examples of transgressions of the classical standards of science. The sole existence of such courses implies nothing about their effect, which depends on who teaches them, and what is covered or suppressed in them. [26, p. vi]

¹² For an account with references, see [36].

The contemporary scene confirms this judgement. Two of the most famous investigators¹³ of scientific misconduct [38] have written in 2008, in commenting on [39], that the real issue is not the failure of «scientific leaders» to pass their assumed integrity «to those whose research they supervise»:

On the basis of our own discussions with biomedical scientists at the predoctoral, postdoctoral and faculty level, we hold a different view. The academic and financial rewards of calculated, cautious dishonesty on the part of some scientific leaders are, we believe, all too apparent to the junior scientists they supervise. No amount of tutoring, stricter supervision or courses in research ethics will fix this problem. [10]

A particularly insightful statement, consistent with this analysis, was made by Louis DeFelice, a biologist at Caltech, in a 1991 letter to *Nature* ([5], cit. in [25, pp. 329-30]):

[...] researchers accept a certain level of dishonesty and therefore defend larger transgressions that involve the same vice. The particular corruption that I speak of is unearned authorship. [...] Established scientists, under pressure to obtain extramural funds, are burdened with the baggage of success: leadership in national societies, membership of editorial boards and grant review panels, travel and lectures, committees and administration. These activities drain the time and the energy of every established investigator, and they make bench research nearly impossible. yet the pressures to present oneself as being at the vanguard of research are greater than ever.

By accepting or insisting upon unearned authorship, much of the scientific community has forfeited the right to bear witness. Thus when investigations reveal unbecoming conduct that involves the same crime, scientists close their

¹³ Stewart and Feder had a prominent role in the Baltimore affair, as their attempt to publish in 1987 a critical review of the controversial *Cell* paper met with rejections by *Cell*, *Nature* and *Science* (they eventually succeeded in publishing in *Nature* a shortened version, in 1991), and with obstructionism by the NIHs of which they were both employees [26, pp. 257-63].

ranks, because many are guilty of far less spectacular but similar infractions.

In fact scientific career is to a very considerable extent conceived within the academic world as the assumption of additional hierarchical duties which, by their very nature, increasingly distract from the primary and essential duty of a researcher, which is to do research at the best of his or her possibilities. As a consequence, the more a scientist climbs the hierarchic ladder, the more likely it is for him or her to place status and power-politics before scientific truth and integrity.

As courses in ethics or bioethics multiply, so do also the «examples of transgressions of the classical standards of science» mentioned by Lang. Undoubtedly a course in research ethics having *Challenges* on the required reading list could make a lot of good, but a search I made in the Internet suggests to me that, unfortunately, this is not a popular choice among instructors and textbook authors in the field. So much the worse for them – and for their students. In any case, Lang's method of documenting and advertising transgressions of the classical standards of science is one of the few tools which may have a chance of contributing to a substantial improvement of this lamentable situation.

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Envoy

18. Anthony Liversidge
The Palace of Truth

By giving the stage to independent minds, a remote Italian institute of philosophy is holding open the door to new and better paradigms in science

Imagine, if you will, that one morning you hear the *New York Times* slap down on your doorstep. When you go to pick it up, the front page headline is jarring indeed. It reads: "Contrary View of AIDS Vindicated: Supposed Cause HIV Held Harmless".

For most of us, that would certainly turn our world view upside down. As would similar headlines, such as "Key to Cancer Found, And It's Not Oncogenes". Or "Wright Brothers Not First To Fly Plane Heavier Than Air". Or "Big Bang Big Bust: Theory of Universe's Beginning Abandoned".

Incredible? Perhaps. But fantasy or fact, there is a breed of tough, independent minded thinkers in science, including some top drawer researchers, that would have you consider the possibility that each of those ideas are true. And right or wrong, many of them are neither outsiders nor crackpots in manner or in logic, but are well credentialed and respected names in establishment science.

Or at least, *were* officially respected and even honoured until they veered off the rails of established, mainstream views. Now, in the manner of modern science, they are typically scorned and ostracised by a mainstream crowd that, contrary to the history and principles of science, would have onlookers believe that it is infallible.

One mark of the active repression of even respectable scientific dissidents may be that most of us have never read about or seen them, even on the Web. Hardworking science reporters, editors, and producers, tied to their most established sources, rarely have time or inclination to give much space to scientific dissidents, at least until their ideas are finally accepted and even win them a Nobel, as sometimes happens. Another problem is that enduring outliers tend to be given fewer and fewer invitations to speak at conferences.

But non-mainstream views were given a rare platform recently, when a band of renegade thinkers came together in a palace in Naples last June. It was the second instalment of the conference on Science and Democracy, a new, biennial* discussion of politics and power in science.

Cheerful gunslingers of science

Which is how I found myself one sweltering summer afternoon at Al Plebiscito, a leafy outdoor restaurant in Naples, having lunch with several other speakers from that meeting. I had been invited too, to give a talk about the problems journalists had in covering maverick science.

Not unexpectedly, they formed a wonderfully distinct group of individuals, each undermining the conventional wisdom attached to his topic. The first surprise was how agreeable they were in manner, and how good humored, given their experience of constant rejection by the establishment they were once part of. Laughter was frequent as they traded wry reports of the unprofessional behaviour of the ruling clique they were fighting – the publications blocked, the invitations rescinded, the colleagues permanently out to lunch.

Outside the garden archway of the *trattoria*, some of the apparently reckless scooter drivers of Naples were noisily rocketing up and down the hill. Half of those daredevils were women, I noticed, some with a thrilled child standing between their breasts and the handlebars. There wasn't a cop or a traffic light in sight, but with all their lack of restraint, the two wheeled racers seemed safe, their reflexes well up to the challenge of the steep, cobbled street.

The confident free thinkers at our table were, in a way, their intellectual counterparts, I thought. They too were free spirits, irritating to some, exciting to others, swiftly

* [There have been five Science and Democracy conferences so far, all in the Palazzo Serra di Cassano described here (with a partial exception for the last one): April 20-21, 2001; June 12-14, 2003; October 20-22, 2005; May 15-17, 2008; April 14-16, 2011. (*Editor's Note*)]

navigating obstacles and larger entities as they cut through the traffic jams of conventional wisdom.

For heresy is a risky pursuit in modern science, where consensus rules with an iron hand, and the incautious can easily come a cropper. Central funding from Washington has long consolidated scientific opinion, and it is helped nowadays by huge bets on startups, which can make scientists millionaires in short order. Faced with contradiction which threatens their goals, the big names on the top of the heap may resist to the death having their rewarding paradigm overturned.

Critics can quickly find themselves without a platform, sidelined, ostracized, and professionally broke. The clear implication for scientists from graduate students to full professors with tenure is, watch out. If you want to get ahead in science, don't rock the theoretical boat; not, at least, without locking up very hard evidence, and even then, be careful, and be prepared for battle.

Yet, living dangerously as they were, the gunslingers at Al Plebiscito seemed surprisingly at ease in their High Noon revisionism. One relaxed participant was the idealistic mathematician and physicist from Perugia who had mounted the conference, the tall, slightly balding Marco Mamone Capria. "I did this kind of thing out of curiosity, at first, and to confirm my faith in orthodox views," he smiled, with languid assurance. "Instead, I found it eroded. Today's science promotes conformity rather than the search for truth".

Another was the genial Gordon Moran, an art historian with a store of lengthy jokes, a rosy cheeked retiree from Wall Street who looked more like the cheerful Tuscany olive grower he was than the careful scholar he also turned out to be.

It was a small irony that some of Moran's punchlines were drowned out by the loud scooters buzzing past. For his witty and revealing book, *Silencing Scientists and Scholars in Other Fields* (Ablex 1998), had counted many cases where debate was stifled when paradigms were challenged. Moran demonstrated that this censorship is typical not only of modern science but across the academic world.

Academic thinkers are as territorial as kings, and rarely take kindly to challenges which threaten their rule.

The most cheerfully effusive troublemaker was David Rasnick, the ruddy, white bearded chemist who partners the prominent retrovirus and cancer expert Peter Duesberg of Berkeley in the two most startling claims in current scientific heresy. First, that current AIDS science, which counts HIV as the sole cause of AIDS symptoms, is nothing but a fantasy without valid evidence. Second, that they have found a better path to explaining cancer than the ruling, Nobel winning idea of 'oncogenes', which blame specific genes. At the conference Rasnick had just presented a revelatory slide show on these topics. He was now in ebullient, post presentation mood. "We both deserve the Nobel prize!" he bubbled cheerily, knocking back his lager.

After listening to his persuasive lectures, so different but so much more hopeful than what I had read daily in the *New York Times* and other US media, I was ready to drink to that too. But I also realized that it was not just the beer, or the excellent food in a Mediterranean city that invented both espresso and pizza, that was lifting Rasnick's spirits. What was helping these besieged science critics feel so expansive was the warm embrace of the intellectually magnificent Institute of Philosophical Studies in Naples.

The heretics conference program may have been mounted by Mamone Capria, but it was the remarkable Istituto Italiano per gli Studi Filosofici that was hosting the meeting and encouraging the speakers with large hotel rooms and good Neapolitan wine and food, a hospitable reception which was a nice change from the crumbs of attention that were their daily fare back home.

The only pity, I found out later, was that their days in the sun courtesy of the Istituto might be numbered, for reasons to do with the finances of their savior.

Scholars of the world, welcome

But for the moment, the sun was out. It's one of the academic world's best kept secrets that thirty years ago Naples gave birth to a remarkable institution, born of the

establishment yet independent minded, which today serves as a busy oasis of free speech for scholars around the world.

Elitist in its speaker lineup, yet wide open to all who seek their ideas and knowledge, the Institute of Philosophical Studies funds research - 19,000 research fellowships to date (2003) - and constantly holds lectures and meetings on topics in philosophy, the humanities and the edge of science. The proceedings are published in solid books with titles such as "Macroscopic Quantum Coherence and Quantum Computing", or "Gesture in Naples and Gesture in Classical Antiquity". The same June week as the three day Science and Democracy II conference, there were sessions nearby on mathematical logic, codes of honor in dueling, how Michelangelo drew hands, and the life of an early Italian feminist.

Most pleasing for those who feel that philosophers as truth seekers deserve a high place in the material world, the Institute is housed in a grand old palace. An 18th Century ducal residence, the Palazzo Serra di Cassano is a rundown but still magnificent structure overlooking the wide, glittering expanse of Naples bay. Across the blue haze of the sea beyond the royal palace and docks below, the massive slopes of the dormant but potentially volcanic Mount Vesuvius shimmer in the summer heat. They form a suitable backdrop for a conference on repressed, but potentially explosive heresy.

The palazzo is up the hill from the Al Plebiscito, and in its faded nobility philosophy could hardly have found a more suitable home. You enter through huge, weatherbeaten doors, cross a cobbled courtyard and mount a monumental stone double staircase, lit by a vast, two storey window facing the bay. The stairs lead to ornately painted, wood paneled rooms where glowing chandeliers hang from chapel high ceilings and illuminate gilt and marble furnishings. To add to the seedy glamor, the halls sometimes feature uniformed police of high rank as a visiting prime minister or other distinguished politician speaks. The rooms are filled with red canvas chairs, for the conferences, seminars and lectures in what has been called a "crossroads of Europe for scholars".

Radical challenges to the status quo

After that lunch at Al Plebiscito, the lively Science and Democracy conference proceeded under the palazzo chandeliers and once again made clear just how radically the spirit of critical questioning, that sine qua non of philosophy, might transform the complacency of consensus science. Few of the slide shows were likely to be welcome at established institutions elsewhere, but here under the palazzo's gleaming lights no theoretical cow was too sacred for slaughter, and the knives were sharp.

A prime example was David Rasnick's summary of his and Duesberg's latest broadside of AIDS skepticism, "The chemical bases of the various AIDS epidemics".** The extraordinary talk appeared to resolve all the vast paradoxes and inconsistencies found in HIV/AIDS theory by simply rejecting the notion that HIV had anything at all to do with the immune deficiency of AIDS victims around the world.

Essentially, Rasnick and Duesberg claimed, HIV is a red herring. AIDS was perfectly explained by ignoring HIV completely, and counting all its manifestations as derived from familiar diseases and chemical causes, especially recreational drugs among gays, abetted in Africa by malnutrition, and worsened by the side effects of the medications prescribed to attack HIV, which were causing the very symptoms they were meant to cure.

Needless to say, this wholesale rejection of standard AIDS dogma was not popular among believers in what is currently the most lucrative proposition in the science of disease. Their article had eventually found a home in the *Journal of BioSciences* of the Indian Academy of Sciences, but only after two nerve wracking years during which more than one prominent journal in the West accepted, vetted and then mysteriously sat on the article (one publisher's veto came from "fear of losing readers", they finally learned). The circulation of *Biosciences* is tiny at 1600 but what mattered to the authors was that the article was respectably refereed and available to all on the Web, where outsiders could judge it for themselves. The world could

** [Reference 4 of chapter 11. (*Editor's Note*)]

read it. It was no longer silenced, and to those convinced by its logic, it could be transforming.

Other speakers with less earthshaking heresies told similar tales of how deeply the proponents of conventional wisdom in science can dig in when faced with challenges threatening to the status quo. One example had the high priests of Big Bang theory simply ignoring new data that a scientist had found.

Astronomer Halton 'Chip' Arp, once a well established figure in US circles in his field, had been effectively banished to Europe, he related. Now at the Max Planck Institute for Astrophysics in Germany, he showed us pictures of a dozen high red shift quasars being ejected from active galaxies, harvested from nights on major telescopes in Hawaii and elsewhere. The observations refuted the Big Bang theory "at a glance", he said, but they were ignored. Arp was such a reliable, patrician figure in his WASP appearance and manner, it was hard to believe his ideas and accumulating evidence had been so firmly sidelined.

Censoring in the academy

Next up was Gordon Moran, a lively retiree from Wall Street who had moved to Florence and resumed his Yale studies in art. An independent scholar, he was now notorious in the art world for demolishing the attribution to Simone Martini of the 'Guido Riccio', the soldier's portrait that serves as Siena's tourist medallion. His book, "Guido Riccio: A Guide to the Controversy" (Siena: Notizie d'Arte, 2000) was banned from the bookshop of the Palazzo Pubblico Museum, which houses the fresco.

Not one to be put down, Moran then became curious about how typical was his experience of being gagged. That revolutionaries in science, including future Nobel prizewinners, can have trouble gaining acceptance is not news, of course. Just ask any Nobel winner how they fared when younger. Rita Levi-Montalcini was typical when she answered me once that it was "horrible! They would not listen!" Quantum physicist Max Planck, a Hercules of a paradigm buster with ideas that even Einstein could hardly swallow, put the problem succinctly. A new truth in science

triumphs, he said, only "because its opponents eventually die". Science, in other words, advances funeral by funeral.

Historians have noted this syndrome since Socrates was handed hemlock for questioning the assumptions of ancient Athenians. Counterattacks on the modern scientific Enlightenment started with Galileo, confined to his villa by the Papal Inquisition in 1633, and have been suffered by most scientific revolutionaries since, from Charles Darwin (natural selection) and Alfred Wegener (continental drift) to Barbara McClintock (jumping genes). Medical pioneers who have been labeled cranks or quacks include Jenner (smallpox vaccination), Lister (antisepsis), Semmelweis (surgery hygiene), Ehrlich (bacterial staining), Pasteur (germ theory), Fleming (penicillin), Papanicolau (Pap test), Emile Grubbe (cancer radiology) and more recently, Barry Marshall (stomach bacterium).

In *Silencing Scientists and Scholars in other Fields* Moran showed that the active repression of dissidents is a tradition which continues as a staple of all academic life. One dimension of this behavior he found is that once a mistake is published, editors of scientific and other scholarly journals resist mightily publishing any correction. In his talk he outlined five cases of published errors where, contrary to the proverbial phrase, science was not "self-correcting". Owing to "lack of volition", he said, editors drag their feet so that it is "much more difficult to publish corrections than to publish the errors in the first place". He planned another book to turn over that stone as well.

At first sight not all speakers seemed so unfairly repressed, perhaps. Could it really be that the Wright Brothers takeoff in 1903 was bogus? Brazil's Marcos Danhoni argued that his countryman, the great balloonist Santos Dumont, was truly the "father of aviation", as President Clinton labeled him in 1997, if you count the first *self-propelled takeoff*, heavier-than-air flight. The Wright brothers still used a catapult and a rampart to assist their launches as late as 1908, he stated, and their 1903 flight, in the teeth of a headwind strong enough to lift a barn, used a shallow incline to assist in takeoff.

Santos Dumont, on the other hand, cheerfully took off and flew in front of hundreds in Paris in 1906, though admittedly in a vehicle he could hardly steer. The event will be wildly celebrated in his home country of Brazil in 2006. Months after the Naples conference, when the replica of the Wright's 1903 design rolled into a puddle in front of President Bush, the humiliation seemed strikingly in line with Danhoni's view.

Seemingly even farther out, other iconoclasts discussed the Vatican radio antennae they blamed for child leukemia, the dangers of vaccinations, and why animal models are poor guides to human reactions. With some of these presentations in Italian too rapid to follow easily, one's comfortable preconceptions could remain unscathed. But it was clear that each speaker had an informed case to present. Moreover, the fundamental issue here was free speech, not whether every repressed view is right. As Mamone Capria wrote afterwards, "I think that if I had had absolutely no experience of scientific censorship, I might have been more prejudicially suspicious of claims like David Rasnick's or Halton Arp's, and this would have been a pity".

Later, however, when I reviewed the evidence available for these talks, there was more in their favor than I had bargained for. In particular, it was enlightening to see how poorly animal models performed as guides to human reactions. The most famous case was thalidomide, where a corrected animal test was devised which suggested the real danger, but too late for many.

When Rasnick spoke for the second time, his talk was as radical as his first. I was bowled over by his coherent account of why he and Duesberg felt the key to cancer lies not in "oncogenes", the currently fashionable theory for which Nobels have been awarded for decades, but rather, in a striking but long neglected fact, that cancer cells typically have more chromosomes (60 to 90) than a normal cell (46). All cancer agents studied produce this 'aneuploidy' in cells, Rasnick pointed out, whereas only about half of them involve gene mutations. With their view slowly gaining respectful attention in the mainstream world, one could imagine this might be these leading AIDS heretics' ticket to rehabilitation in science politics, if there weren't thirty years

of careers and funding invested in the ruling idea that 'oncogenes' cause cancer. Nobel winning or not, their new approach clearly made a great deal of sense, and there would be a conference in the US on the topic the next January.

Whether any these views are ultimately proved right or wrong, time will tell, of course, but airing them is obviously the first step to finding out. Then comes the hard part, as Mamone Capria sees it. "When you are freed from the superstitious belief that what the establishment says is right, things become more difficult, not easier, for you. Because the fact that a scientist swims against the current does not mean that he or she is automatically right, either. So you have to work much harder to reach any conclusions".

One man's revolution

One thing seemed clear, however. Many of these well qualified dissidents were possibly right in part if not in whole, and they should be heard. The Institute's support for a conference of credentialed dissidents was a rare and valuable public service in the current era of big budget science ruled by consensus, where the castle drawbridge is not lowered for dissidents very often.

I wondered what the man who had founded it, Gerardo Marotta, was like. His devotion to pure knowledge has drawn the elite, including many famous names in science, to speak at the Institute, often gratis. The late philosopher of science Karl Popper taught many seminars, and the celebrated physicists John Wheeler, Sheldon Glashow and Steven Weinberg have all come without fee, in tribute to the scholarly nature of the retreat. Ilya Prigogine, Nobelist in biochemistry, was so delighted by the atmosphere that he served as acting president till he died recently. Vittorio Hösle, a distinguished German philosopher at Notre Dame, says the independence of the Institute makes its activities "more interesting than almost all Italian universities".

"Nobel prize winners come here free because they feel honored to be invited" was Marotta's mild boast when I finally met him. He turned out to be a small, warmly

charismatic gentleman of 77, with a cellolike hum to his voice. During a long interview in the greenhouse humidity of the palazzo, Marotta stayed magically cool in a three piece suit and tie, while all around him coatless shirts were stained with perspiration. He was born to a ducal family and trained in law, and his growing interest in philosophy led to a personal library of 100,000 volumes and a lively intellectual salon in his own drawing room. Thirty years ago this officially became the Institute, which he moved into the Palazzo.

A nobleman with the common touch, Marotta is clearly a man of principle and purpose, and he is visibly beloved by those who come often to the Institute. His extravagant dream is to change the mental map of the world by bringing back philosophy and restoring humanism in the corridors of power. "The ruling classes have lost their ability to reason and this is going to ruin the world", he said. "Without a humanistic philosophy, your vision is distorted. Philosophers from Plato onwards have understood this". One of his favourite activities is the summer program of the Institute where 200 schools all over the South of Italy teach philosophy courses to all comers, with Marotta as roving cheerleader.

His *palazzo's* tradition of establishment revolution began two centuries ago with a rebellion that ended badly. The Duke's son was hanged in 1799 after leading a short lived expulsion of the reigning Bourbons, and the Duke vowed the front gates facing the royal palace would be shut "until the Enlightenment returned to Naples". Now Marotta continues to keep the palace gates facing downhill closed, as a comment on the world, not just Naples. What concerns Marotta, he says, is the materialism that has taken over the West as 20th century philosophy shriveled into sterile deconstruction.

"Europe doesn't know how to give its own cultural heritage to the world", he says, "and it is starting to ignore its own past. Italy is almost the only country that still teaches philosophy in high schools, and this only because of the Institute". One of philosophy's values that he takes for granted is free speech, of course. When I congratulate him on hosting a session of dissidents, he chuckled dismissively.

"The Institute is open to all ideas. It is an adventure of the mind".

After dinner at Al Plebiscito, where the seemingly reckless scooters were still buzzing past without accident, Marotta left us with his signature thought: "Only culture and reason can save the world". But as my plane took off the next day and a symbolically dormant Mt. Vesuvius receded on the horizon, I worried how much the Institute would be able to do in the future to help the kind of well informed dissidents they had briefly restored to a place at the high table.

One barrier to its influence in a world of science where English rules is that most of its daily fare and publications are in Italian. A few papers and books are in English, however, and in ten years the staff have built a video library of a thousand talks and seminars by weighty thinkers which includes many English speakers such as Popper and Galbraith.

Money troubles

But the more serious problem is funding. Once a millionaire from his success as a lawyer and his property investments, Marotta had confessed at dinner that he had long ago emptied his pockets in support of his vision. Now the Institute is dependent on government grants, the last of which was two years ago. With Italy battling recession, Marotta's friendship is with the aging President of Italy, Carlo Azeglio Ciampi, rather than its powerful Prime Minister Silvio Berlusconi, who is worth \$10 billion but not known for his sympathy for scholars. After running on empty for two years, there is general acknowledgment among Marotta's high level connections that, in the words of a Vatican bishop, "it's a problem".

At the Istituto no one seemed to be worried, least of all Marotta. Except perhaps the professorial Antonio Gargano, the overworked secretary of the Institute. But then Gargano, the lynchpin of its activities, is habitually stressed out, for he invites, greets, organizes and lectures himself on topics from Hegel to Aristotle from morning to night in service of the cause. "It's a struggle", he told me at the Al

Plebiscito table with Marotta, beads of perspiration on his brow.

Yet one could not forget that revolution fomented at the Palace of Truth has been decapitated once before. In 1799, the splendid old palazzo was a hotbed of political revolution. The Duke's son Gennaro, in company with most of the intellectuals and aristocrats of the era, overthrew the Bourbon king, but five months later, the Bourbons were reinstated with the help of Admiral Nelson. On Nelson's Machiavellian advice a hundred of the revolutionaries, who had been promised safe passage, were executed. The savagery of the executions shocked even the Tsar of Russia, who said that he had provided the Bourbons with soldiers to reinstate them but "not to cut down the flower of Neapolitan aristocracy".

As Moran shows in his book throughout the history of academia, scientific and medical revolutionaries have often been silenced just as ruthlessly. But the additional twist is that it's not just the leaders of ruling ideas that act to stifle heretics. Many of the rest, including the general public, are fellow travelers with the elite, for it is human nature to resist a revision of scripture. As well as fighting those in power, dissidents such as Rasnick and Duesberg must battle the media and the general public for a hearing. Significantly, in 1799 it was the Neapolitan rabble that took the greatest delight in the hanging of their saviors. "I have always desired their welfare, and they are rejoicing at my death!" said Gennaro in amazement, as he was led to the gallows.

The paranoia of truthseekers

A couple of months after the conference I worried even more when I detected signs that the Institute was getting seriously short of money. I flew to see Gordon Moran in Tuscany, where he has among other properties an olive grove in which he likes to picnic, a mile walk down the hill from his country house in Casteldelpiano. Sitting at a white picnic table balanced precariously on dry clods of tilled earth between olive trees already bearing fruit, we talked of

the conference and I mentioned that the Institute's funding hadn't come through for two years.

"Two years? That may not be a coincidence!", he chuckled, reminding me the first Science and Democracy conference on power and heresy in science had taken place exactly at that time. I nearly fell off my folding chair. Could it be that, rather than saving a handful of heretics, the Institute was in danger of capsizing under their political weight? I hastily called Mamone Capria in Perugia. He also laughed, but more reassuringly. "I don't think there is any connection", he said. "There are too many conferences at the Istituto for ours to stand out".

Still, Moran, a world authority on the silencing of unwelcome views, remained cynical. Could he be right? Italy, after all, was the home of a powerful AIDS specialist, Fernando Aiuti, who had once claimed that Rasnick's colleague Peter Duesberg, the prominent scientist who has most thoroughly documented the case against the still unproven theory that a virus is the cause of AIDS, was therefore a criminal and should be banned from the scientific community.

The next day I caught a train to Naples, and walked up the hill to the Palazzo in the late afternoon sun, now cool and pleasant. There were police outside the great palazzo doors, some in splendid Federal uniform. A well dressed crowd filled the cobbled courtyard. It turned out that they and Marotta were waiting to welcome the ex-President of Italy, who was to give the keynote address to a weekend meeting on people's rights. Soon the speaker arrived, and the courtyard became deserted except for the handsome President of the Region, who had paused in entering to speak quietly into a battery of cameras and mikes held by earnest and attentive reporters.

Upstairs, under the glittering chandeliers, the ex-President began a long address on war and citizens' rights to a packed ballroom. Looking around at the smart and influential crowd, it certainly seemed that the Institute's political clout was big enough to handle a few scientific heretics.

After the speech was over, I spotted a key player in Naples society in the crowded hall, and asked him whether he thought the Institute could possibly be in danger as a harbor for critics of profitable paradigms.

"No, I don't think so. Here you can give an opinion different from the establishment", said Maurizio Elettrico, a towering artist and Renaissance historian. "And sometimes the establishment is here, like today". Yes, there were problems. "Aggression comes from every side. The President [of Italy] does what he can. But Marotta is a fighter as well as a dreamer. A lot of people believe in him". Did he believe in him? I asked. "Yes. *Molto, molto fondamentale!*" But could the heretics' enemies throttle the Institute? "No way".

Just then Marotta appeared, so we finally put the question to the man himself. Why the financial stoppage? The old patrician was as calm and reassuring as ever. If there is a problem, he told us, it is only the politicians' unawareness of the vital importance of philosophy in running the modern world. "It's a problem of education. It is not political opposition, just ignorance".

Of course, if there was something more complicated, Marotta was unlikely to tell us directly. But it was a relief that Marotta did not blame the Science and Democracy conference for his difficulties. I left the Institute hopeful that it can remain a force for scholarly truth in a world of multibillion dollar science. But at a meeting in Rome in November, Marotta's daughter confirmed that no new funding had yet come through, and I started worrying again. If it didn't, the Institute's role as a unique world stage for independent scholarly contributions which might otherwise never find a public voice in front of a live audience would end.

Why we need heretics

The need for critics of consensus science is not always obvious to outsiders, but they need to know that by definition, the greatest breakthroughs in science have always been revolutions, replacing the old order with a very different new one. And very often indeed, the new findings

are brought to us by individuals, not large groups. Censorship, in fact, is a threat to progress in science, because it kills off the individual creative criticism and exploration on which science feeds. Instead, smug or frightened complacency rules, a torpor which allows dictators to twist science for political and economic reasons.

Back in the US, the need for public debate in science became clearer than ever as politics pressured scientists from outside and from within. While President Bush gutted his own report on the environment of global warming concerns, novelist Michael Crichton, in a passionate lecture at CalTech in January, accused the left of bulldozing the truth aside in everything from secondhand smoking to global warming. He called it "disgraceful" the way the scientific community vilified Danish statistician Bjorn Lomborg, whose book *The Skeptical Environmentalist* found that planetary doomsayers were overclaiming.

"When did skeptic become a dirty word in science?", Crichton asked. He pointed out correctly that science is not a democracy. "Whenever you hear the consensus of scientists agrees on something or other, reach for your wallet, because you're being had. Consensus is the business of politics. Science, on the contrary, requires only one investigator who happens to be right. The greatest scientists in history are great precisely because they alone were right".

Meanwhile, there are those who say that heretics who are right must surely win out in the end, however long it takes.

Even the cynical Moran remains optimistic, in the face of all his evidence of fierce repression of challenges to the scholarly status quo. "The truth comes out in the long run", he says, "it always does. At some point, if Rasnick keeps his sense of humor, he and Duesberg will make a breakthrough". Certainly, if there was one challenging claim at the Conference which on my further research seemed inarguable it was their contention that HIV had zero to recommend it as the supposed cause of AIDS. But with hundreds of billions invested in that global assumption, the chances of changing the world's opinion seemed remote.

One sign that vindication may come for the pair on their second front, however, might be the “unexpectedly great success” of the aneuploidy conference in January, according to Peter Duesberg, who presided. The Berkeley professor says that he was unanimously complimented on his tackling the “timely, open, important, huge but forgotten question of aneuploidy and cancer” by mainstream scientists who attended from the National Cancer Institute, Mayo Clinic, and Karolinska Institute in Stockholm, Sweden, among others.

Perhaps Duesberg and Rasnick will win out. But how long it takes is dependent on how often they can gain a hearing, and as long as the Institute of Philosophical Studies can continue to provide a respectable platform for those who advocate replacing ruling wisdom, it will help to reassure all those who believe that censorship is the death of good science. Fortunately, by the summer, I learned from Mamone Capria that the funding allocation had been made, and the delay was now merely bureaucratic.

Meanwhile, Randall Meyer's *Universe – The Cosmological Quest*, a feature documentary from Norway, has premiered in the US, and on European TV, granting Halton Arp and other astronomers a big public platform for their evidence against the Big Bang. And Bjorn Lomborg was vindicated when the accusation of a scientific committee that he had twisted science to make his sceptical points had to be withdrawn as completely unfounded.

Maybe if they too can continue to gain unprejudiced hearings, Duesberg and Rasnick will get their Nobels one day, for science does have a habit of overturning established beliefs in the end. And it is rare that an unproven paradigm – and that HIV causes AIDS remains unproven, no matter how many believe it – is reviewed and rejected so thoroughly in the top literature by such a prominent scientist as Peter Duesberg, whose science otherwise has never been doubted. And now there is the Web, where readers can check all his papers for themselves at www.duesberg.com.

But if and when they are vindicated, who will count the losses in dollars and in lives of not having listened fully to such heretics sooner?

Author's Note: This text was written for a new popular science magazine in the US, *Seed*, in 2004, but never published. According to a reliable source (a *Seed* editor) the material presented ironic political difficulties for the young magazine. Specifically, their most highly valued columnist, Laurie Garrett, author of *The Coming Plague*, a best seller about the threat of new viruses worldwide, notified the editor of *Seed*, Adam Bly, that she would discontinue her monthly column if the Berkeley scientist Peter Duesberg was covered by *Seed*. Duesberg, as noted in the text, is the eminent researcher who rejected the two possibilities that HIV is the cause of AIDS, and that specific cancers arise from mutations in specific genes, in an article in *Cancer Research* in 1987, and in other reviews since. As a result, this article was not published in *Seed* or elsewhere until its appearance in these pages. Laurie Garrett is now a Senior Fellow at the Council of Foreign Relations, and is mentioned in numerous articles on the author's web site, *Science Guardian* (www.scienceguardian.com).

Meanwhile, with the Italian government in financial straits, the Institute is now in worse shape than ever before. At the end of 2012, it was reported that it had been forced out of the Palazzo, with its extensive library headed for storage.

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