

Science, for What? Or: Science with Conscience

The Invisible College of Dissenting Nuclear Scientists

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Abstract

The main contention of this essay is that sciences can be seen as belonging to two broad categories: a) demonstrative; b) interpretative. Demonstrative, or «tough», sciences are «natural» sciences; interpretative sciences are philosophy, history, all the social sciences, different as they are (for instance, history is based on causal imputation; sociology, on conditional comparative approach).

At present all sciences cannot presume to offer universally valid «laws», timeless and spaceless, but only general, probabilistic tendencies. Moreover, contrary to a misconception Max Weber's «Wertfreiheit», no science is neutral. It pertains to the social responsibility of scientists the practical use of eventual scientific findings (for instance, the atomic or the hydrogen bomb).

Keywords: Demonstrative sciences; Interpretation; Causal imputation; Comparative Typology; Practical Fallouts.

We live in an age that thinks of itself as a scientific age. What does it mean? Science, per se, is an ambiguous word. To put it briefly, and perhaps insufficiently, I feel that sciences can be distinguished into two broad categories: *demonstrative* and *interpretative* sciences, that is to say, natural or, as they are generally called, «exact» sciences, at times referred to as «tough» sciences, and humanistic sciences, including especially philosophy, history and the various social sciences, usually regarded as «soft» sciences.

This distinction, although logically tenable, has been perhaps at the basis of the so-called theory of the «two cultures and scientific revolution», as expounded by C. P. Snow, which amounts to a major misunderstanding of the nature of the present day scientific enterprise, especially taking into consideration the new developments, due to the «time» dimension, as persuasively explained by Ilya Prigogine and Isabelle Stengers in their book *The New Alliance*.

For both sciences, natural and humanistic, a question can be reasonably raised as far as the use of their eventual findings is concerned. This question was rarely considered in the past because it was assumed that science was by definition «neutral». At present for both physical and social sciences, the question, on the contrary, appears to be relevant and it cannot be lightmindedly dismissed.

The polemical reaction against science and scientific reasoning is nothing new. When small industries, developed in the old *régime* as a sort of complementary activity to large-scale landowning, grow and enlarge their field of operations until they give way to the first accumulation of capital and make large-scale mechanization technically possible and economically convenient, the consequences for the whole way of life and «culture» are immediate and profound. Here a more pervasive anti-machine feeling arises and develops into two different directions which could perhaps be called the «mystique of craftsmanship» and the refusal of the modern scientific world. The «mystics of craftsmanship» are not anti-technology on principle; they accept technical progress with reservations. They recognize the advantages of technical progress but fear that the price to pay is too high. They propose decentralization; they preach against the mania for the colossal and size in all its aspects. Their most coherent historical representative is the French libertarian socialist or, perhaps more precisely, anarchist Pierre-Joseph Proudhon.

Other groups are more extreme and collide head-long with the modern world as the world in which, to use the famous title of Siegfried Gideon, «mechanization takes command». Despite the intellectual refinement of these groups, one can easily detect in them, overtones of medieval and decadent nostalgia. The romantic German poet Novalis had already noticed the damage that, in his judgment, science was doing to the «sense of the invisible». But even sophisticated political writers such as Dwight MacDonald seem to share the romantic tendency to downgrade the scientific mind. MacDonald writes:

We Americans are hunters rather than artists, men of action rather than of thought or feeling. Our chief contribution to philosophy is pragmatism [...]; technique rather than theory distinguishes our science; our homes, our cities, our landscapes are designed for profit or practicality but not generally for beauty; we think it odd that a man should devote his life to writing poems but natural that he should devote it to inducing children to breakfast on *Crunchies* instead of *Krispies*; our scholars are strong on research, weak on interpreting the masses of data they collect.¹

This is, according to MacDonald, the «triumph of the Fact» that is brought about by a dominant scientific attitude.

It seems clear that we have here an emblematic example of the confusion between science and its popular caricature, that is «scientism». This pathetic error, although widespread, to the point of considering science as a kind of mysterious and all powerful magic art, is also due, at least in part, to scientific propagandists who tend to see in science and in scientific research the cure for all the evils of the world. From such commonplaces the scientist emerges as a new saint, the saint of the industrial age of mass technology. Science itself is conceived and presented as a new religion. It

¹ Cf. Dwight MacDonald, *Against the American Grain*, New York, 1952, p. 426.

is seriously stated that science, given its head, is not just cold mechanical efficiency; its attitude is tolerant, friendly and humane. It has already become - it is maintained - the dominant inspiration of human culture, so that modern poetry, painting and architecture derive their most constructive ideas from scientific thought. This dithyrambic mood goes as far as ignoring simple facts that are connected with obvious scientists' responsibility. Twenty years before C. P. Snow, the celebrated author of *The Two Cultures and the Scientific Revolution* (London, 1962), C. H. Waddington takes the love for peace on the part of the scientists for granted: «Far from considering war as the highest activity of man [...] scientists even more than most people in this country (England), find it a damnable, if unavoidable, interruption of their serious business. For science is concerned with man's real evolutionary advance, with giving him the mastery over things which will enable him to translate his wishes and aspirations into fact».² Too bad, one may add, that scientists have also provided politicians with the most powerful and deadly means of mass destruction.

Quite unexpectedly, it is among the most advanced scientists, particularly among some specialists of nuclear physics, that the reaction against the practice of scientific research as a neutral, purely instrumental activity - a kind of perfection without purpose - is formed at first and then, little by little, developed. The most eloquent and telling example of positive counter-culture movement is not, therefore, to be looked for among the vociferous «revolutionary» students, but among dedicated researchers and top level scientists, from Robert Oppenheimer to Andrej Sacharov. They have contributed to the third type of counter-culture - the reconciliation of humanistic values and machines - though their clear-eyed critique of the development and deployment of nuclear weapons. In their different ways, these scientists have organized through the years since the end of the Second World War, some sort of «invisible college». The function of this college has been to work in the scientific laboratories as well as in close contact with public opinion at large in order to turn the resources of nuclear energy away from war programs to peace activities and practical application in various fields, from medicine to electricity production. In the early days of the *Bulletin of Atomic Scientists* one realizes that the scope of such initiatives is extraordinarily broad. In the groups of dissenting scientists, centering around the *Bulletin*, not only physicists but also social analysts such as Edward A. Shils and David Riesman, would actively participate.

The contribution of nuclear physicists to the peaceful use of nuclear energy has been outstanding in terms of its impact on public opinion as regards the technical

² Cf. C. H. Waddington, *The Scientific Attitude*, London, 1941, p. 160. C. P. Snow was also preceded by scholars such as James Harvey Robinson, *The Humanizing of Knowledge*, New York, 1923, p. 81: «Those who devote their professional lives to literature can probably look back to the vain efforts of their awkward teachers of science to adorn them with a dab or two from Science's iris-hued brush and their lasting resentment at the attempt to discolor their poetic or romantic souls. In later life they compensate themselves for their gross ignorance of natural processes by declaring, as Mr. Chesterton does, that science is irrelevant to our deeper lives; or as Brunetière did, that science is bankrupt».

aspects of the issue. But in some cases this contribution has turned into a political struggle in the proper sense, notably in the experience of Andrej Sacharov and his wife, Jelena Bonner. While Leonid Brezhnev was in power in the former Soviet Union, the Sacharovs were exiled and forced to leave Moscow in order to settle down in Gorki, where their visibility, especially in the eyes of foreign public opinion through newspapers and television networks, was dramatically diminished. In some cases, the opposition to the use of nuclear energy for war purposes was less conspicuous but nonetheless constant and, to an extent, courageous. Robert J. Oppenheimer, the director of the Los Alamos Project during war time, refused to support the construction of the hydrogen bomb on technical grounds, citing practical difficulties, if not a sheer theoretical impossibility. Dr. Oppenheimer was in fact hiding his personal moral scruples behind some technicalities. For this he was forced to resign his government post. A less morally sensitive colleague, Dr. Edward Teller, would eventually build the hydrogen bomb.

Given the crucial importance of their work, it is no wonder that a cloud of doubt has always loomed large on the loyalty of the whole category of nuclear scientists. The situation was made worse by the inevitable internal dissension among scientists. Only naive commentators could in fact imagine that scientific progress unfolds according to a smooth, harmonious and self-correcting logic of development. The autobiography of Emilio Segrè, an important collaborator of Enrico Fermi since the early days of the «Via Panisperna Boys» in Rome, proves once more that cold-blooded and self-controlled scientists also are passionate human beings and can have sentiments of warm sympathy as well as of profound dislike for other human beings.³

Nobel Prize winner Emilio Segrè states flatly in his book that the relationships among scientists, especially among physicists, far from being idyllic, are usually «veiled by a reciprocal doubt of suspicion». Segrè is particularly bitter and, it seems, unfair towards Robert J. Oppenheimer, whom he found not only unsympathetic but also «slightly ridiculous». Naturally his term of comparison was the towering figure of Enrico Fermi, «a man of great solidity, whose simplicity was in stark contrast with the elaborate and complicated erudition of Oppenheimer». Segrè has also something to say about the Oppenheimer group, whose average cultural level, in his opinion, «was somewhat below the level of European high school students». It would be wrong, however, to reduce the internal frictions among these scientists to purely personal idiosyncracies or psychological feelings. The very fact that nuclear physicists were dealing with the construction of secret, and powerful, weapons would expose them to the traps and temptations of the spy rings East and West. The recent book by Pavel Sudoplatov and Anatoli Sudoplatov is, in this respect, an important, although controversial,

³ Cf. E. Segrè, *A Mind Always in Motion*, Berkeley Press, 1994.

contribution.⁴ Its main thesis is that scientists such as Oppenheimer, Fermi, Szilard and Bohr were manipulated and used by soviet intelligence. This might be a gross exaggeration but it is well known, on the other hand, that at least some prominent scientists in the West such as Klaus Fuchs thought at one time that passing atomic secrets to the Soviet Union would help keep peace in the world through a relative nuclear balance between East and West. In a sense, I submit that, especially in the years immediately before the cold war when Western Allies still felt that the Soviet Union was a reliable partner in the struggle against Nazism and Fascism, disclosing classified information was regarded more as a counter-culture move, more or less ideologically inspired, than a spy initiative.⁵

In this connection one cannot help admiring the sober attitude of Andrei Sacharov. Confronted with immediate danger of persecution by the Soviet authorities, Sacharov was nevertheless adamant in defending the cause of peace and international understanding. What seems to me, at this point, most admirable is the sense of measure and of balanced judgment he showed time and again. Devoted as he was to the cause of disarmament, even of unilateral disarmament, if necessary, he never gave up the idea of nuclear testing as the only means to assess scientifically the impact of the new weapon technology by either side. At the «Forum for a Nuclear Free World», held in Moscow in February 1987, Sacharov is reported to have said:

The question of nuclear testing is *not critical for the restraint of the arms race*. The issue of nuclear testing, in my opinion, is of minor, secondary importance in comparison with the other military, technical, political and diplomatic problems involved in preventing thermonuclear calamity. [...] I believe that eliminating the issue of a comprehensive nuclear test ban *will facilitate negotiating on more urgent problems of disarmament*⁶.

Thus, we have come a long way. In approximately two centuries, from the anarchist Kropotkin to the scientist Sacharov, the counter-culture movement has come of age. It is no longer to be confused with the grandiose, but highly unrealistic, dream of a totally liberated world through a cathartic revolution and a consequent palingenesis. Rather, it emerges as a piece-meal transformation which is constantly under the control of community judgment, in order to strike the best connection between what is ideally desirable and what is today already possible.

The «Intellectual Factors»

It is well known that the evolution of the later Comte has divided the «positivistic school»: on the one hand, the rigorous ones, like Littré, of strictly scientific or even

⁴ Cf. P. Sudoplatov, A. Sudoplatov, *Special Tasks*, New York, 1994.

⁵ See the interesting polemical exchange, «Were the Atom Scientists Spies?», in *The New York Review of Books*, September 22, 1994, pp. 72-74.

⁶ Cf. A. Sacharov, «Of Arms and Reforms» in *Time Magazine*, March 16, 1987.

scientific positivism; on the other, the Comteans most loyal to the master, those whom even the poetic-sentimental exaggerations of the mature Comte, or the para-religious cult of Clothilde de Vaux, could not shake from their adoring attitude toward the fast «inventor of a new science», working in the solitude of his modest apartment in rue Monsieur-le-Prince close by the Place de l'Odéon.⁷

For all Comteans the primacy of ideas is the presupposition that holds good. It is the development of ideas that permits and makes real the evolution of the arts, institutions, and customs. Ideas are the motor of society. The Marxist approach is inverted here. Comte clarifies: «It is only thus, and with the increasingly pronounced influence of intelligence on the general conduct of man and society, that the gradual passage of our species has been able to acquire that characteristic of consistent regularity and lasting continuity which mark it so distinctively from the vague, incoherent, sterile progression of the higher animal species».⁸

The tripartite evolution – from the theological to the metaphysical and finally to the positive – is peculiar both to humanity and to the individual. To Comte, between the evolutionary phases of each there is a perfect parallel. «Individual development necessarily and in a more rapid and familiar succession reproduces before our very eyes the principal phases of social development – a succession which is overall even better able to be grasped, though it is less pronounced».⁹

It is well known that the law of the three stages, a «law» which to modern epistemology appears too dogmatically expressed to be fully accepted without raising some doubts regarding its critical force – has a crucial importance for positive philosophy. John Stuart Mill defined it as the «backbone» of positivism, as it is supposed to provide the conceptual basis for sociology, which in turn ought to guarantee to the whole positivistic system that universalist character, that completeness, which it needs. With the law of the three stages, sociology becomes a positive science. From the moment this law is the principle of social development as a whole, it not only makes the past intelligible, but allows the forecasting of the future development of society. It is precisely this predictive capacity that makes sociology a positive science.

Comte's enthusiasm for thinking his task finally concluded is understandable; it was a task meticulously planned in advance: both as regards the number of volumes as well as his mental and physical health (no extraneous reading so as to avoid «intellectual contagion», and a diet planned to the last gram to insure top psycho-physical performance). With sociology, Comte finished his scientific voyage and topped off the

⁷ Cf. my «E. Durkheim e M. Weber di fronte al fenomeno religioso», in G. Harrison, ed., *Culturologia del sacro e del profano*, Milan, Feltrinelli, 1966, esp. pp. 30-32

⁸ A. Comte, *Corso di filosofia positiva*, ed. F. Ferrarotti, trans. E. Zagarese, M. Maioli, P. Fioranti Migliucci, 2 vols., Turin, UTET, 1967-'68, p. 342.

⁹ A. Comte, *Corso*, p. 342.

building of unitary knowledge, which was to be embraced body and soul, and at the same time intellectually rewarding and effective from the practico-political point of view.

However, this did not heal – as his correspondent across the Channel was to grasp perfectly – the basic contradiction of the positivistic theoretical construct. From the epistemological viewpoint, Mill saw that it was contradictory, and epistemologically untenable to give precise, compelling designations to the historical development of society through the working out of long-range historico-evolutionary hypotheses and at the same time to state that sole legitimate knowledge was provided by experimental sciences. To notice (as has been insightfully done) a convergence between Comte and Mill on the influence exercised on both of them by two extraordinarily gifted women may be a provocative claim, but not one that can help us resolve questions of theory.¹⁰

Mill's sober empiricism judiciously holds off – despite the influence of Harriet Taylor – any universalizing, cloudy inspiration either of a philosophical or prophetic-religious kind.¹¹

In Comte, the mysticizing effects of the systematic construct as a whole runs the risk of falling into a metaphysicism from which it would seem impossible to save even a trace of intersubjective propositions. The numerous citations from Comte referred to above are sufficient witness of the crude repetitiveness of his «rebarbative» style, to use the epithet applied to it by Hippolyte Taine.¹²

However, admirers have not been lacking and include even those of considerable weight – from Maurras to Alain. Charles Péguy expressed admiration for Clothilde de Vaux's prose. There is no doubt that the reader who is capable of tolerating that clanging, rigorous, even obsessive character of a style builders ends up being absorbed in its iron logic and, can become, in some way, mesmerized by it. Comte's is a style not without its own resounding grandeur, such as to silence if not ignore its essential and at times frankly leaden inelegance. I recall Nicolai Berdjajev's remarks on Lenin's style – writing with hammer-blows; every blow is well aimed and at all cost must be repeated for good measure to avoid forgetfulness or inattention.

¹⁰ Cf. Wolf Lepenies, *Le tre culture*, Bologna, Il Mulino, 1987, p. 135; «For Mill too the memory of his dead wife took on religious aspects. Just as Comte had preserved the memory of Clothilde de Vaux in his religion of Humanity and her own cult [...] Clothilde de Vaux had a role for him analogous to that of Harriet Taylor for John Stuart Mill». The Three cultures discussed by the author are the humanist-literary, the scientific-technical, and the sociological, which ought to serve as medium and mediation between the first two. The author's interpretations of the lives of these writers are very persuasive and enjoyable, but that of their context is less so. There is no reference to the stage of economic development.

¹¹ Cf. S. Paggi. *Il Positivismo*, Rome-Bari, Laterza, 1987, p. 80. «In the more clearly methodological and epistemological conception which takes shape, space required by a point of view which proposes to identify specific conflicts becomes essential».

¹² Cf. H.Taine, in *Journal des Débats* 6.7.1864: «If the first volumes of his Cours are bearable, the later and in general the works in which he deals with politics, religion, history, equal in barbarism the most rebarbative features of German and scholastic philosophy».

More than any possible gap or internal lapses, it is this granitic and hectoring style which in Comte's thought betrays a dogmatic purpose. This tends to confuse the theoretical level with the hortatory one, scientific verification with pedagogic warning. The scientific imperative is transformed into scientific lucubration. The unitary spirit of the system, or the worthy attempt to build and support the unity of knowledge beyond the mechanical partitions of the various bureaucratized disciplines, is corrupted and degraded into mindless reductionism.

From this point of view, the very international contradiction of Comteanism mentioned above is no longer sufficient. Usually, this contradiction is perceived in the very core of the purpose of old-style positivism in its Comtean form, reductively presented as an attempt to diffuse, pseudo-scientifically, the cognitive monopoly of science. In other words, it is what Herbert Marcuse unhesitatingly denounced as crude «propaganda for science». This is true. Comte does not seem worried about constructing *in limine* a theory of knowledge, by resolving what traditionally philosophers regarded as the problem undermining any future philosophizing: that is, the gnosiological problem. In one sense, and in a most typical perspective, Comte had assumed that the problem of knowledge was resolved simply by starting the process of scientific knowledge and thereby liquidating the problem of abstract scientific knowledge through internal examination and practice in scientific work. From this standpoint, Comte's thought as analysis of the sciences is more fertile and committed than his philosophy of science, which is moreover implicit and ambiguous.

Current analyses of Comtean thought, from Raymond Aron's to lesser known ones, do not appear adequate. They restrict themselves to nothing, also with a view to ensuring the logic of Comteanism, that the *Cours* establishes as the philosophical foundation of that scientific politics which finds its full, complete expression in the *Système de politique positive*. In order to renew society, Comte thinks philosophy first of all should be renewed (the «intellectual factor»), and that this should then be grounded in science so that philosophy finds itself playing the delicate role of mediator, as crucial as it is historically unheard of, between science and society. But the distinction between the various levels - philosophical, scientific, and social - does not seem adequately protected against the risk of reductionist confusion. The philosophical riddles of Comteanism are negatively reflected in his theory of science, the new place for political judgment leading toward social renewal.

It is unnecessary to remark that Comte's reductionism hides a deep need that goes beyond the traditional romantic break between the sciences of nature and those of the spirit - with which Weber had tried to come to terms. This dualism still appears, dividing and impoverishing research both in the sciences, wrongly called "exact," and the human and social sciences. This break has become a tradition, but an encounter between the two fields of knowledge and the transcendence of the so-called two

cultures appear as simple necessity, and also a condition of progress in the cognitive processes.¹³ If it is true that there is no specific research technique that does not contain metatechnical value elements, one may also say the same of the language that we use to express observable data accurately. This language is laden with theory, permeated with assumptions and concepts. The postempiricist position of the philosophy of science has been exhaustively recalled and summarized in the following terms:

1. In the natural sciences, data are not separable from theories; what is considered a datum is determined as such in the light of theoretical interpretations and the facts themselves must be reconstructed in the light of interpretation.
2. In the natural sciences, theories are not models compared from outside with nature in a hypothetico-deductive schema: they are the ways in which the facts themselves are seen.
3. In the natural sciences, the relations of laws and their likenesses attributed to experience are internal, as what we consider facts is made up of what theory asserts about their interrelations.
4. The language of the natural sciences is irreducibly metaphorical and inexact, *formalizable only at the expense of a distortion of the historical dynamics of scientific development and of the imaginative constructs in whose terms nature is interpreted by the sciences.*
5. In the natural sciences, meanings are determined by theories, and understood on the basis of their theoretical coherence rather than on their correspondence with the facts.¹⁴

It seems clear that once these points are established, the traditional distinction between natural sciences and human sciences is in crisis (or, to use still more traditional terminology, the problematic relation between facts and values enters into crisis and needs expressing in new terms). Facts are values and values, on the other hand, are to be considered and investigated as facts.

It is not just a matter of stressing, as has moreover often been done for Comte and for others, the inadequacies of the «logic of signs» as abstract logic, or the need to «historicize the logical spirit». It often ends by confusing the «historical method» with a crude teleological evolutionism, the «positivistic spirit» with a presumed «sublimated utilitarianism» and science itself, beyond its intrinsic theoretical nature, with an essentially instrumental function destined to «illuminate the practical». «A logic firmly

¹³ Contemporaries still lag behind on this subject – among them J. Habermas, especially in *Erkenntniss und Interesse* where the sciences of nature are wrongly reduced to their empiricist meaning – without theoretical supports in the real sense.

¹⁴ This effective five-point summary is by M. Hesse, *Revolutions and Reconstructions in the Philosophy of Science*, Harvester, Brighton, 1980, and taken up by Paolo Rossi, «Fatti scientifici e stili di pensiero: appunti intorno a una rivoluzione immaginaria», *Rivista di filosofia*, 21, October 1981, pp. 403-428 (my emphasis).

linked to the scientific doctrine that first made it arise is the aim of Comtean logic», as one author remarked:

Thus it cannot live by means of the preponderance of the deductive spirit. Positive logic remains equidistant from deductive logic and inductive logic because it is not separate from the science which genetically produces it [...] One studies and teaches logic, by studying and teaching mathematics or physics, chemistry or biology. The principle is formally enunciated: «The study of method is inseparable from that of doctrines» [...] To historicize the logical spirit means being aware of its historical necessity, and being aware of this means understanding how it helps the formation of the positive logical method as at once deductive and inductive [...] The harmony between the two methods is historically instituted, thereby flowing out into the open fields of a culture truly positive because it is dogmatically and historically encyclopedic.¹⁵

This harmony is more postulated than established. It remains an unrealized ideal and one it is perhaps not worthwhile reaching. The progress of science has nothing idyllic about it. It obeys no preestablished harmony. It does not follow the tidy paths laid out on the basis of purely speculative calculation. This is the illusion underlying certain discourses that seem at first sight anomalous or exaggerated, like that of Ugo Spirito, who passed without a break, and seemingly with no need for mediations, from the pure activism of Gentile to Comte's scientism. Both lack field work and its essential indeterminacy which so need heuristic techniques and creative imagination.

It may be that Harriet Taylor, friend, inspirer, and then wife of Mill, and Clothilde de Vaux, held responsible for having made the dry Comte discover the warm, poetic world of the sentiments, are about to win their reward. Imagination and reasoning, heart and intellect, no longer seem to have to be opposed, in a merciless struggle, in scientific research. The most authoritative philosophers of science, from Thomas Kuhn to Paul Feyerabend, Derek L. Phillips to Lakatos and Toulmin, seem convinced that the context of discovery and that of empirical validation should not be confused; that both are necessary to the progress of science. In fact,

Neither inductive logic nor deductive logic are enough to explain the growth of science and its life: if the passage of science were subjected to the absolute primacy of experience it would deprive itself of intellectual imagination and creativity. Theories are underdetermined by empirical facts, and the growth of science bears witness to the freedom of the spirit in relation to experimental data. The history of science does not lie in a unilinear progression starting from invariant observable data, but rather in a discontinuous succession of relatively closed *Weltanschauungen*. Scientific rationality has many more points in common with the other domains of thought (art, religion, myth, metaphysics) than logical empiricism believes.¹⁶

¹⁵ Cf. A. Negri, *Auguste Comte e l'umanesimo positivistico*, Rome, Armando, 1981, pp. 57-59.

¹⁶ Paolo Rossi, *Fatti scientifici e stili di pensiero*, pp. 406.

When it is said that Wittgenstein, talking to Bertrand Russell, at one point turned his back and began to recite poetry, we must believe that the Austrian philosopher referred to the same thing. He was pointing to the excessively reductive context and the desiccated nature of a science which was limited to operations of abstract logic, too easily disposed to yield to the temptation to «fail life», if by chance this were not carefully included in its schemas.

As has been remarked:

Especially significant for Wittgenstein's character is the following account by Russell: «One evening, after an hour or two's deathly silence had reigned, I said to him: 'What are you thinking about, Wittgenstein? Logic or your sins?' 'Both,' he replied and fell back into silence» (*Philosophers and Idiots*). And so it was throughout Wittgenstein's life, which was marked, moulded by passionate reflection on logic (in the broadest sense) and by meditation on his own blameworthiness, on the less than full observance of the norms he had set himself. The first provides the content of his philosophy, the second restricts it. Whoever can read sees how the extremely «nonsubjective» writings of this man reflect a character which could not practice logic without thinking of his sins, and could not concern himself with his sins without drawing on logic.¹⁷

Put simply and beyond the picturesque nature of the anecdote, the most recent studies in the philosophy of science seem to converge on an insight that only frustrated specialization has made us forget: science is a human undertaking, problematic by its own nature and open to failure as well as success, and which in its essence presents itself as the dramatic attempt to respond adequately to society's demands in a given phase of its development. To say, as is often done, and also subtly argued, that scientific discourse is one essentially marked by its internal self-correctability, or by its ability to place itself autonomously in crisis when faced with new «facts» which do not form part of the «theory» achieved, able to correct itself by research and renew itself to the point of including the new facts with new, original theories – so presenting science as an activity constantly in crisis, permanent and fundamental – certainly means to have grasped one of its important features. But it also means limiting oneself to a purely internal view of it. When Weber, in *Science as Profession*, perceived in the scientist a new type of ascetic, lay and modern, working with all his might, knowing that, as against the great poet, he must inevitably be superseded, and indeed sees his own work not as a monument for eternity but only as a moment, a simple little step in a collective work, he completely expressed the consequences in existential terms of science as problematic self-correctability. The scientist, faithful to his ideal of the *Kultur Mensch*, as the great individual who rejects every immediate personal gratification in view of the task that transcends this, is stoically realized in self-denial. This moves us to admiration.

¹⁷ Cf. J. Schulte, «L. Wittgenstein o il tesoro misurato», in E. Nordhofen, *Filosofi del Novecento*, Turin, Einaudi, 1988, pp. 7-8.

However, this idea of science does not let one fully grasp its significance as an important historical phenomenon. Science understood as its own ongoing internal self-correctability does not let us understand the formation of schools, of scientific «parties», clans, heads of schools and their followers. It idealizes, or effectively reduces, the development of science into a slow, unilinear accumulation of new knowledge based on new evidence gradually discovered, interpreted, and «stipulated». Such a reduction makes it intersubjectively binding, conceding thereby nothing to the inevitable blurring of specific historical phenomena, delays related to mental habits, dogmatism and scholastic loyalties, and to power struggles that the «politics of science» inevitably unleashes beyond and against the purely theoretical paradigms of scientific argument in its internal aspects. This is especially true in an age when science has stopped being a question for the individual scientist, alone in his cave, study, or *cabinet du travail*, half empirical experimentalist, half alchemist or witchdoctor, becoming transformed into the complex organization of big science, with massive funds linked to industry and government.¹⁸

Thus Thomas Kuhn is right, and behind his “structure of scientific revolutions” and «paradigm changes» it is all too easy to discern, or at least guess at the moving, tortured shadow of Wittgenstein. Once it is established that science is none other than a human undertaking, or one of the many, varied human activities, behold, it becomes flesh, something everyday, underlying everyday practices dictated by custom and habit. It stops being a majestic edifice, as the totality of true propositions, and loses the mysterious and rather wearing aura that inevitably accompanies the idea of a universally valid and timeless construct. This is by definition so perfect, becoming by pure interiority, that it cannot even be said to have a history in the current sense, that is, of chance accumulation (at times as cryptic as at others it is explosive) of experiences and travails. It is not even the whole of «falsified» propositions, if only for the banal reason that it is an illusion to believe one can critically test the validity of science through science itself. This would mean believing that one can transcend or simply increase one’s stature by climbing on one’s own shoulders.

Moreover, there are no «brute facts», by whose measure one can test theories. I have already said that there are no facts without theories. Facts become «data» insofar as they are perceived, organized, and elaborated according to a theory. One can say that one has science when the *pragmatic datum* is transformed into a *problematic*

¹⁸ We know above all C. P. Snow’s *The Two Cultures and the Scientific Revolution*, Cambridge, Mass., CUP, 1961, is more important. On the relation between science and political power see the remarks in *Il paradosso del sacro*, Rome-Bari, Laterza, 1983; on the «technocratic illusion», see the essay of the same name in my *La sociologia come partecipazione*, Turin, Taylor, 1961. It is well known that in classical Greece the scientists kept apart from power and thought it imprudent to pass their secrets to politicians. Moreover, every technico-operational application of theoretical calculations was considered degrading to the same degree as religious profanation. It was not an accident if, once the defense of Syracuse had been assured by Archimedes, he burnt his technological notebooks. The behavior of Enrico Fermi who communicated the secrets of controlled atomic fission to political power would thus appear irresponsible or simply incredible.

datum.¹⁹ But theoretical apparatuses do not fall from the clouds, and they are not individually constructed by individuals.

One learns a science in today's conditions almost like joining a club, more or less an exclusive one. One no longer works alone. One goes to school. One is part of a scientific community. Even when one decides to play the rather ambiguous role of outsider, and to criticize the whole scientific establishment and put oneself against the dominant orthodoxies, even then, and perhaps especially then, the scientific community confronts us like a personified polemical term. It is like the «enemy» against which we measure ourselves and, to a certain necessary extent, to which we assimilate.

It is no longer possible, if it ever was, to devote oneself to scientific activity as one devotes oneself to a private activity. Science today is a public proceeding, and requires being communicable and intersubjectively transmissible. It is a collective legacy. This is not only a chance of style, but one of substance.

From this point of view, one grasps the whole of Comte's, and historical positivism's, greatness. Comte fully understood the new social character of science. He understood the link developing between science and society. At least a hundred years early, Comte saw science was becoming a directly productive «means», and thus a reality, not just instrumental, but rather a resource, a new basis, the new basis of consent and legitimacy of industrial society. It is no longer possible to speak of «two cultures», the scientific against the humanistic. Only observers stuck in unilateral preferences can still do this. Culture is summed up in a nutshell in the ability rationally to evaluate, globally, humanly meaningful situations. To return to Comte, one must reason in terms of a total «intellectual order» resting, as has been persuasively argued, on «a speculative system, from which one arrives at the level of the abstract study (a knowledge made up of a scientific *credo* and thus no longer eternally constructed anew, on its own account) of the natural world and the human world». «This abstract foundation will let us at a certain level introduce deductive method (*marche déductive*), so as to draw together all our thoughts into a unity, enough to make possible a sufficient and customary system of our sentiments and actions».²⁰ In this sense G. Preti had observed, at a time when the old, outdated historiographical categories of Crocean and Gentilian idealism were still dominant, that:

positivism, as regards the history of culture, and also of philosophy insofar as this is a form of culture, and one not to be overlooked, means to be a systematization, a reordering. In this sense, one feels oneself very close to a new Hegelianism. [...] All forms of culture are true - within their own limits - true insofar as they represent a «moment» of truth. All aspire to transcend this moment and to be the Truth. And in this they are all false. For us, to restore their meaning is the task of historical critique;

¹⁹ Cf. my «dato pragmatico e dato problematico», in *Quaderni di sociologia*, Naples, Liguori, 1973.

²⁰ Cf. A. Negri, *Auguste Comte*, p. 215.

not the infantile one seeking good and evil, truth and error – but that the Gods are everywhere, as Heraclitus taught.²¹

The moments of truth correspond to what I would call «worlds of thought», prescientific attitudes in the sense that they precede true scientific theorization. They condition it in the sense that they point it in certain directions rather than in others, and limit it in the sense that they enclose it within a given «problematic awareness». Every moment of truth is never thus solely a pure cognitive act. It is determined, but also fed, by a whole world of sentiments, attitudes, tastes, and principles of preference not to be reduced to intersubjective knowledge, rigorously «stipulated», or to a public procedure. This is what Schumpeter, a little pompously, called «the original vision».

Here a serious limitation to «Comtism» becomes clear. This limit is in Comtean terms insuperable. His undeniable merit, a very great one, lies in his having understood and anticipated the social significance of science – a contribution which still today throws light on the inner workings and interconnections of industrial society, and of incipient postindustrial society. Comtean thought pays for this discovery by way of a «dogmatic infallibility» which, at the very instant at which its own no temporality is asserted, decrees the end of history and places itself contradictorily outside it. This marks its high point and its death. It can no longer recognize that the values and criteria of rationality together are historically variable. It revives the sterile contrast between humanistic and historicist culture and does not recognize that the «poverty of historicism» cannot be repaired through the night from history, but rather through a neo-historicism capable of grounding the evolutionary concept of a unitary science. In this science, nature and culture encounter and mutually fertilize each other, in a network of dialectical meditations: that is, in Comte's initial terms, the aprioristic conjunction of the «physics of nature» and the «physics of custom».²²

The basic shortcoming of Comte (shared with Saint-Simon), but also of the whole of contemporary science, is to be seen in the consideration of the scientific judgment as the basis of *social consensus*. It is true that science is a «public procedure», open to question, controllable by everybody able to check the correctness of applied method. In this sense, science is endowed with a peculiar self-correcting mechanism, but at the same time science does not seem able to give meaning to human experience. It is essentially a perfection without purpose. Goals, that is, values for human initiatives, must be given by ethical consideration which far exceed the scope of scientific inquiry. In this respect, the «Invocation finale» of Auguste Comte, at the end of the fourth

²¹ Cf. G. Preti, *Idealismo e positivismo*, Milan, Bompiani, 1943, p. 243.

²² Cf. Karl Popper, *The Poverty of Historicism*, Boston, Beacon Press, 1957, which does not, however, manage to free itself from the technocratic illusion of «social engineering», supposedly ending up having the same paralyzing effects Popper accuses the evolutionists and “metaphysical” historicists of causing. «Holistic control, which must lead to the equalization not of human rights but of human minds, would mean the end of progress», p. 159. For the suggestion of a neo-historicism, see my *Storia e storie di vita*, Bari-Rome, Laterza, 1981; *La storia e il quotidiano*, ibid., 1986; and *Il ricordo e la temporalità*, ibid., 1987.

volume of *Système de politique positive*, as well as, in the same vein, the «Prière sur l'Acropole» by Ernest Renan, in his delicious *Souvenirs d'enfance et de jeunesse*, are passionately suggestive and misleading. Science cannot be construed as the basis of a program for the regeneration of humankind. Science must recognize its limitations. It has nothing to say vis-à-vis the properly human issues: love, justice, the recognition of one's personal dignity, death. Its drive toward total quantification in the name of the cult of precision ignores the simple fact that not all the knowable is rigorously measurable. With her usual insightfulness, Simone Weil understood this crucial point as regards the ancient Greeks: «I think they were not amazed that there were relationships undefinable by numbers, but intensely happy to see that even what is not defined by numbers is still a relation. [...] The "second class" minds might have been dismayed; the others must have been ecstatic in being raised to a notion of relationship which asks for an exercise of the intellect purer than the numerical relation».²³

This seminal idea has been developed by Eric Weil in a well-known text concerning the role of the humanistic studies faced by the overwhelming advance of technical and scientific disciplines. Far from seeing the humanities on the same level as the so-called hard sciences, and while recognizing explicitly the importance of the natural or exact sciences, Weil insists that the humanities should have a guiding function whenever far-reaching social and political decisions are concerned.²⁴ For this reason, the role of Renaissance humanists in transmitting scientific texts should be remembered and reconsidered in the right perspective, as Eugenio Garin has forcefully demanded.²⁵ As well, the primary function of moral and historical sciences should be reaffirmed, especially in the present situation in which the inability of scientific and technical progress is clearly perceived by everybody as is its inability to give a sense of direction to human history and society. The uncritical glamorization of science and technical progress seems to be nothing more than the eternal return of the identical. It is quite amazing that such a shortcoming should have been grasped not by the «specialists», but by a sensitive literary critic. «The conflict between the "two cultures" – Susan Sontag writes – is in fact an illusion. [...] The problem of the "two cultures" [...] rests upon an uneducated, uncontemporary grasp of our present cultural situation. It arises from the ignorance of literary intellectuals (and of scientists with a shallow knowledge of the arts, like the scientist-novelist C. P. Snow himself) of a new culture, and its emerging sensibility. [...] We are what we are able to see (bear, taste, smell, feel) even more powerfully and profoundly than we are what furniture of ideas we have stocked in our heads».²⁶ Present-day science should find a reconciliation with humanities through a salutary sense of its limits, what for the Ancients was the fear of the *ápeiron*,

²³ S. Weil, *Sur la science*, Paris, Gallimard, 1966, pp. 245-246. [Editor's translation].

²⁴ See E. Weil, «Le rôle des universités» in *Commentaire*, n. 24, 1983, pp. 871-879

²⁵ Cf. E. Garin, *Il ritorno dei filosofi antichi*, Naples, Bibliopolis, 1994.

²⁶ Cf. s. Sontag, *Against Interpretation*, New York, Anchor Books, Doubleday, 1986, pp. 296-299.

or the «boundless». In this way, there is hope for a scientific progress not hostile to the equilibrium of the environment and ready to serve the vital interests of human beings.

Time as a Scarce Commodity

Philosophical weakness, linked to a certain degree of unawareness, has prevented social analysts from using Heidegger's profound intuitions without submitting to their paralyzing fascination and Heidegger's pro-Nazi position. Virtue does not have the monopoly of truth. His reflections on memory are certainly to be kept. They help us understand how society is not possible without culture or a complex of experiences and shared and lived values. In this sense, tradition is essential. The roots of the past are a guarantee of meaningfulness for the future. In the revolt of 1968, its statements and behavior of indiscriminate irreverence revealed themselves in their characteristic infantile-minded superficiality. In this, they were like the vociferous «antipastism» of the futurists at the beginning of the century, who proposed to destroy the museums while exalting speed, the slap, and the knife-thrust. Not just the reverent attitude of the student of «antiquarian history», about whom Nietzsche wrote, is at stake. The question goes deeper. It involves the awareness of one's own original mold, the promises already contained in it and expressed in a potential state. «Devotion» toward the past in this sense has nothing passive or blindly subordinate or merely repetitive in it, nothing dogmatically «obscurantist». Memory is an attitude of internal disposition toward the careful consideration of what once was and what is today. In this sense, memory is an attitude of «devotion» - one of respect for everything that, giving meaning to life, should be preserved in a safe place, away from the hubbub of the market and its transience.²⁷

Societies that are unilaterally oriented and spasmodically straining toward the future are not only destined to lose their past, along with their roots; it is probable they will also lose their future. Already they run the risk of the insignificance of a mindless, arbitrary present where the capacity for evaluation is reduced and the new coincides with the different. And on the other hand, the different resolves itself invariably into the already-known. Therefore, for example, a country like the United States is continually changing; it moves from one «revolution» to another, and always seems prey to profound transformations, whereas in reality the change does not exist, does not go beyond the morphological rind of situations. Structural and sociopsychological change do not exist. There is only transition from the same to the same. Everything is copresent, simultaneous and flattened. The perspective, sense, and perception of depth are lacking. Analysis splinters against a facade of bungalows. Reasoning is

²⁷ Cf. M. Heidegger's reflections in *Was heisst Denken?*, Tübingen, Niemeyer, 1954, especially lesson 4, part 2: «Memory initially signifies the interior disposition of man, and his devotion [...] "disposition" has a wider meaning than that common in modern speech; it means. [...] the essential being of all human nature. [...] In Latin it is called *animus*, as distinct from *anima*. [...] Memory, in the sense of human thinking which remembers, lives where everything that offers nourishment for thought is kept in safety». On modern «flattening», see M. Perniola, *Transiti*, Bologna, Cappelli, 1986.

lost in the uniform forest of images. «Factuality» tends to replace critical reflection. The terms of questions cloud over. I have already remarked on a singular fact of North American life. What seems in the shopping mall a magic moment outside any determinateness of time and place tends through TV to become a mass experience, a collective sleepwalking.²⁸

Gore Vidal's wisecrack may seem unduly generalized and mean («America is a Ramada Inn from coast to coast»), but anyone who has traveled for long, preferably by car, through the endless plains and central deserts of the United States, has known at first hand its sense of infrangible squalor, must have experienced the worn-down insignificance, without form or design, formless and casual like a landscape after a bombardment, of space void of humanity. Such a traveler will have known the wide streets lined with the pulverized ruins of myriad irregular, fragile buildings, similar as a whole to the painted canvas flats of touring theater, to be struck the day after, in certain urban landscapes; together with the sinister, funereal peace of certain suburbs, unreal in the manicured perfection of their yards. This traveler must have felt flow through his or her own body the loneliness of a civilization of the interchangeable and the provisional. This is the world of the inauthentic, the world which prefers the comfort of the disposable to that of duration through time, the convenience of superficial change to the pleasure of the stability wherein experiences and meanings sediment.

To get out, suffering seems inevitable. It is the great historical tragedies, the anguish of failure, the subtle, entangled uncertainties in the face of the difficulty of the task which lay bare the nerves of self-consciousness and thus of the authentic. So too it is the sense and the acute awareness of one's own finiteness that, along with the sense of limit and of one's own mortality, give the individual the awareness of his or her own irreducible unrepeatability, his or her own unfakeability, of the final, no instrumental nature of the person. But the transition from the person as simulacrum to the personality as individual and specific to the person is impossible by way of the pure, labyrinthine introspection which has been bestowed by the philosophical tradition. The initiative whereby the personality of the individual is expressed is not to be characterized through a generic «commitment» or *engagement*. To be specifically operational and not be reduced to the outdated alibi which confirms a practical inertia, initiative must come to terms with the historically determinate characteristics

²⁸ Cf. my *La storia e il quotidiano*, pp. 5-9. The German movie director Wim Wenders has remarked that in the United States «people are victims of the overweening power of TV. Video does not expose reality, it manipulates it. The image is made up of many lines, which have no relation to the things focused on. It is a sophisticated trick. It does not let one really penetrate the world. Aside from Manhattan, which is not America, TV dominates daily life 24 hours out of 24. Literature, painting and theater count for nothing. Newspapers themselves have an ever-decreasing importance. [...] There is no more information, no more possibility of expression, there are no more ideas» (interview in *L'Espresso*, 30 March 1986). Wenders's originality is certainly not earthshaking: that TV is manipulative and that, contrary to the cinema, it «writes» its images on the face, that is, the skin of the viewers, is well known. However, his statements confirm a problem worth examining. According to Walker Percy, *The Thanatos Syndrome* (New York, Farrar, Straus and Giroux, 1987), «a large part of people's anxiety and depression today comes from watching TV» (*N.Y. Times Book Review*, 5 April 1987, p. 22).

of the extrasubjective context. These cannot be deductively foreseen. They must be examined, described, explained, and interpreted by conceptually oriented empirical research. The traditional philosophical outlook with its apparatus of ahistorical concepts and essentialist quiddity here meets with its limit. The principles of personal preference and subjective idiosyncrasies tend to mask each other and take on the character of universal, and by nature unattainable and untouchable, principles. The specific characteristics of the context become ungraspable. The suggestiveness of the philosophical formula then conceals a cognitive void which blocks self-expressive operational initiative insofar as it ignores the «effective», historical terms with which the latter must compare itself.²⁹

In industrialized societies, possibly for the first time from the historical viewpoint, time becomes a scarce commodity, calculable quantitatively beyond its intrinsic quality. The cult of speed as a good in itself develops: that is, as a goal worthy of being pursued as such. The rhythms of the machine tend to replace human ones. Deadlines reproduce themselves. Temporal pressure generates itself. A generalized hurry makes its entrance in human society, anxiety producing and frantic, whose reasons and ends have been forgotten.

Some seemingly modest authors, who are in reality detectors of time like very sensitive seismographs or water diviners, are still instructive at the beginning of the year 2000.³⁰

Perhaps this is the case of Mario Morasso, from Turin, active in the last quarter of the nineteenth century up to the First World War. He was a versatile writer, an effective essayist, if at times exposed to the risk of discursiveness regarding his subjects. These ranged from the properly sociocultural, like *Contro quelli che non hanno e che non sanno* (Palermo, 1899), *L'evoluzione del diritto* (Turin, 1893), *L'origine delle razze europee* (Turin, 1895), *Uomini e idee del domani-L'Egoarchia* (Turin, 1898), to subjects still stimulating and relevant today like *L'imperialismo del secolo XX* (Milan, 1905), *Il nuovo aspetto meccanico del mondo* (Milan, 1907), *La vita moderna nell'arte* (Turin, 1904), and lastly *La nuova guerra* (Milan, 1974). Morasso was a feverish forerunner (emblematically one of his poems is entitled *Profezia*), and precisely for this his basic characteristic is simultaneously that of spy and bearer of the time he lives in. This is the Italy of the last years of the century, after the tremendous economic and sociopolitical crisis of 1900, which starts decisively along the path of industrial development during the Giolittian decade. It opens up to the great myth of progress as the necessary and inevitable result of technico-mechanical evolution. Morasso wrote: «The metropolis, the central fire of civilization, the tempestuous seat of modern life, the crazy terrain of the crowd where

²⁹ I purposely use the Machiavellian term «effective». It adequately indicates a research purpose which comes under the area of «acritical realism».

³⁰ I use, and draw attention to my «La macchina come 'nuova arma.' Riflessioni su un autore minore», *La critica sociologica*, 73 (Spring 1985).

the struggle unfolds with a terribly compounded rhythm, the metropolis of endless streets and endless noise, where passes, unstoppable, the tempestuous, inestimable parade of human activity and wealth, the most enormous construct of our age: the amazing pile which only our growing energies have let us build and let us live in – the metropolis is the lighthouse of civilization, the goal of all our desires and all our efforts».³¹

This is a dithyramb to the industrial city, center of the production of technique, which foretells and precedes the fiery writings of F. T. Marinetti, the founder of Italian Futurism. The city, along with the automobile, arises as symbol of modern life: it appears as the trademark of a whole civilization, mirrored in it and recognizing itself therein. Humanistic contemplation and the archaic, rustic nature of traditional culture is replaced by the powerful myth of an urban world, no longer artisan and idyllically rural, but technical, swift, tense. It is no longer tied to the rhythms of nature, but ready to transform it, to invent a new form of life. There is nothing in this regard that is extemporized in Morasso. These ideas come to him from afar, from his earliest writings. The will to power which has often let him be mistaken for one of the many fin-de-siècle nationalists, or one of Nietzsche's proto-d'Annunzian enthusiasts, takes on an original conceptual form in him. In the Preface to *Uomini e idee del domani - L'Egoarchia* (1898), he said:

This is not a matter of Nietzsche, his superman and his system of moral reversion. Only the customary dilettantes will be able to bring forward the absurd accusation of the superman - I give a shrug, and don't bother about them. I admire Nietzsche, and admired him when no one in Italy yet knew who he was, but I firmly assert that my insights on universal aggregations, and on the sexual origin and the evolution of human society have absolutely nothing to do with Nietzsche, and in any case they much preceded the knowledge I had of him from his writings. These ideas, which have an exclusively scientific and positive basis, are mine. Only mine: and finally even my individualistic theory, if it did reconnect with something in precedence, can be found to have its connection with Stirner. My theory is the further development of philosophical individualism.³²

Possibly the candid statement of faith above would suffice to make the limits of Morasso's thought comprehensible. This thought does not transcend the framework of the prevailing culture of his day. It is essentially positivist, evolutionist, basically Spencerian, little aware of the historical character of human phenomena. However, what characterizes and deeply sets apart Morasso's thought from Spencer's and many Italians at the end of the last century is his ability to grasp the aspects of novelty connected to the new productive techniques. More precisely, his is a real gift of understanding and perceiving, often intuitive and artistic, if not quite explaining and

³¹ M. Morasso, *La vita moderna nell' arte*, Turin, 1904, p. 243.

³² M. Morasso, *Uomini e idee del domani - L'Egoarchia*, Turin, 1898, p. XI.

calculating, the social effect of technique: his foreseeing, even if still in an imaginative rather than scientifically specific way, its weight in daily life and on the masses' mode of thinking. Perhaps in this area one can maintain that Morasso remains original also as regards the Futurists who, on the other hand, provided him with subjects and metaphors. In this sense, Morasso has a journalist's nose and the eye of the social investigator. He lacks the discipline of scientific research. He is a kind of sociologist without method, incapable of «disciplined subjectivity», but his sense of social problems being created and growing from the apparently chaotic bosom of current life is undoubted. The work that most convincingly demonstrates these gifts, even though with undeniable discontinuities, is certainly *La nuova arma (la macchina)*, published in 1905. It has been remarked that «a true aesthetic of the automobile was asserting itself in France, and also in Italy, especially in the work of Morasso, author of *I prodigi* (1898), *Profezia* (1902) and *La nuova arma* (1905). In this last book, Morasso wrote with precognition of the coming of “new, very powerful beings, of an unknown species, centaurs of flesh and iron, wheels and limbs”. The automobile: “the individual finds his energies multiplied a hundredfold by the machine”. Finally the author lyrically described a race in an automobile. It was the same subject dealt with by Filippo Tommaso Marinetti»³³.

The remark is certainly well based, but it repeats and echoes a widely shared opinion. It does not exhaust the question. Morasso's originality is to be seen in his ability to connect the coming of the car and mechanization on a vast scale with lifestyle and modes of thought, according to a universality of effects and series of repercussions which cross over the level of literature and art to involve the world of social relations and economic and political structures. From the first part of *La nuova arma* dealing with the «rhythm of life», to the sixth part devoted to the «man of speed» and the «heroes of the car», Morasso has the following peculiarity: he is never content with merely literary or aesthetic considerations; on the contrary, he penetrates the meanders of the everyday and asks himself about the interconnection between the growing mechanization and quality of social life. He asks himself about the human types which will be required by the growing number of cars, about the new psychology the car will make necessary to enable adaptation to its rhythms, its operations as impetuous and irresistible as they are impersonal.

Bibliography

1. A. Comte, *Corso di filosofia positiva*, ed. F. Ferrarotti, trans. E. Zagarese, M. Maioli P.Fioranti Migliucci, 2 vols., Turin, UTET, 1967-'68, p. 342.
2. A. Comte, *Corso*, p. 342.

³³ Cf. B. Romani, *Dal simbolismo al Futurismo*, Firenze, 1969, p. 113.

3. A. Negri, *Auguste Comte e l'umanesimo positivistico*, Rome, Armando, 1981, pp. 57-59.
4. A Sacharov, «Of Arms and Reforms» in *Time Magazine*, March 16, 1987.
5. B. Romani, *Dal simbolismo al Futurismo*, Firenze, 1969, p. 113.
6. C. H. Waddington, *The Scientific Attitude*, London, 1941, p. 160.
7. C. P. Snow, *The Two Cultures and the Scientific Revolution*, Cambridge, Mass., CUP, 1961.
8. D. MacDonald, *Against the American Grain*, New York, 1952, p. 426.
9. E. Segrè, *A Mind Always in Motion*, Berkeley Press, 1994.
10. E. Weil, «Le rôle des universités» in *Commentaire*, n. 24, 1983, pp. 871-879
11. E. Garin, *Il ritorno dei filosofi antichi*, Naples, Bibliopolis, 1994.
12. F. Ferrarotti, *Il paradosso del sacro*, Rome-Bari, Laterza, 1983; on the «technocratic illusion», *La sociologia come partecipazione*, Turin, Taylor, 1961.
13. F. Ferrarotti, «dato pragmatico e dato problematico», in *Quaderni di sociologia*, Naples, Liguori, 1973.
14. F. Ferrarotti, *Storia e storie di vita*, Bari-Rome, Laterza, 1981; *La storia e il quotidiano*, ibid., 1986; and *Il ricordo e la temporalità*, ibid., 1987
15. F. Ferrarotti, «La macchina come 'nuova arma.' Riflessioni su un autore minore», *La critica sociologica*, 73 (Spring 1985).
16. F. Ferrarotti, «E. Durkheim e M. Weber di fronte al fenomeno religioso», in G. Harrison, ed., *Culturologia del sacro e del profano*, Milan, Feltrinelli, 1966, esp. pp. 30-32.
17. Ferrarotti, Franco. "Sacred and Profane. Essential ambiguity and vital necessity of the Sacred." *Academicus International Scientific Journal* 17 (2018): 9-35.
18. F. Ferrarotti, *La storia e il quotidiano*, pp. 5-9. *L'Espresso*, 30 March 1986
19. G. Preti, *Idealismo e positivismo*, Milan, Bompiani, 1943, p. 243.
20. H. Taine, in *Journal des Débats* 6.7.1864.
21. J. H. Robinson, *The Humanizing of Knowledge*, New York, 1923, p. 81.
22. J. L. Schechter & L. P. Schechter «Were the Atom Scientists Spies?», *The New York Review of Books*, September 22, 1994, pp. 72-74.
23. J. Habermas, *Erkenntnis und interesse*. Vol. 422. Beacon Press, 1971.
24. J. Schulte, «L. Wittgenstein o il tesoro misurato», in E. Nordhofen, *Filosofi del Novecento*, Turin, Einaudi, 1988, pp. 7-8.
25. K. Popper, *The Poverty of Historicism*, Boston, Beacon Press, 1957
26. L. Wolf, *Le tre culture*, Bologna, Il Mulino, 1987, p. 135.

27. M. Hesse, *Revolutions and Reconstructions in the Philosophy of Science*, Harvester, Brighton, 1980
28. M. Heidegger, *Was heisst Denken?*, Tübingen, Niemeyer, 1954
29. M. Morasso, *La vita moderna nell' arte*, Turin, 1904, p. 243.
30. M. Morasso, *Uomini e idee del domani – L'Egoarchia*, Turin, 1898, p. XI.
31. M. Perniola, *Transiti*, Bologna, Cappelli, 1986.
32. P. Rossi, *Fatti scientifici e stili di pensiero*, pp. 406.
33. P. Sudoplatov, A. Sudoplatov, *Special Tasks*, New York, 1994.
34. Paolo Rossi, P. Rossi, «Fatti scientifici e stili di pensiero: appunti intorno a una rivoluzione immaginaria», *Rivista di filosofia*, 21, October 1981, pp. 403-428.
35. S. Paggi. *Il Positivismo*, Rome-Bari, Laterza, 1987, p 80.
36. S. Weil, *Sur la science*, Paris, Gallimard, 1966, pp. 245-246.
37. S. Sontag, *Against Interpretation*, New York, Anchor Books, Doubleday, 1986, pp. 296-299.
38. W. Percy, *The Thanatos Syndrome*, N.Y. Times Book Review, 5 April 1987, p. 22