USAGES OF SCIENCE: THE USE AND ABUSE OF PHYSICS

by

P. N. Correa & A. N. Correa

ISBN 0-9689060-4-4

Published in Canada by
AKRONOS Publishing @ Aetherometry.com

USAGES OF SCIENCE:

THE USE AND ABUSE OF PHYSICS

by

P. N. Correa & A.N. Correa

ABRI Monographs: Philosophy of Science: S1-01

CONTENTS:

> "You yourself have said that knowledge is power."
>
> "No!" he said emphatically. "Power rests on the kind of knowledge one holds. What is the sense of knowing things that are useless?"
>
> C. Castaneda, "The teachings of D. Juan"

PART I -
A BRIEF GEOLOGY OF KNOWLEDGE AND ITS USAGES

1. Knowledge in archaic societies

For most of the archeological and historical record of humanity, science was of little importance. Knowledge of the Real was neither scientific, nor the object of formal training and study. But ever since the dawn of culture, perception was coded, trained and overlaid with interpretation - one that fitted the daily life of human beings and held together the project of endowing Man with words and their memory. The creation of a social reality depended entirely upon this work of culture - a relationship of denotation between the sign and its referential, between words and things whereby both become tools, tools for new and more exact communication of thoughts, senses and affections, and tools for the transformation of both self and the world. Most cultures have now come and gone - through declines of their own or those which civilizations, and particularly our own, have imposed - and with them unsuspectedly different and complex systems of knowledge disappeared forever. Only today are we beginning to fathom some of what has been thrown by the wayside - and it bears questioning whether our feeling that nothing has really been lost is not but a spurious result of our interpretation of what knowledge, and science, really are all about. For we tend to think about science as a merely intellectual capacity to comprehend the world. But comprehension by itself is worthless - for actual understanding only comes from transforming the world, from acting upon what is comprehended, from experimenting, from altering our perception. And other cultures, with other means and lacking the analytical and quantitative techniques which we make exclusive to the notion of science, have experimented no less with reality - and found, not necessarily what we have found, if we are to refer to such matters as atomic secrets, periodic tables, entropy corollaries, syllogistic deduction, etc — but found perhaps other realities, other experiences of reality, other forms of employing energy, and derived knowledge from them, and acted with power upon them, experimenting along paths we have no inkling of, let alone of whether their results were accurate or not. Science, then, is not independent either of perception or from intent, or still from action in the world. And there can be knowledge of the real even when there is no quantitative description for phenomena.

Typically, the depositaries of the knowledge of archaic societies were shamans, sorcerers, brujos and brujas, medicine-men, karaïs, men and women of knowledge, men and women of power with a peripheral and anomalous position within the band, tribe, clan. They served as conduits between the socially formed perception and the imperceptible powers of nature, as a guide to subtler senses and finer percepts, a guide for becomings that uncovered nonhuman worlds. If their knowledge was affected by culture with a positive value this depended solely upon its practical utility or, at any rate, the conception of such utility, even when perceptually it was or became devoid of any actual usefulness.

How does knowledge becomes devoid of any usefulness? For the argument here is not about the utility, real or perceived, of something, but about the usefulness of the tools of knowledge - about whether they can comprehend reality and permit us to transform it, be this by noble or by base desires. At stake in this usefulness is the employment of knowledge, so to speak, the types of conversion into power that it can undergo, and here it is not just errors of perception or memory that creep in, nor just the distortion that systems of knowledge undergo when perceived by noninitiates, but also a certain desire for the false, a certain desire to express itself by myths, fictions, illusions and fantasies.

Thus knowledge came to indistinctly encompass that which permitted understanding of the Real as much as that which mistrusted the Real, or attributed to the Real imaginary characteristics it lacked. This arbitrary tangentiality of knowledge with respect to the Real constrained cognition to take, not the Real, but itself as the object of its work — and the Real only to the extent that cognition itself had become part of it. Throughout archaic animist cultures, primitive and savage societies of the Paleolithic - this ambiguous relation of knowledge with sensible reality remains, with culture already engaged in a reflexive activity that serves as double to the work of nature itself. Undoubtedly this was a strange enough experimentation of the unconscious with the forces of consciousness and the socialized domain of a preconscious that works on the level of a cultural channel of instinct. But this animistic ambiguity was not dominated by a negative element - yes, it was already ethnocentered, xenophobic, superstitious, projective; but it could not afford being closed to the outside, it was constrained to affirm a minimum of practical usefulness in knowledge - and thus such ambiguity was an essential condition for the experimentation these archaic societies engaged upon with natured nature, with the naturation and renaturation of the animal nature of Man.

Sometime in the more recent past of the Late Paleolithic, a series of events took place which transformed this general condition - the ambiguity became ambivalent, a closure came about, some

societies and cultures became 'closed', their ethnocentrism became theocentered, superstition became supercilious, mystical, religious in the strict sense of the term, and knowledge turned into a negative value - became knowledge for knowledge's sake. Here we find knowledge becoming an object of formal training in the originary model of an engineering and managing priesthood; and, just as well, we find it becoming an object of secret training in the alliances of metallurgical miners: the hydraulic sciences of the State, on one side, and the itinerant science of warring nomads and their allies, on the other. But this is a complex movement. On the side of the State, the practical utility of the knowledge wielded by a sedentarian peasant is now exclusively referred to the earth but in the context of an imaginary knowledge of the heavens provided by a ruling bureaucracy that unifies agricultural villages with an hydraulic network; and the knowledge wielded by the archaic priest is stratified both on a imaginary level, on a transcendental plan, and on a terrestrial plane, as knowledge of the practical utility of hydraulics and administration. But it is not as if the usage of an imaginary knowledge on that transcendent plane of representation did not have an obvious utility: for it was the very recognition, at the level of representation, of the reality of knowledge as power, in this instance as capacity to integrate and dominate a herd, a large mass, a large network of fixed villages, in the form of a separate or imperial Power.

So, in a sense - and greatly condensing all the meanderings of these oscillations of a more recent past that cut across the sedentarizing periods of the Mesolithic and Neolithic, and the so-called Bronze and Iron ages where a flux of nomadism coexisted with Warfare-States, with City-States - we are compelled to say that science and religion were born together in royal or imperial societies. What in more archaic societies was the animistic domain of knowledge, culture and communication - the invention of the sign and a writing mnemotechnique of inscription upon the body - gave way to a first division of activities for knowledge: as religion, its usage is entirely tied in with the exercize and emergence of a separate political power, a Power; as science, it becomes sedentarian agriculture, it becomes hydraulics (the sciences of the State) - and, in a zone of indiscernibility between sedentarians and nomads, it becomes metallurgy (the itinerant science). Here, straddling both the sciences of the State and the itinerant science, is where one finds the origins of Physics, Chemistry and Biology, no matter how modest, but as already distinct in content, though not in form, from Theology, from a knowledge that can only be religious - transcendental, arbitrary and imaginary.

Obviously, the separation of the scientific content of knowledge from its political content in the form of religion (and every religion began as State religion) was a function of the practical utility of scientific knowledge for the reproduction of socially created conditions of survival. Life in primitive societies was undoubtedly constrained by the natural milieus, and the positive aspect of knowledge was directly engaged upon these milieus as a function of the practical utility of what was 'cog-

nized' as experience in the perceptual apprehension of repetition. But the animist relation is one rather of insertion of culture into nature, than one of constraining nature for a different evolution of culture, an evolution that involves a certain decay of culture, of customs, of intelligence, to the eventual benefit of an imperial Power. With State priesthoods, daily life is exclusively transformed into a process of labour, a process of survival where activities are irreversibly specialized and territorialized: the peasant, the priest-engineer, the priest-administrator, the priest-policeman, the priest-judge, the priest-astronomer and necromancer, the metallurgist, the mercenary, the soldier, these become the new social figures. It is the State itself that introduces exchange and currency as a means of controlling fluxes of signs, objects, women and war. It is the State that determines the emergence of the commodity - and which eventually gives in to military aristocracies by granting them private property rights, thus making capital itself possible.

2. Knowledge in the classical and scholastic periods: physics and metaphysics.

The break occasioned by Greek culture comes at a crossroads when - at the outcome of an integration of nomadic war-machines with State apparatuses - knowledge seeks a foundation for its autonomy with respect to belief in imaginary constructs, by invoking the separation of fact from fiction, of truth from the false and the imaginary, of reason (nous) from the arbitrary. But this process of evaluation is, from the outset, caught up once more in the primitive ambiguity, now doubled up by the burgeoning separation between science and religion, between sense knowledge of the material world, and the metaphysical knowledge of forms and imaginary essences conceived by thought; in sum, between body and soul, between organ sensations and 'disembodied' concepts.

This dualism was inevitable, as theology or the imperium of religion was at once confronted with having to yield to a higher physics (Anaxagoras as the beginning of a Physics of the Aether), and having to become a metaphysics of pure Forms (Parmenides and then Plato, the beginning of the dialectics of Being and the Void) - under pressure, either way, to find a rational foundation for itself. Christian scholasticism, and particularly Aquinas will later stem this movement by construing the domain of theology as that of revelation, and placing physics and metaphysics on the side of rational knowledge. This, of course, would go a long way to confuse the notion of metaphysics, of whether metaphysics was a science or simply theology. But at stake in Aquinas' move was a reaction against Augustine - against his assertion that things, Man and God were unintelligible - while preserving the domain of God's unintelligibility as accessible only via revelation.

With Aquinas then, the first dualism is that between revelation and rational knowledge, followed by a second disjunction between the physics of the senses and the metaphysics of the soul and the idea. But why then is metaphysics not said by Aquinas to be simply and exclusively founded upon

revelation?

The notion of metaphysics is one of the most circuitous and arbitrary concepts of post-hellenic philosophy. It originated with Andronicos of Rhodes, from a mistake in the mere cataloguing of those books of Aristotle which were collected and placed after (beyond, meta) Aristotle's Physics. With Averroes, it first applies to the knowledge of divine matters but also to the principle of knowledge of things and action. But it is with Aquinas that it acquires the sense of a rational knowledge of that which manifests the supernatural, a science of the divine and supernatural that complements the Christian revelation, by making the immaterial intelligible. The object of metaphysics as a science would be precisely all that which is not given by the senses, all that which is beyond physical matter — the objects of metaphysics being what Aquinas called transphysica. Essentially then, metaphysics concerned the knowledge of beings which are not given by the senses, knowledge of the soul and God not by revelation but by 'natural reason'. The transcendent could be grasped either by revelation or metaphysically, as knowledge - such is the position of Aquinas.

This separation of physics and metaphysics was undoubtedly marked by the fundamental dualism between senses and forms inherited from Platonism. Late Greek culture and philosophy had steepened the separation between senses and concepts, between sense-perception and the geometry of essences, between the multiple in a state of flux and the static unity of forms. Science or Physics could never be truthful or bring truth to light - they were condemned to the fraud of the world of the senses, the world of the fleeting and the passing, the world of the multiple and the mobile. Once the real identity of being and thinking becomes a metaphysical identity through the mediation of the immobile forms - reason itself contradicts sensation and it is the senses which now acquire the aspect of something unreal, something irrational, something dissembling in that it has no being, is pure semblance or Parmenidean nonbeing.

We know how Anaxagoras had opposed this useless and fruitless knowledge that only serves to perpetuate its own error - which he perceived as already being part and parcel of Parmenides' philosophy. For the price to pay for placing being on the side of forms and reducing concepts to pure forms, was to miss the opportunity to understand how being was on the side of the senses, on the side of the multiple, on the side of becoming, on the side of motion and the eternally changing. We also know how this Anaxagoran project of integrating existence with essence, or the perceptible with the imperceptible, to uncover an immanence to the Real, was not picked up again during the classic age, except to a certain extent by Democritus, the Atomists and Lucretius. From a Parmenidean Platonism towards a dualist Aristotelianism via a dialectical or maieutic Socratism, it is all history of metaphysics — counting one, two, three: the static unity, the principle of conflict between essence

(noumena, thesis) and existence (phenomena, antithesis), and the false synthesis — the compromises, the epiphenomenal resolutions. The problem of Hegelianism begins here, with Parmenides and Plato. And it is here that the Judeo-Christian tradition of a new priesthood finds its ecumenical, universalistic and catholicizing intent: by inverting the terms of the relation, the unity of the world is made to appear to lie outside of it, since the flesh and the mind are taken as mere semblances of the soul, which alone belongs to the unity of God.

However, the principle of subversion of this dualism can already be found in Aristotle - not in his formal treatment of logic, but in his inversion of Plato's theory of abstract Ideas as pure Forms that exist only in the world of Reason, with the notion that Ideas or Forms only exist in nature and not apart from it, on a transcendental plane. With Aristotle, what is at stake with respect to knowledge is not understanding forms produced by the spirit, but the things that confront spirit and induce perception of forms.

Across the scholasticism that dominated European feudalism, the dualism of reason and the senses remained connected or ligated by the unity of a metaphysical soul, alone endowed with reality, and alone capable of guiding any thinking in concepts. But here and there, during the scholastic period - Duns Scotus, William of Ockham, and then in the Renaissance — Francis Bacon, Descartes, Galileo, Spinoza - the Anaxagoran critique of Parmenides is again fragmentarily taken up, in the hope of finding a physical foundation for the form-essences, in the hope of finding a method or approach to treat essences as truly existent in the form of a multiplicity that, in Nietzsche's words, "has true being" even if it is not yet capable of being thought or seized as coming-to-be or becoming.

With Duns Scotus (1270-1308) we are first confronted with the assertion that "the invisible things of God", the incorporeal and imperceptible elements of being can be known exactly by way of the visible, the corporeal and perceptible elements. Being does not differ from essence, yet for Duns Scotus, what makes something different and not identical with something else, what defines the "principle of individuation" of a thing or element, is form, not matter, such that there is always a qualitative difference in essence between individual things or elements. This will be echoed by Hume's empirocriticism and stood in opposition to Thomas of Aquinas' contention that individual things, barring the distinctiveness of their souls, could only differ by their positions in Space since they could always be resolved into pure matter - and pure matter consists alone of undifferentiated parts that are distinct solely by the positions they take in Space. B. Russell remarked in his History of Occidental Philosophy that Duns Scotus' polemic with Thomas of Aquinas had the result of re-introducing "an excessively metaphysical interpretation of [Aristotle's] Organon", with the consequence that logic and the theory of knowledge remained dependent upon metaphysics and theology. But Russell may well

be mistaken in his commentary - since Duns Scotus' concept of the difference indicated rather the need to think substance as a multiplicity.

The 'excessively metaphysical' usage of Aristotelianism - or the Platonic interpretation of Aristotelianism, was frontally attacked by Wilhelm of Ockham (1290-1349), first disciple and then rival of Duns Scotus - as Ockham placed logic on the side of a philosophy of nature and posited it as independent de jure from theology and metaphysics. Ockham held that things are intelligible, since the object of the senses and the object of understanding are one and the same. If science deals with things, logic deals with the analysis of science, with the relations established by science and with their inner cohesion - it concerns therefore the universals or concepts as elements of the spirit and created by the spirit, elements that only exist in reason and by reason - whereas things are in the domain of singularity. Science would concern itself with terms of the 'first intention' (what we would call today, functions, or concrete concepts) and logic with terms of 'second intention' (concepts tout court, or abstract concepts). With Ockham's neo-Aristotelianism one of the most important foundations of science takes place: if understanding must be said of things or of the given by the senses, and not of forms produced by the spirit, and if these forms are only universal when they relate the 'first intention' notions of science, then philosophy is essentially the logic of science, the analytical knowledge of science. Hence, the rule that carries his name, Ockham's razor, which addressed a limitation both to philosophy and to science: "Beings must not be multiplied unnecessarily"; in other words, amongst competing explanations or theories, one should opt for that which provides the simplest account with the smallest number of known or ascertainable variables. Ockham's razor is essentially a principle of logical analysis, rather than one of experimental research, but it marks the most definitive contribution of Aristotelianism to scientific investigation.

Be this as it may, Ockham sided with Aquinas by agreeing that there is a universal before things (universale ante rem), needed to explain creation itself (as the created uncreated), and as a concept that belongs to metaphysics (foreshadowing Kant's Pure Reason a prioris). Yet the universals are not things - but concepts, and as such the only universals that knowledge can admit to are the universals after the things (universale post rem), after things are perceived and known as individual things.

3. Knowledge in the Renaissance period: science finds its method

Despite his defense of the 'doctrine of the dual truth', the revealed truth of theology or religion and the rational truth of science, Francis Bacon (1561-1626) attempted to provide science with an inductive method which would enable science to secure a domain of experimentation distinct from the analytical and formal deduction of mathematics and geometry. Greatly influenced by the pre-

Socratics and above all by Democritus and Lucretius, Bacon held - against neo-Aristotelianism in his Novum Organon - that only efficient causes were necessary and sufficient to explain the workings of nature, hoping that from the mere ordering of the given one would come to induce the correct explanation for the facts. But his inductive method for the establishment of series of propositions that transited from the singular or special to the general never quite overcame 'induction by simple enumeration', as it remained unable to take into account the quantitative aspect of natural multiplicities - of physical and biophysical assemblages. The mere plurality of facts suffices for nothing - one still has to understand their links, their connections of production, their syntheses and how they deploy different types of coherence or cohesion. Bacon saw justly when he sought to validate experimental science by a method which would be distinct from that of deduction or formal logic. Effectively he attempted to penetrate the energetico-material logic of reality, the syntheses of the Real - but without any notion of how science would address the problem of the quantitative. Yet his contribution, like that later on of Galileo Galilei, was to replace the metaphysical question why? with the scientific question how?, a question that in its origins is not separable from the notion that science and art (techne) are one and the same, a craft that understands reality (theoretical science) and a craft that knows and intuits how to change it (practical science).

Descartes (1596-1650) also subscribed to a dualist view of a thinking substance and a substance in extension, positing the total independence of soul and body (and it is here that Newtonian physics borrowed the notion that Space and Time are autonomous and independent realities), but his thought is a very strange instance of a philosophy that retained separate and independent hypotheses. By postulating that there cannot be a perfect or distinct idea of the union of the body and soul, Descartes tried to secure for science a mechanical domain for knowledge - while sustaining the notion that there is no causality between body and soul, that the movements of one and the other are autonomous. But Descartes, as Wahl too has demonstrated, is a complex philosopher - one that reached beyond Cartesianism, specifically, one that did so by attempting to describe the object of mathematical theory as an effective physical object, with the result that God itself becomes but a subtler substance (an aether) filling up Euclidean Space — a Plenum establishing a continuum between all things, all bodies and all souls. It was by invoking an interstitial Plenum that Descartes rejected any notion of action at a distance - and he was the first to introduce the problem of the imperceptible, the problem of the permanent motion of the immaterial, in sum the problem of the Aether, into science — by mathematically conceiving of the mechanical vortex-like properties of this subtler fluid. Of course, such a foray into functionalism - which limited itself to the mechanical properties of energy systems - would also be condemned to failure, to stepping back to mechanicism - since the electric properties of fluids remained entirely mysterious, and Cartesian algebra could not suffice by itself to deduce the properties of the medium of Space. Mechanical effects are derived from energy func-

tions, but they cannot replace energy functions.

Aspden has drawn attention to this quasi-functionalist hyper-mechanistic approach of Descartes [(1)], one that goes beyond simple parallelism or dualism to establish the physical and mathematical, ie the scientific foundations for the essences or substances that move through separate existences. Whittaker described Descartes' ultimate doctrine as one of epistemological rationalism - "that is, the assertion that physics can, like Euclidean geometry, be derived entirely from a priori principles, without any dependence on observation and experiment" [(2)]. This stands in stark contrast to Bacon's search for an inductive method that would validate experimental science - and today we know the extent to which abusive reliance on mathematical methods, from Descartes, to Leibniz, to Newton, Maxwell and Einstein has damned the actual progress of physical knowledge of nature and indirectly strengthened the hand of those, like Spinoza, Bergson and Deleuze, who hold that absolute knowledge can only be conceptual, qualitative, not functional and quantitative.

But in Descartes' notion of a Plenum, which is structured into distinct vortices, one finds another point of connection with Spinoza's monistic pantheism or with Leibniz's monadology: the notion that the forces of matter, whether active or reactive, derive from more primary forces, those of the 'soul', those of monads or substances of themselves. In his modern theory of a dynamic mass aether, Aspden draws our attention to Descartes' concept of an Aether filling up all Space as one that required the Aether to be in a constant state of motion. This, of course, was a return to Heraclitus, but even more importantly, a return to Anaxagoras - and a full fledged rejection of the Parminedean-Platonic problem of metaphysical essences. At the core of his theory - and evoking Anaxagoras who first suggested that the nous was composed of ceaseless whirls, Descartes places rotation as the fundamental function of Aether motion - hence his concept of Space filled to the brim with Aether vortices. It is noteworthy that Aspden's recent theory of a layered Aether — where an electromagnetic lattice structure in constant spin is coupled to a countermoving electrogravitic Aether layer — pursues the Cartesian insight of a vortical organization of the Aether in the model of a 'vacuum spin'.

The Aquinas distinction between the physical or natural and the metaphysical or supernatural is the disjunction that marks all subsequent philosophy, the Cartesian dualism of body and soul and the Kantian dualism of noumenon (thing in itself) and phenomenon. This dualism originally placed the real world on the side of the metaphysical noumenon, and the world of the appearances or semblances, on the side of the physical phenomena provided by the senses. But with Kant this undemonstrable real world becomes unattainable - prescribing that it is not just unknown, but de facto and de jure unknowable, save for the necessary a prioris. Thereby the real world of metaphysics becomes abolished - becomes exposed at last for what it was all along - a myth (as Nietzsche describes

in the Twilight of the Idols, under the title of 'History of an error'). But with it is also the world of the appearances, the World as Appearance, which is abolished - almost imperceptibly. This ends the long history of an error, permitting other workers to begin exploring what it is that works to produce both extension and intensity: the beginning of a microfunctionalist exploration where what is said to be noumenal is no less the object of science than what was said to be phenomenal.

This "zenith of mankind" (Nietzsche's term) takes long in coming. Few in fact escape the dualistic striation of Occidental thought - in the Baroque age, Spinoza and Leibniz perhaps. E. Whittaker stressed how 'the birth of modern science" was necessarily an emancipation from Thomist philosophy" (3). Yet, on one hand, science inherited the Thomistic dualism, just as Ockham also did, and on the other, if modern science emerged with Ockham's neo-Aristotelian principle, with Descartes' analytical method, with Galileo's experimental method and the Copernican revolution, it remained prisoner of a metaphysics of representation - which with Descartes already took the form of a pure geometry, just as sense presentation acquired exclusively mechanical characteristics. This was Descartes' compromise - neither siding with Platonist idealism, with vitalism and spiritualism, nor siding with neo-Aristotelianism, with mechanistic logic, with materialism, but trying to establish a parallelism between the two by positing the dual nature of reality, at once material and spiritual or immaterial.

But rejecting causation between the spirit and the body, between the senses and percepts, on one hand, and thought, concepts and forms, on the other, can only go so far without understanding how the material and the immaterial depend upon one another, how they function together as an energy machine, how organ movement (Spinoza's mode of extension) and organ perception (Spinoza's mode of thinking) obtain 'inorganic points of contact', how the function effectively determines the goal: any attempt at overcoming dualism and psychophysical parallelism could only go as far as monism (Spinoza, Leibniz).

Following the commentary of Bergson on Spinoza (1632-1677), the intuition that served as basis for what J. Wahl has called 'the metaphysical experience' of Spinoza resided essentially in the "sentiment of a coincidence between the act whereby our spirit comes to know truth perfectly and the operation whereby God creates our spirit" (4). There is in Spinoza a junction, a merger between the neo-Platonism of the Renaissance, the hebraic tradition (as opposed to the judeo-christian tradition) and the Cartesian influence. Descartes had not been loyal to his own project of disengaging a science, by reducing science to the physical and leaving the metaphysical as standing outside and beyond the knowable. Like Descartes, Spinoza posits that between the body and the mind (mens, Spinoza rarely using the word soul, anima) there is no real action, no principle of causality, but unlike

parallelism (Leibniz) there is a correspondence (isomorphic, isonomic but also isological, to employ the terms of Deleuze's analysis of Spinoza's practical philosophy) — that all action in the body is also action in the mind, that there is only one order of world for things and ideas (an identity of order for bodies and minds), and that since the mind is solely the idea of the corresponding body, knowledge is solely a matter of the adequacy of ideas to things. Given that "there is a correspondence between the affections of the body and the ideas of the mind" (5), what is intelligible is at once the same spiritual and material world.

Reich was correct when he assessed in this respect how monists came closer than vitalists (spiritualists), mechanists (materialists) or dualists to the common denominator of all natural functions. For monists, like Leibniz or Spinoza, both the mind and the body are in turn phenomena of an absolute ontological unity of substance. But this one substance for all the attributes is already a multiplicity of substances with different attributes, one substance per attribute of thought and extension.

If Whittaker qualified Descartes' ultimate doctrine as epistemological rationalism, Deleuze once denoted as epistemological and ontological parallelism (6) Spinoza's doctrine of the body and the mind and the coincidence of Nature and God in the context of there being only one substance, one aether. As we have seen, maybe the term parallelism was not the most appropriate, to the extent that Spinoza poses a correspondence between body and mind, which Descartes' rationalist dualism had precluded. Be that as it may, and if Spinoza harshly delimits the value of mathematics, he nevertheless presupposes, no less than does Descartes, a method of inference whereby the formal relation of ontological elements can be comprehended a priori, since the "privileges of the attribute of thought are based on the complex status of the idea of God or the infinite intellect" (7).

Galileo (1564-1642) is in many respects the breath of fresh air that shakes this belief in the progress of knowledge by virtue of analytical methods that limit themselves to deductive approaches and require axiomatic a prioris. From most of his teachers and predecessors he could only glean erroneous assumptions and grandiose generalizations which he systematically proceeded to test and demolish. Through a method of critique - by the design of local hypotheses to be experimentally tested, Galileo sought to arrive at fundamental laws for the movement of bodies via systematic observation and the mathematical interpretation of the results. It is Galileo who sets experimental and mathematical physics squarely upon a quantitative inductive method - variously described as complete induction or the inverse deductive method: facts are obtained repetitively by observation or experiment, and a provisional hypothesis is adduced to account for them, from which, by a process of rigorous deduction, predictions are made which again must be tested by further experiment or observation: "Let us therefore take this at present as a Postulate, the truth whereof we shall afterwards find

established, when we shall examine other conclusions built upon this Hypothesis, to answer and most exactly to agree with Experience" (8).

It is with Galileo that the scholastic age - and the dominance of Aristotelianism in natural inquiry - came to an end, just as science first struggled for its emancipation from the church, from theology and metaphysical speculation. And the paradigmatic shift was a multiple one - since Galileo at once condenses the impact of the Copernican Revolution (as he is the first to explain the orbits - place and speed - of planets as a function of the law of free fall) and Bacon's inference of an experimental method. Galileo is thus to be credited with the demonstration that the observable and sensible are not only intelligible but also measurable and as such describable by mathematical relations, beginning with the principle of the conservation of motion. With Galileo, there is a continental shift from a theocentered world where knowledge was mostly a matter of faith and revelation, and things and beings hardly intelligible, to an anthropocentered world where exercizing the powers of reason (observation, experimentation, inference and deduction) permitted us to understand and modulate the mechanisms of nature. Just as there is here also another breakage, between a universe which was geo-centered (where the earth was motionless, following Aristotle), to one which is heliocentered - a universe which becomes composed of precise and eternal clockworks modeled on Galileo's pendulum law.

4. Science and philosophy in the Romantic and Modern epochs

At the dawn of the Romantic period and in the wake of the Renaissance, science obtained its classical foundation with two thinkers who acridly disputed one another - Leibniz (1646-1716) and Newton (1642-1727). Leibniz draws on Descartes' argument of a Plenum of space against Newton's notion of action at a distance. At stake was not whether Space is Euclidean, but whether it is an empty form or is fully occupied. Since neither Descartes, nor Leibniz or Newton could enunciate the basis for an energetic physics, the whole debate focused on the notion of forces - an approach that would remain dominant throughout the luminiferous and electromagnetic (Maxwell) aether theories, Nietzsche's philosophy of force and even relativistic 'field' theory; an approach from which modern science has never been quite able to extricate itself.

Leibniz proposed the notion that the derivative forces of matter refer to primary forces, "but differ from them in status or in aspect" (9). Only the monads - or "substances in themselves and of themselves" - are primary forces endowed with "a solely inner action" ('powers in action'), whereas the derivative forces are mechanical or material forces. But since Leibniz was constrained to think of Space as a tissue of forces, primary and derived, his view of the Plenum has often been equated (for instance, by B. Russell) to a system of relations between monads (or souls) and bodies. It is also not

accurate to see Einstein's General Theory of Relativity as a vindication of the Leibnizian conception of Space as a system of relations over Newton's theory of an absolute Space where bodies exert 'forces by action at a distance' mechanisms. And when it comes down to a theory of movement that can account for rotation and not just translation, neither Einstein's nor Newton's nor Leibniz's theories make motion and specifically rotation any less mysterious than it remained throughout Descartes' purely deductive doctrine. Indeed, it will take long even for modern Physics to come to the realization that unlocking the mysteries of the motion of waves holds the key to understanding both translation and rotation. The absence to this day of a single successful filiform solution for wave-functions remains as a tribute to the still current unintelligibility of the natural functions of movement. And despite much mocking of Galileo's persistence in regarding states of rest as merely states of infinite slowness — because time would only exist by virtue of motion and motion, as that which alone has speed, would always require time which therefore could not be a quantity that vanishes to zero — against therefore Einstein's principle of equivalence between rest and motion, it may well be that Galileo was pointing to an actual algebraic relation which Cartesian algebra prematurely discarded, a relation which may well prove essential to understand wave functions properly: it is rest which is relative but motion which is absolute.

In this fashion, could we have come closer to return to Anaxagoras' problem - and from a Heraclitean perspective at that? And if motion alone is absolute, if becoming, change and transformation are perpetual, then it must matter indeed to understand precisely how this motion is effectuated, what are its functions, how it operates, how it fills or fashions Space and unfolds Time, how it moves - in short, how the nous orders the chaos. This brings us to the difference between the monistic systems of Spinoza and Leibniz - as the former seeks a unification of thought regarding the modes of the sole substance that is absolutely infinite (and where Hegel goes to borrow his notion of the Idea that through Spirit becomes Concept, since Spinoza's Idea of God comprehends both the substance and the attributes), the latter, Leibniz, proceeds by "multiplying matter" through the multiplication of what it is that lies beyond matter, through the multiplication of the souls or monads - to arrive at the conclusion that Wahl took: "thereby [Leibniz] found that there was just as much multiplicity in matter as there was in thought" [(10)]. Wahl pursues this further by arguing that Leibniz "tended even to destroy the idea of matter, for all there is everywhere are assemblages of diversity". It is here we find the moving foundations for understanding the monads, or souls, or primary forces, as massless functions of speed - pressaging Einstein's treatment of mass as condensed energy, and pressaging, still rather more importantly, a treatment of the Aether which would be purely energetic, and in being so, would directly provide for the integral longitudinal and transversal components of wave motion.

The unending quarrel between Newton and Leibniz concerns not only their shared claim to

the invention of calculus (differential method for Leibniz, or method of the fluxions for Newton), on precisely the problem of understanding and describing motion, but also two very distinct conceptions of the Aether. For, if Leibniz retained the Cartesian notion of a Plenum, but abandoned the deduction of vortices to the benefit of a system of relations, these relations were at once independent from their terms and conceived as pure relations of speed. The elasticity and plasticity were already material, mechanical or secondary effects of a permanent state of motion - which brings us to the contrast with Newton's mechanical theory of the Aether, what Sklar has called the fundamental substantivalist theory.

When Newton sought to criticize the Cartesian vortices and Leibniz's monads, it would be to Galileo's inductive method he would take recourse, by arguing that "I have not been able to deduce from phenomena the reason for these properties of gravitation, and I do not invent hypothesis". It is common to read or hear Newton being given credit for discoveries which were made by Galileo. Of Newton's three laws of motion, the first, as it regards conservation of motion - and specifically uniformly accelerated motion, was discovered and formulated by Galileo, and Newton's universal law of gravitation is essentially a reformulation of Kepler's laws of motion and Galileo's law of free fall. Newton neither discovered gravity nor understood its causality, nature or operational function. But, more to the point, Newton's fundamental principle of action-at-a-distance coupled to his notion of a static and vibratile medium was no less an hypothesis invented from scratch and undeducible from the facts, than Descartes' notion of aether vortices had been - and, at any rate, it is even less legitimate.

Newton left us a conception of the Aether which differed in a fundamental respect from the conceptions of a Plenum that Descartes and Leibniz had elaborated: the Newtonian Aether was a static one, like a jelly, where fluxes of matter and subtler fluids were considered to be either movements of corpuscles or mere vibrations of a static and elastic medium. In one stroke Newton had removed from the imperceptible all notion of movement, as if the absoluteness of the Plenum relied on its staticity, on its uniformity, on its immobility, and not precisely on its motion, on its unceasing and swirling motion. It was this false knowledge of the Aether embodied in a mechanical structure of Space that limited the entirety of electromagnetic theory, even if Maxwell sought to avoid this mechanistic limitation (with the notions of aether drift, force fields, the immaterial substance of electricity, etc) - and which at last was put to the test, and to rest, by the Michelson-Morley experiment. The triumph of Special Relativity was predicated here - not on the premise that the Aether does not exist (since Einstein believed at a point that the gravitational field constituted a massless or immaterial Aether), but on the determination that the static Aether does not exist - that Newtonianism was dead wrong in assuming that the motion of bodies can be referred to a static Aether in the form of an

absolute speed.

But Spinoza, Descartes, Leibniz and Newton all shared one notion in common - a notion which Nietzsche and Bergson will also share - that there is only one Time, single and universal. In this respect, the mechanistic break with the notion of a single Time did not come from the Physics of gravitation but from the Physics of heat, where the break insinuated itself first in the form of the irreversibility of Time. Like the Christian theological break with circular Time in the form of a linear Time of evolution between alpha and omega states, between the allegories of the commencement and the end of Time, the Physics of heat gave to Time an irreversible direction that excluded any repetition of the universe, precluding therefore any notion of circular Time. It is a long way from denying the unity of Time, yet it already breaks with its ancient notion of a repeating cosmic clockwork. Indeed, the Physics of gravitation, and Newtonianism in particular, retained the notion of Time as a repeating clockwork mechanism: even if there was no specific notion of a circular Time proposed - the notion of a cyclical Time remained implicit to the mechanism of free fall and the interplay of centrifugal and centripetal forces in the movement of bodies and planets. But the rise of positivism - tied as it is to the increasing dependence upon the heat engine to power the Industrial Revolution - introduced for the first time an energetic consideration which prescribed an order to Time, precisely because of the irreversibility of the processes that involve evolution of heat caused by the transition between qualitatively different states within a system.

Prigogine and Stengers commented on this relation between the two fundamental models of science, the gravitational and heat models: "Heat and gravity, two universals, coexist in physics. Worse, as Comte was to state later, they are antagonistic. Gravitation acts on an inert mass that *submits* to it without being affected by it in any other way than by the motion it acquires or transmits. Heat *transforms* matter, determines changes of state, and leads to a modification of intrinsic properties. (...) To the mechanical equilibrium between forces, the positivist classification simply adds the concept of thermal equilibrium" (11).

The thermodynamic concept of energy and kineticism implies an irreversible and non-repeating order to Time. Clausius organizes this element of the conservation of force and the irreversibility of process around the concept of entropy. He contrasts the mechanical processes proposed by the Physics of gravitation, where the ideal case is seized as perfect reversibility of mechanical forces and a perfect coincidence of this reversibility with the conservation of energy, to the thermodynamic processes ruled by entropy - where "a physico-chemical transformation may conserve energy even though it cannot be reversed" (12).

Strangely enough, there is here a mixture of the properties of Time (the irreversibility of the Duration process) with the properties of thermodynamic systems that evolve to a greater state of disorder, a randomistic chaos of thermal equilibrium. For the arrow of Time is no less an arrow for any self-ordering processes of nature, than it is for entropic systems that become disordered by equalization of heat flows. Yet, this association of irreversible Time with entropic systems that dissipate heat gave a measure of Duration as aging, now taken as increasing disorder of a discrete milieu. Any conception of circular Time was irreversibly precluded, and to this day the thermodynamic corollary of the 2nd Law has remained entrenched in the postulate that, be it by expansion of Spacetime (the increasing void between particles) or by the evolution of heat, the universe is progressively breaking down until, it too, will die out when all the conserved energy will yield to a degree zero of motion, in a state of maximal disorder. With thermodynamics, irreversibility of forces is equated with the irreversibility of Time, and despite the paralogical assimilation of irreversibility of forces to an increase in disorder, the possibility of a repeating Time is precluded. Thermodynamics, and entropy in particular, tell us that Time is bound to have an end, Time itself is entropic, evolving towards states of lower probability of order. As Prigogine and Stengers describe it, the world of Thomson, Carnot and Clausius, unlike the world of Newton and Laplace is "described as an engine in which heat is converted into motion only at the price of some irreversible waste and useless dissipation" (12).

It is only natural then, that the failure of the Michelson-Morley experiment to detect the motion of the earth through the Aether would put the Newtonian-Laplacian gravitational model in doubt, provoking a further rise to dominance on the part of the heat model - and it is eventually from thermodynamics that the quantum mechanical revolution will emerge, with the study of blackbody radiation and the discontinuity action principle. At the time, the question then became - how could one synthesize a thermodynamic quantum-mechanical behaviour with an electromagnetic theory of waves revised to conform with relativistic postulates, and furthermore, come to integrate any relativistic quantum theory with a field treatment of gravitation? Throughout all the attempts at such a double synthesis, Time retained its irreversibility while undergoing fragmentation or loss of universality. Eventually, with QED, even irreversibility would be lost from Time, with the theories of antimatter and hyperspace.

With the advent of Relativity, as the culmination of both Cartesianism and Newtonianism, we have become condemned to search forever for the unification of nature outside and above nature, outside and above sense-perception. The unity that is offered is not the real unity of function, but a metaphysical unity that permits the separation of imaginary Spacetime from the Space and Time of the senses. Physics has become condemned to forever try to reach for the roots, to forever seek the totalizing unity of the diverse phenomena that will continue by definition to escape its grasp. For as

long as the problems (the nature of charge, the nature of mass, the problem of rotation, the problem of motion, etc) remain badly posed - in a confused way - so will the solutions remain inadequate. The quest for a unified field theory inserts its origins here, in the religious search for a book-tree, a Holy Grail, a holy-book, a holy analogue of the world. In a real sense, Relativity is more a *reformation* of the metaphysical positions of Newton, than an anti-Newtonian *revolution*, or a purely relativistic victory. Newton posited an absolute Space over and above the dynamic and kinematic relations between material objects, and Einstein's Spacetime continuum is also an absolute reality separable from energetic and material considerations, as a type of pure Form. Undoubtedly, Relativity marks the end of the Romantic age of science, forever barring the theories of the static luminiferous aether from redressing their head. But the era of modernity which it augurs is no less dependent upon abstract aprioristic formalisms, than were Newtonianism or Cartesianism.

The classical theory of a static luminiferous Aether - in its most consummate form as Maxwell's theory of an electromagnetic Aether - had presented a strong unity from which almost all phenomena, optical, electrical, magnetic, and inertial, could be derived, the gravitational phenomena being excepted. At first, however, the dethronement of the classical picture by Relativity did not so much replace the classical unity with a relativistic totalization, as it put into doubt the viability of the classical picture - it *unpowered* it. Inertial motion, affecting a change in the respective places of material bodies, was not susceptible to an absolute measure by electromagnetic means. This could only signify that the stationary Aether was a physical fiction. But where Special Relativity chose to draw the line was instead in negating the reality of simultaneity, with its concept of Time-dilation. Here is where the most intense point of rupture with the romantic and classical notions of Time took place - the rupture with the classical view of a universal Time, a single Duration. For the unity of Time, be it conceived of as circular or evolutionary, was the foundation, the roots of the unity of all classical and romantic worlds, the very unity of static Being: uniform Time, whether linear or circular, is at the roots of static Being - and ensured therefore some legitimacy to metaphysics.

Certainly Relativity compensates for the fragmentation of Time into timelines that can only enter into relativistic 'simultaneity', by integrating these timelines in the Spacetime geometry - by making them into reversible and extra dimensions of Space. But in doing so, all simultaneities are distorted, because the real compensation for the introduction of multiple times, rootlet-times, is the acceptance of the dilation or transformation of Time along any and every line, as a function of relative wavespeed having a uniform limit. The unity of the world is then to be found not in its content, but in its (empty) form. The reign of the Form in Relativity is also a return to Plato, not Spinoza. It is in this sense that Relativity actually treats the speed of light in vacuum (in Space empty of matter) and all electromagnetic interactions as having an *absolute* speed, an invariant from which it deduces

the pure Form of Spacetime. In the second principle of Special Relativity, which serves as postulate for the motion of gravitational waves in General Relativity, we have a *residual notion* of absolute velocity. It is this residue of metaphysics which leads SR to accept that acceleration, irrespective of an inertial frame, has an absolute value of nonzero magnitude. Hence, Sklar wrote- "If we refuse to adopt a particular inertial frame of reference, the only invariantly characterizable magnitude of acceleration is the zero magnitude. It is [therefore] meaningful to ask [for Special relativity], 'Is this particle suffering no absolute acceleration at all?" It is not meaningful to ask, "what is the (nonzero) magnitude of the absolute acceleration of this particle?" So we are left [in SR] with a residual part of the notion of absolute acceleration." (13). Sklar concludes that "in the special relativistic spacetime (...) there is no such thing as (...) the absolute magnitude of nonzero accelerations", as all other speeds, but the speed of light in vacuo, are relative speeds.

5. Towards a unitarian microfunctionalist science

At stake in somehow taking up the Anaxagorian project was understanding change, by making any 'coming-to-be' into the true object of cognition, by seizing the world as interaction, as transformation, as permanent conversion — in a word, "as a sum of truly existent essences" (14). This is a movement that brings knowledge to the point of understanding things as relations, as nothing but relations between speeds, between matters (or matter-forces) in flux. There is thus here a refusal to make forms produced by spirit into the object of knowledge - exposing not only "the falsehood inherent in the absolute separation of senses and concepts" (15), but above all by searching how to make the concept mobile - and that, we shall argue, is to find the functions that delimit the practical reality of concepts, to move from concepts to their functions - be these functions of natured nature (*natura naturata*), or functions that naturate nature (*natura naturans*), renaturate it or denature it. The problem of knowledge then becomes one of introducing motion into the concepts, as much as one of introducing becoming into a multiplicity of 'truly existent essences' which exist "simultaneously in all eternity" (14). And, to begin with, any such project must uphold that "if thinking in concepts, on the part of reason, is real, then the many and motion must partake of reality also, for reasoned thinking is mobile; it moves from concept to concept; it is mobile, in other words, within a plurality of realities" (15). It is motion, change, becoming itself which holds the properties of being - motion, change, transformation alone being permanent, uncreated, eternal, indestructible. Difference then between beings and forms is not an illusion, not a mere appearance or semblance, but directly the result of the permanence of motion, change, alterity or becoming.

It is apparent that it is in monism that microfunctionalism - beginning with Reich's orgonomic functionalism - uncovers the beginning of the true scientific method, one that satisfies Bacon's requirement for an induction principle which would be more than simple enumeration and quanti-

tation. But here, the criticism that one addresses or must address to Spinoza is the same that one must address to Riemann, Bergson and Deleuze: monism also failed to understand how "abstract mathematical reasoning is able to predict objective natural events" (16) - and in this respect calculus hardly compensated for the failures of algebra. This in fact is integral to the overall failure of science, specifically of Physics - even in an epoch when the number has acquired an essential uncertainty (the Born-Heisenberg paradigm) or has been relegated to mere approximation of a geometry of intervals (with the Principle of General Relativity). The problem here harks back to Leibniz's calculus of probabilities - to a notion of quantitative multiplicities which is at best limited to a stochastics of point-numbers and to the calculus of variations (and yet claims to describe the micrological by the infinitesimally small) - and to a notion that quantitative multiplicities cannot differ in quality.

In this respect, if Reich was unable to completely reach a molecular functionalist science, Deleuze and Guattari were equally unable to uncover how Space and Time actually correspond as distinct multiplicities both in number and in quality. For microfunctionalist science could never be satisfied with the notion that philosophy may only address the concepts as qualitative multiplicities of Time, and science only the calculus, vectorial, stochastic, matricial and tensor functions as quantitative multiplicities in extension, spatial multiplicities. There is here a Cartesian error, but no less a Spinozan and Leibnizian insufficiency: and the whole of the ambiguity of the Einsteinian edifice is tributary to this Cartesian error and this monistic inability to cope with the number. There is a common root to the shortcomings of Relativity and the shortcomings of Bergson's critique of Relativity - in their shared inability to treat Time as a quantitative simultaneity: Einstein refuses simultaneity in order to treat Time quantitatively or interval-wise, whereas Bergson refuses quantitation of Time in order to treat simultaneity as a purely qualitative multiplicity. If the former ends up with a fragmented universal Time, a plurality of times or even worse, a plurality of intervals, the latter ends up with a single Time which cannot even time itself.

The problem is at once philosophical and scientific - and it pertains no longer just to the question of whether the whole of the Real, in extension (things) or in intensity (sense-perception and 'sense-conception') is intelligible, but also to the more basic problem of whether this intelligibility is not absolute both in kind and in number. In other words, are we bound to understand the multiplicity of substances with different attributes purely in a qualitative way, as Spinoza, Bergson and Deleuze claimed was all we could ever aspire to do - given that the numbers would always remain uncertain? Or is it that, to actually think that to each thing there corresponds an idea, an adequate idea — as those philosophers themselves posited to be the principle of cognition — requires that both number and quality be thought indissociably together, synthesized as commensurate but distinct manifolds - just as actual Space and Time are by the flow of a single energy, by a single throw of the

(loaded) dice of existence?

So then, the greatest enemy of science is that which prevents science from expropriating what metaphysics hides as supernatural just because it is immaterial and 'incorporeal'. The immaterial, imperceptible or incorporeal is no less real than the perceivable - nuclear radiation kills, though few, if any, can see it. We are back to Kant and, in particular to Schopenhauer - or, more accurately, to a necessary critique of Kant and Schopenhauer — whenever we are thrown back to the notion that the noumenon which stands behind the phenomenon is beyond experience, beyond nature, beyond cognition and constitutes therefore an exclusive domain for deductive and speculative metaphysics, at bottom for apriori moralizations. It is here that microfunctionalism most differs from phenomenalism and even from any phenomenology - for functions are only uncovered when the quantitative multiplicities they synthesize vary in quality between modes of extension (of things moving in Space) and of intensity (of sense-percepts and thoughts moving in Time). Schopenhauer was correct in rejecting metaphysics as a false knowledge that pretends to know "what lies hidden behind nature, and which renders nature possible", but thereby he also rejected that what is the power that naturates nature can ever be known, and at that known adequately, absolutely known both as to its quantities and its qualities, as multiplicities in becoming, multiplicities of becoming. This is why Schopenhauer marks the end-point of a pessimist impossibility of knowledge, an end-point for modern nihilism. Yet, it is perfectly compatible with a strict positivism - with one that disregards entirely what makes the correspondence between mind and body not only viable but necessary - and thus a false positivism, since it derides the very noumenon itself, the unconscious activity of bioenergetic flows, the functional rooting of thoughts and sense-perception, and the adequacy of concepts with respect to natural and naturating functions.

Precisely the intent of Bergson in preserving a positivity to metaphysics was the hope that a science of metaphysics was possible and desirable, a science of the fluxes that naturate nature - an absolute and not just relative knowledge of the Real. Now we contend, this was on Bergson's part a poor attempt at such a science and a poor choice of concepts for one of the great philosophers of immanence who so much admired Spinoza. But that aside, the problem was really one of a scientific and physical investigation of those imperceptible and immaterial forces that alone may permit us to understand what is still phenomenological in our science - since, for too long, these transformations had been relegated to the province of metaphysics. Hence, like Reich, we contend that such absolute knowledge would have to be no less philosophical than scientific, no less quantitative than qualitative - because Time is no less a quantitative multiplicity than Space is- without Time thereby having to become reduced to a spatialized dimension. And Space, or extensivity, is no less a qualitative multiplicity than Time is, without it thereby having to become an inhomogenous Space, or a

mere Space of intervals. Thus within science, the progress of a New Physics is not separable from the development of a better mathematics, a better topology, a better morphism, one that takes into account qualitative multiplicities - at once in the order of simultaneity, in the order of distinct modes (Time and Space) and in the order of succession or experience. If such a science of the Real were possible, knowledge would have to become unitarian - at once reaching for the functions of all percepts and concepts. The living as well as the non-living, the material and the immaterial, the inertial and the noninertial, would effectively become a single matter of physics, a single material of naturation, in terms of a knowledge that would realize Bacon's dictum: "to know is to may", when knowledge becomes power.

This however is not to the detriment of the independence of the terms from their relations, and the relations from their terms - precisely the great discovery of Hume and the empiricists: that relations are external to the terms and serve as their milieu. Paraphrasing Deleuze and Parnet, the difference that matters is no longer that between the sensible and the intelligible, the percept and the concept, between experience and thought, between things and ideas, but between "two types of ideas, two kinds of experience, those of the terms and those of the relations" - and we could just as well have added, two experiences, that of Space and that of Time. Relations and connections can always vary without the terms or the ideas varying, as a kind of a "vital protestation against the principles", against the invariants - yet relations and terms form an assemblage, just as Spinoza envisaged the mind and the body as composing an assemblage - there not being an attribute of the body which would not be coupled to an expressed of the soul, such that at the limit not only things are bodies, but also souls and breaths (anima), mind and sensations are bodies on their own account: "the soul is neither above nor within, the soul is with the body" (17). So says microfunctionalism also - Time is neither part of Space, nor beyond Space, nor within Space, Time is with Space, in a relation of correspondence and commensurability. For these two experiences are energetic syntheses of the Real's auto-production: "To follow the flow of energy is being functional" (18).

Spinoza's monism was intended as a scientific philosophy, one that was neither materialist nor theistic or teleological, finalistic; and above all one that rejected any transcendentalism, either of thoughts or of spirit. It was the first Occidental philosophy of immanence since Anaxagoras - and one that rejected the Thomistic division of knowledge between physics and metaphysics. Indeed, it is with Spinoza that one first finds the term metaphysics applied to anti-scientific philosophies that relied upon theist and finalistic principles, that relied upon a principle of supernatural transcendence. And, from the viewpoint of a functionalist science, this position of Spinoza's is not just justified but also legitimate and accurate: metaphysics can never accede to the status of knowledge, not by virtue of the nature of representation per se, but by virtue of the fact that this representation (and its effects

of interpretation and signification) is inadequate, that it provides inadequate ideas of things and the relations between phenomena, that it is distorted and distorts. On the other hand, metaphysics continued to address that domain of natural reality deemed to be noumenal or essential, precisely the domain of the modes that Spinoza did not want to limit simply to extensivity and thought, or to body and mind - as he supposed it possible that other modes could still be found.

Obviously, despite the downfall of metaphysics, it has to this day remained with some semblance of its object, one that no less than the founder of formal positivism, A. Comte, accurately described as "the essential mode of production of all phenomena", in his Discourse on the Positive Mind. Why was this so? Why this obscurantism of metaphysical explanations that more than ever abound in this conjuncture of a millennial end? Because the object of Physics has remained the so-called world of the appearances - and without relation to the noumenal? Or because Physics more and more should have refused to provide finalistic theories of everything and anything?

Our answer here can only be a tentative one - to understand how thoughts and sense-perceptions are simply modalities of the same energetic reality, whose functions are not given just because we can phenomenologically describe the actions they provoke - anymore than, for example, Newton understood the nature of gravitation when he enunciated his universal law for the phenomena of positive gravity, or Einstein actually described gravitation with his General Theory. Effectively science, Physics and Mathematics in particular, have refused to pursue Nietzsche's "truly existent essences" and to understand how energy converts between so many modalities - electric, mechanical, thermodynamic, gravitic, inertial, kinetic, etc - just as medicine and psychiatry have refused to admit Reich's fundamental insight that ideas, like sensorial percepts, are merely "concentrations of energy quanta". The revolution in Physics which is demanded of our epoch is no less a necessary revolution in Biology, Medicine and Psychiatry. It is the entirety of the scientific field which is strewn with useless apparatus and gimmick-formulas that prevent us from knowing the Real more accurately and adequately, and thus prevent us from deriving a usage of knowledge that befits the wisdom "of the right way to live".

How sure can we be that we understand heat or gravity - even with Prigogine's generalized thermodynamics? And the electrodynamic interaction - is there really a satisfying law? Are there real electromagnetic waves? And what exactly are electrons? These are the questions we must make, when tentatively positing that only on the day when Physics finally reaches "the modes of production of all essential existents" will metaphysics and mysticism be forever dispelled. The dualism of quasi-particles and would-be wave functions cannot endure much longer the scrutiny of functionalist analysis and experimental investigation into electrodynamic, thermodynamic and gravitic processes. For as

long as the structure and machinisms of the Aether will remain uninvestigated, the experience of the flux of energy in nature will remain mysticized and mystified in the form of personal and spiritual subjectivism, or reduced instead to mechanistic systems of relations which cannot provide the actual functions of motion; in either case, as Reich put it in the Rooting of Reason in Nature, they will remain "ascribed to an unknowable, forever closed realm of reality beyond man's reach". For it is about reality, the reality of energy, the reality of Space and of Time, the reality of matter, the reality of awareness, that the whole exploration of knowledge is about - with its wars, conflicts, variations, deviations, insights, accumulations - even independently from and before we can discuss what a concept is, or what is a thought, or what is our perception of things — that reality 'which just happens' is already there engaged in ceaseless becoming, in ceaseless conversion between modes.

This then brings us to the question of the modes of usage of knowledge and science in particular. It is by experiment that false hypotheses collapse, and it is by experiment that deductions from new hypotheses are tested - but experiment and observation must also be controlled, mistrusted and criticized, for the perceptible is everywhere riddled by the imperceptible and it is this riddling itself that a nobler science seeks to seize, to understand and to wield. And this work of inducing experimental research to overcome its phenomenological limitations is not independent from the action of a theory, from the force of an hypothesis. Only an open mind can carry this task of learning knowledge from the Real at once as a theoretical and practical activity. For science has served for many things indeed - it has served wars, it has served for the perpetuation of myths, it has even convinced some that knowledge for the sake of knowledge is a value in itself, that science is a principle in principle superior to life, that most of what nature is all about is already known, and what cannot be known is uncertain anyway. And further that neither a pure experimentalism nor a pure analytical machine can ever hope to penetrate the functions that produce all sensation, all perception, all thought, just as much as they produce every modality of energy and every type of body, plasma, mineral, vegetal, animal, cosmic. We know otherwise - that there is nothing hidden anywhere when you set about searching for its inner logic. And that a New Physics is not only possible, but is also necessary and may be even an urgent necessity. But never has Man been further from being able to enunciate it.

Such a New Physics would have to be at once a practical and theoretical activity - geared to subordinate science to life, putting knowledge to the usage of transforming the world and transforming our understanding of it by those senses that affirm life. And reason too is one of those senses, one that is no more dissociated from its power than sense-perception is, so that we must come to the realization that all that matters in knowledge is its power to change our perception and the things around us, its usage to free life from ponderable and inertial constraints.

Clearly metaphysics cannot do so - its very design aims at the opposite, to land us, to fix us to a soil ruled by some immutable transcendence or another, to establish a static principle devoid of becoming and functionality. Only a science of energy can free us from our humanity, can free us from the cancerous organicity of our being - by teaching us to follow the flow of energy, the flow of its conversions, it will eventually enable us to perceive directly that flow of energy in the universe all around us. We cannot transform our reason without listening to and transforming our senses and our perception. For as long as society holds back on this science of energy, for as long as it condemns its investigators for making necessary mistakes in their experimental exploration of a 'no-man's land' - nothing more will be fundamentally gleaned from nature, with the sad result that useless knowledge will bury us yet - for if there is any scientific knowledge today, that little which there is of use is precisely what such investigators have been able to glean from the infinity of the Real:

"We possess scientific knowledge today to precisely the extent that we have decided to *accept* the evidence of the senses - to the extent that we have learned to sharpen and arm them and to think them through to their conclusions. The rest is abortion and not-yet-science: which is to say metaphysics, theology, psychology, epistemology. *Or* science of formulae, sign-systems: such as logic and that applied logic, mathematics. In these, reality does not appear at all (...)" (19).

> "Ideas may come and go. Their existence depends on the state of motion of the body's energy."
>
> W. Reich "The developmental history of orgonomic functionalism"

PART II-
A BRIEF COMMENTARY ON THE POLITICS OF SCIENCE

1. Science and Religion: official and officiating sciences

It is neat to present science as the daughter of religion, only to give it the emancipation status of a sister as its destiny. A line would seem to go from the sorcerer to the priest to the scholar and the scientist - a line of progress and evolution. A continuum of the search for truth, where we must reason our faith and have faith in our reason with truth as reward: truth for its own sake and knowledge for knowledge's sake. So, what have we then? - the truths we deserve and the knowledge we care to imagine. Worlds filled with dragons, unicorns and lamias. The suffering from the past that casts its sad gaze upon the future. The weariness of the higher men of science.

If we look back to our history, we see how our philosophy and our science everywhere emerged from theology, how black-robes whitened their cloaks to become philosophers and scientists. The academia formed as a scholastic circle. The attributes of spirit were stolen from the transcendence of a God, then lent to Man and to Matter. The inquisitive spirit modeled as an inquisitorial mind - unable to question the dogmas, a follower of fashion, the lay form of virtuousness. Hence was born a science which gave less and less pleasure and, most symptomatically, never could quite abandon error, illusion, fantasy and anthropomorphism. A science destined to ruin itself as it steepened further into common sense and the poverty of wit.

BUT, this was not where science was born - only how science is aborted. It was only the birth of a science that asks why - why me? why us? why now? why here? why life? why death? why disease? why war? why poverty?, etc. A science which has become the religion of the great public. A democratic science which has displaced despotic religion: the moralizing science of nihilism, always in search of a justification for the worst, always capable of finding one, systematically rationalizing what it cannot comprehend, ready to enact laws and regulations, ready to enforce behaviour: do not smoke! Because it is harmful to your health; do not laugh! Because it causes wrinkles; do not cry! Because you are impotent to do anything about it; do not practice unsafe sex! Because you will die of AIDS. Do not expose yourself to the sun! Because you will contract carcinoma.

Why the question why? *Because* from the outset it places us squarely upon metaphysical considerations - what is the meaning of existence? The very question begs the question of who makes it. It is a question for nihilists: a nihilist *why* looking for a metaphysical *because*. BUT, *it* is not the question of science - *it* is not science as questioning, or as the ability to pose adequate questions.

The question of science is how: how does it work? How does life function? How is life will to power? What do we do with the powers that make us and escape us? How does the cosmos work? *How it works* subtends a passion for an immanence - not knowledge for its own sake, but knowledge in the service of life and action. Metaphysical reason is not the domain of science - only its religious image, and History its error. Science does not have a reason why but a reason how - it is knowledge of the 'intelligible character' of the 'world seen from within'.

Official science, on the other hand, is the continuation of the nihilist labour of negative religion by other means: fear and faith become replaced by a reason divorced from its senses. Science of the dead, science of the eviscerated, science as potestas. It culls the authority of reason from an irrational faith in reason: "but reason is only an instrument, and [on this] Descartes was superficial" (20). The religion of State is replaced by the religion of science: science as the continuation of metaphysics: "science as the exactest humanizing of things that is possible" (21). Official science is science of the true. Always in search of a power for truth. Science, whose ideals are "unconsciously influenced by decadence" (22). Science as an evolved form of sickness becomes the rationalistic disparagement of nature.

But there is also an officiating science, following Deleuze and Parnet's analysis, a science which is neutral, that assures crisis management: a popular science, science in the service of money, the science that hurts nobody..., the science of the engineer, apolitical, acephalic, amorphous. The science that serves as a practice for power dispositives. No longer a question of establishing dogmas or creating paradigms. All is accepted, fragments of fragmentary knowledge in systems of equivalence: marketable science, science for the military mechanism, science to cure, to kill, to profit, to police, to identify - above all science that peddles the politically neutral image of science: technological progress. This is science of the greatest mercantile utility, but also the most useless of all knowledge. All promises are possible in the right context; the scientist becomes a travelling salesperson. A scientist for every season and every dirty job. A scientist that sweeps floors, hides research results, fudges the data, markets the grants, convinces the generals, saves the impotent, engineers slow death. The cure for cancer - from JD Rockefeller's XIXth century snake-oil vendor potions to the famous combined chemotherapies with *carcinogenic* poisons - tamoxifen, methotrexate, hydroxyurea, etc, etc

- approved by the FDA: a whole officiating 'medicine' or pharmacology of fighting disease with more disease. The sick officiating their cure upon the sick. Lithium enemas. The politics of contagion: the science of the pestilent. The neutral politics of the officers of science: never appear to take a position. Everyone is a thanatocrat. Science of formulas and sign systems where reality no longer needs to figure in. Science of the false. Science to entertain. Science of Survival, science *as* Survival of the dullest.

At the end of the day every little man and woman is an officiating scientist, an engineer of survival debiting their two cents' worth, selling knowledge by the pound. Mortiferous technicians of power, interpreters of nature, necromancers of a lost future. Each with a little contribution, the diminishing proposition of the eggs layed by the exhausted chicken. "How did the exhausted come to make laws about values?" (23).

2. The arbitrariness of established Physics as an official belief in fictions

For the smashing majority of human beings, science is no concern of theirs. At best if it brings home a little improvement, like a better can-opener, a higher resolution VCR, etc, one will find praises for the benefits of science. These days that pass, supposedly of a more sophisticated modernity, abound with popularizations of science. Everybody talks about the fourth dimension, but no one has seen one - nobody has seen a Time which is a fourth dimension of Space. Everybody talks about SpaceTime, but no one can possibly verify such an imaginary continuum - what's more, those who peddle this snake-oil are the first to admit they lack a Physics of Time. We could go on and on like this about other equally mythological notions - black holes, quarks, the neutrinos, the Big Bang, the collapse of the universe, manifolds with n dimensions, fractional space, etc. Yet these are accepted physical and mathematical notions, no less than accepted popular ideas. And it is commonplace to hear that the boundary between science and fiction has blurred if not outright dissolved. It even appears as if science is as daring as fiction is - proudly, some go as far as trying to convince us that there was never so much freedom to investigate everything and anything.

But they are sorely wrong - and to the few scientists who have had the chance of seeing something remarkable, something remarkably different, all this modern excitement about science appears to be much ado about nothing. As with all myths, the new fictions open some paths and close others. For a scientist all that matters is whether the paths one opens are factual - if they are fictitious, it is of no interest. Now, what has happened with the modern myths of science is that the paths they have opened lead for the most part to 'fictitious facts' (what Nietzsche once called 'facta ficta') - and, moreover, they demand that some basic, very basic facts be ignored, be simply discarded, in the name of an irrational belief in Reason. What we are referring to are basic facts like the existence of simul-

taneity, facts like actual wave functions, like glaring violations of the 2nd Law, like the presence of anomalous transmutation pathways — these facts are largely discarded just as official Physics retrenches its fictional accounts of reality into prejudices. And prejudice is arbitrary - it lacks not just rhyme but also _any_ reason.

Take as example one of the critical notions of modern Physics - the notion of a vacuum-state. Many physicists employ the term vacuum state as an equivalent of the Aether, of a plenum that has the properties of a continuum. In the notion of a vacuum state, determinism and nondeterminism would have made peace and thus would have successfully resurrected the concept of a space filled with energy in the form of a stochastic distribution of electromagnetic waves coexisting with an infinite multiplicity of virtual particles. Yet, modern Physics is unable to offer a single real wave function. There is no recognized actual function of a continuum even for waves, which are, at best, solely understood stochastically as rays. And are we to buy the notion that these are, at bottom, simply the incarnation of probability waves? But not content with this mystification, modern Physics has added the notion and function of virtual particles which, at the very least, would appear to locally violate the Law of the conservation of mass and energy. Even if we are told that this is alright for microscopic interactions, still, what does it mean to create a particle from the void, to actualize a virtual particle, but the notion that somehow energy would have to come from nothing?

Yet, when a scientist, an experimentalist or a theoretician, suggests that it is possible that we can get excess energy from something in that vacuum, he or she is immediately shunned and branded a fool. Indeed, if a scientist, take Aspden as example, points out that Newton's rule regarding the equivalence of action and reaction is not a mere corollary for his Third Law of Motion — ie that it does not require that such equality be satisfied for open systems, or even for closed ones (only for isolated ones) — or if a physicist has the temerity of drawing attention to the fact that the motion of orbital electrons within the atom is virtually perpetual, one is immediately saddled with the epithets of fool or fraud to signify that whatever one says on the matter is an error without interest.

And in which pulpit do these high priests of science and popular science take refuge for their denunciations? In the rhetorical question: How could motion be perpetual when the entropy corollary of the 2nd Law of Thermodynamics requires the universe to be running down towards a Big Crunch? Everything happens as if Physics is ready to violate the First Law of Conservation of mass and energy, while refusing to accept any violation, local or nonlocal, of the 2nd Law. It all happens as if only the established scientists, the official scientists in the academia and the scientists officiating in corporate and media endeavours, had a monopolist right to belabour a cosmic error - in the process, any 'outsider' scientists are despoiled of any right to make mistakes and condemned thereby

to eternal banishment for questioning any of the accepted mythic dogmas. Small wonder then that New Ager idiocies take off from here.

And we shall not here invoke a right to be wrong - something which institutional scientists and politicians alone have a monopoly of - but by invoking the necessity for science to make mistakes, to learn from its mistakes, something which the modern politics of science prevents from happening or lies about when it does in fact happen.

So, we can hardly be astonished either that established scientists and would-be philosophers pronounce anathema upon all those who dare violate the 2nd Law, or search to violate it or claim to have violated it. For them, to violate the 2nd Law always requires somehow that one also violates the 1st Law - as if any perpetuum mobile required that its energy would have to come from nothing... But, you might object to their anathema, what about the electron - does it not have to constantly draw its energy of motion from the vacuum state? — or still you might ask — what about the virtual particles, are they not said to arise from the void and its random energy? To no avail you might object, since to postulate perpetual motion in a machine is a dead end street - which yesterday was to dare god and today, is to dare human Reason, that is, to challenge the 2nd Law. To put it bluntly, only mad scientists would make such claims.

One of these would-be philosophers summed it up in these sanctified terms:

"But for all of [these inventors and discoverers of perpetuum mobiles] there was the truly Faustian danger of the Devil having a hand in the game, the risk that he was leading them in spirit to that mountain on which he promises all the power of the earth. This is the significance of the perpetuum mobile dreamed of by those strange Dominicans like Petrus Peregrinus, which would wrest the almightiness from God. Again and again they succumbed to this ambition; they forced this secret out of God in order themselves to be God. They listened to the laws of the cosmic pulse in order to overpower it. And so they created the idea of the machine as a small cosmos obeying the will of man alone. But with that they overpassed the slender border-line where the reverent piety of others saw the beginning of sin, and on it, from Roger Bacon to Giordano Bruno, they came to grief. Ever and ever again, true belief has regarded the machine as of the Devil." (24).

So the suffering of pioneers and dissenters is hereby blessed as fully deserving! The revulsion these words provoke in any dedicated researcher who is willing to accept responsibility for his or her mistakes, simply cannot be described!

For, it is indeed belief, blind belief, in scientific dogmas that have now gained the allure of religion which true scientists dispute and must dispute - in a word, they must dispute the sanity of such beliefs which run counter to the observation of the senses. For after all, there is not even a half-life to the electron - are the electrons then not virtually eternal and perpetually mobile also? But to argue with established scientists and would-be philosophers is a moot point - unless one were planning to hand them on a silver platter the entire body of a New Physics. Even then, they would not bother to read it, unless the mistakes of an epoch had put them squarely up against a wall.

This of course creates a suffocating atmosphere - to the outcast scientist are denied not just free access to the means of investigation and publication, not just the right to commit mistakes, even if intelligent ones, but now is also added an oppressive silence, a silence all around pregnant with the implications of impotence, doubt and contempt.

3. The psychiatrizing of the mad-scientist by the stupidly ignorant

Unkind psychoanalysts (such as one notorious Jacques Lacan) concluded that all these problems and the suffocating atmosphere in which science now finds itself are part of a specific drama, the drama of the scientist -

"Mayer, Cantor, etc," - he wrote - "I will not draw up an honor roll call of these dramas that sometimes lead to madness (...)"

Others, with greater audacity, manage to go still further in this ridiculous fashion and claim that, in the case of science, the axiomatics of money itself acts as a factor of castration, resulting in a specifically scientific castration [(25)]. But, we might strongly object, Mayer, Cantor, von Neumann, Teller, and scientists of their ilk, were concerned not with science or its goal of seizing the functions of nature, but with the recognition of their abilities to develop formal solutions to problems that most often were badly posed to begin with, and problems that arose out of technological requirements foreign to science itself, such as military, statal or mercantile requirements. In this way, the personal drama of scientists seeking recognition is no more specific and no more tied to money either, than is anybody else's personal drama and struggle to survive. It could be the drama of an artist, a housewife, etc. It also does not help to attach this notion of a personal drama of the scientist to some fundamental drama of knowledge - as other philosophers and scientists commonly do. For the problem of knowledge is not even the problem of a tragedy — as Reich once thought it was [(26)].

Rather, the problem of the scientist is that wanting to pursue knowledge for its power to transform life, s/he is condemned to, at best, pursue knowledge for its own sake, and in the worst of

cases, to pursue useless and invalid knowledge. And the problem of knowledge is still distinct from the problem of the scientist - as a triple problem of (1) finding the accurate form of functions as much as (2) the adequate material for those functions within (3) a moving conceptual frame. Yes, of course, there is always the problem of having no reader or no audience. No people, to speak like Paul Klee.

With respect to knowledge, the problem is one of construing the tools of a microfunctionalist science. In this sense, it is a serious mistake to assume that physical functions are either deterministic or non-deterministic, either functions of a cause-effect relation, or merely functions of a mathematical chance, a relative chance. The functions here at stake are micrological operations of energy, conversions of energy which owe nothing to either the determinism of cause-effect or to the nondeterminism of a supposedly fundamental uncertainty. For these functions we refer to are certain indeed, they are certain basic energy functions which modern Physics glosses over, precisely by invoking a fundamental uncertainty - while desperately trying to preserve some semblance of validity for the cause-and-effect schemes of XIXth century determinism. XXth century nondeterminism is, at best, as bad a fallacy as XIXth century determinism was, and what there is left of it today - is a determinism in tatters. So, unlike some of the more progressive commentators, we take little comfort from the words of those who want to push for a still more radical nondeterminism, with stochastic theories of the Aether, of the 'vacuum state', with absolute uncertainty, with manifolds having ever increasing numbers of dimensions, with waves that can only be resolved as infinities of points, with chaos algorithms — in a word, with a whole apparatus of dissimulating the functions of the real which at the end of the day is only good for one thing: to keep people stupid, above all to prevent anybody from learning the true secrets of nature and learning therefore how to transform the world. If there is a social system that benefits from this stupidity, one might add that the point of all these unnecessary veils is the perpetuation of a science which is only good to improve on commodities, above all on the spectacle of a fiction which is not fact but a mere effect of representation, a mere trick of mirrors.

Left are only a few more words of harshness for those who dare to psychiatrize the challenge of science and the experience of this challenge by a minority of scientists or investigators and inventors - tell us not that we suffer from paranoia or 'inventor's diseases', tell us not that we do not know how to market our inventions or discoveries — or make them public in that very private way, and above all, tell us not that humanity deserves this knowledge, our effort and sweat, as a Baal Godhead that swallows up its adepts. Do not insult further our intelligence, nor our courage. If humanity is in rags it is not because it has not had enough time, enough history, enough art, enough knowledge, enough science, enough commodities, to make it intelligent, or to improve upon it. There is something sick in humanity, deeply sick, that prevents us all from deriving the best usages that discover-

ies, inventions, creations, can be put to. It is this sickness that powers the dominant fictions, including those of accepted science.

4. The problem of the pioneer

The problem of the scientist is _not_ a personal drama, but the problem of relating any real science to a society that thinks itself to be the pinnacle of openness but is in fact the greatest jail ever construed on earth. It is a political problem and a medical one, inseparably. And it is a problem of how science is grasped and appreciated by a society which has become bombarded with error, falsity and illusion, to the point that the more useless knowledge is, the greater is its mercantile utility, its exchange value and avidity.

If there is no capital flowing into research of excess energy systems, of alternative non-polluting and non-radioactive forms of energy, this is not because capital is wise and weary of investing in foolish dreams. It is solely a political question, in the sense of the politics by which we guide our daily lives. For capital, in the hands of the academics, or the State, or the army, or the corporations, or the common people, never tires of investing in foolish fictions - the fiction of quarks, subquarks and other putons, the fiction of Star Wars, the Bre-X fictions, the fiction of the social value of taxation, the fictional lives of the stars, the fictions of chemotherapeutic or radiative cures for cancer, we could go on and on. If there is plenty of money for half-baked ideas, why is there no money even for half-baked excess energy projects? Well, in fact there is some, like the alms one gives to the poor on a bright sunny day. And in fact, it even seems that the precondition to obtain these few alms is to manage to be even less than half-baked: the scientist here becomes a stand-up comic vagabond. What there is not, is money for any serious project - here we could speak out of knowledge by experience: yes, everyone is interested, the car manufacturers, the telecommunication companies, the Navies, the utilities, religious sects, small time investors, speculators, perceived competitors, etc - but they have one trait in common, to get smart, or rich or powerful over night and to steal whatever they can from the scientist or inventor - his rights, his money, his time, his knowledge, his good disposition even, not to mention his freedom - whenever possible.

Oh yes, the roll call of honour for those pioneers who were unjustly deprived of their freedom would be long. At the end of the whole exercise, not only is there no capital for a serious project, but the inventor or scientist finds himself poorer than before, in all senses of poorer. He is supposed to live on the promises of money and support. Not even able to afford legal advice. He is supposed, each time that he hears the same tale of promises, to jump with the delight of a teenager's first date. He is deemed patently stupid by offered proposals that at first glance appear good on paper - but on closer examination contain loopholes wide enough to be forever lost in litigation. And if he is a pio-

neer uncovering a brand new field, then for sure, he must be a dreamer who's easy to fool. Anyway, if he is desperate enough he will have to say yes to all these intolerable forms of slavery, and still some. And at the end of the day, those who say yes to the vampires that pose as having an interest in esoteric science, never had anything to bargain for, not even half-baked.

This is a strange age indeed. When one circulates in the academic world one soon comes to terms with the fact that one is badly paid - and that the eventual tenure barely recompenses for the slavery of those two decades of undergraduate and graduate studies and an infinity of post-doctoral degrees. One soon accepts that one goes to meetings and if one's talk is good, one is rewarded for one's efforts simply by the recognition bestowed by peers. Only ultra-tenured professors derive a stipend, even if they have nothing new to report. Similarly, every time one publishes in the more prestigious journals of a field, one immediately relinquishes all copyrights to one's form of expression - in exchange for the status of the publication. Yet, day after day, the standards are more and more mediocre, and only those who satisfy the wishes of their small-time masters ever receive the support of their peers and reviewers. Eventually one grows wiser and realizes what big business it is for these journals to organize conferences and sell prestigious publications - what tremendous profits they generate which somehow always get absorbed by the costs of a bureaucracy. Simply put, young academicians soon get used to the idea that they should contribute their labour free of charge to support the societies that own the journals, choose the peers for review, and organize the meetings. This is called slavery, but since the departments or the divisions at least pay for trips and accommodations, and since it is unthinkable that one could sustain a stream of grants without peer-reviewed publications, the double bind successfully hems in the scientist.

Now, when it comes to the scientist working on the periphery of the system, on its margins, where there is no division or department or prestige, then it becomes even worse - cat, rat and shoe now demand free demonstrations, proof to the right and to the left, each peddling their pet suggestions; some do not like open demonstrations, they want a black box; others do not like batteries, or don't like oscilloscopes, they want you to use their equipment even when demonstrably it cannot perform the job at hand; others want you to buy a data-acquisition system, but refuse to foot the bill or even to help you do so - while they spend two or three times the same amount for a competition on the year's most ecology-friendly products - and guess what, the prize was awarded to a golf T made of dog poo (yes this happened to us after two years of negotiations with the largest utility in North-America); still others want you to couple your technology to theirs, and to make it work for them. Even businessmen who have not the slightest idea of what it is all about, already have in mind some gadget application - as if it sufficed for them to trot through your laboratory with the air of thousand dollar bills dropping out of their pockets, for their wealth to rub off on you, or for you to have mirac-

ulously resolved your problem of not having the means to pursue development of your discoveries. And there is no shortage of colleagues and self-styled journalists and investigators who feel they are entitled to have you demonstrate to them the whole phenomenon free of charge and upon self-invitation. After all, as they explicitly put it, don't you need publicity? Maybe, but not like one needs a hole in the head.

The day we woke up to ask for a fee in exchange for our troubles, of demonstrating to so-called interested parties, half our problems disappeared overnight. Yet, those who passed through the screening and wanted to go further - yes, they observed, and confirmed their observation, of the phenomena of the PAGD, its inverter function, the motor effect and the excess energy - scientists from Ontario Hydro, Dr. G. Egely from Hungary, who formerly worked at Brookhaven, top engineers from companies such as Israeli Aircraft Industries, etc - but notwithstanding the open endorsement by brilliant physicists such as Dr. Aspden, what did we find? The response of a top Detroit executive to the president of GM's European operations, when he presented our proposal, best summarizes it: "Haven't you understood? The EV project [referring to the Impact] is just PR!"

PR that, we might add, paid off, by convincing most of the States of the US to drop their legislative deadlines for the conversion of cars propelled by internal combustion!

But, if you need to know, the most basic bottom line is typified by the following two examples- one from the Alcoa company, which took six months to have their legal team negotiate from scratch another confidential agreement with us only to decline our offer to demonstrate, even free of charge, the technology; then, it returned the two packages of our confidential documentation without those it had assigned to make an evaluation having ever opened them! Or Charter Power Systems, which took a year and half to make an evaluation of the submitted material and data, and then by mistake enclosed <u>two</u> internal memoranda addressed to their Director of Battery Engineering and Development in the confidential materials returned to us, the first of which read-

"I have signed the Labofex receipt and just struggled to read each of the six documents. Quite frankly, I find myself unable to objectively judge what the documents are saying, probably because my background is in Chemistry rather than Physics. What I do see is a technology that is full of promises yet to be fulfilled; 10 years of work which does not appear to have been snapped by anybody in spite of the lofty claims."

And then the second, from another appraiser who tersely wrote-

"You can see that so-and-so is not convinced of their claims either"

Is this the attention these people are paid for, by their stockholders, to dedicate to their business? And is this the peer review one deserves after having not asked a penny for one's troubles? Then, let us say it plainly, the fate of mankind is in the hands of fools.

So then, maybe we have a difficult nature, maybe we suffer from inventor's disease, maybe we have made a mistake - but at least we will be able to say, it failed not because of our lack of trying. And this, once more, underlines my notion - much disputed by some - that the problem of this field of alternative energy is not one of lacking a ready-made product, or not being able to fire the imagination of people. The problem is a political one, and a problem also of the sheer incomprehension of what is at stake in science, both by the lay people who elect politicians and governing bodies, and by established scientists who dispense judgements without even bothering to attempt to understand the material at hand. Against this state of affairs, all I can say is "Balderdash!" For it is in the hands of the common man to do something about it, and yet the problem is precisely the common man, the little man in each and all of us.

Indeed, as far as we are concerned, there is a poster on the wall at Labofex that reads, "No peddlers, religious or otherwise, need apply". If humanity feels it deserves this work, let it go to work, now or when our patents in select countries will expire. As one executive told us - "your rights will have turned to dust, and we will still be here pumping out oil. You need us; we do not need you." Well, I never doubted that oil and nuclear companies needed us like a hole in the head. But that too had to be put to the test. Especially since now, we need them, and others like them, as much as Marcel Duchamp once needed recognition by art-movements when he concluded-

"All right then, since it's like that, there's no question of joining a group - I'm going to count on no one but myself alone."

5. Science, which science? Cheerfulness

(the gay science of the senses and its reason)

Yes, the gay science, the joyful science - that's how Nietzsche termed it - the science that *accepts* the evidence of the senses: science as it has always been ever since one asked *how does it work*? Science which our knowledge can only take back to the 'pre-Socratic' Greeks - but not because it began there. For this science has no beginning save in intelligence (in Bergson's sense) and no end either. It is science of the continuum and its singularities. It is knowledge not in the service of the artifices of truth or untruth, but knowledge in the service of Life. It is knowledge of the 'intelligible

character' of nature for the sake of action - the clarity it seeks is not a blinding illumination, but a searchlight, an instrument of power. This science *knows* that knowledge is power.

It does not have faith in reason - nor is it from fear that it grows. It is a science of courage, not the science of cowards. Its reason, its mathematics, its signs and systems are tools, instruments that put into evidence the sense of forces. It follows an immanent plane of assemblage, not a plane of transcendence, nor an arbitrary coordinatization. If it needs faith, it is faith in the senses, not in reason. For nothing is hidden anywhere that cannot be sought-

"This courage, at length grown subtle, spiritual, intellectual, this human courage with eagles' wings and serpent's wisdom: this, it seems to me, is today called-" (27).

...But the old sorcerer and the higher men interrupted the seer - so that he would not utter the word science, gay science, cheerfulness...and how should he? How, when the mode of perception of men is a sad one, 'broken and separated', made of holding tanks that do not communicate, riddled by a reactive unconscious obscured by sentiment, error, illusion and stupidity?

It is not pleasure that *true* science brings - it also brings sadness and pain. Just as its light can be blinding at every turn of the road. But this science which is not and can never be, this science of becoming, is a science of attack: "it flees and makes flee" - it is terror and it is joy.

It is this science, and above all its physics, its biophysics, which philosophy so much dreads - and official science relentlessly prosecutes. For this science is alive and Life is its domain: "three cheers for physics". It refuses to budge, it refuses to yield. It finds the limits of the known and rides beyond them "towards the sun"! It gives no quarter to any man of knowledge and it asks for none. It takes no prisoners. This is the science which "requires nobler natures than does poetry" (28), the "further evolution of the artistic". It is the pathos of joy:

"For cheerfulness - or in my own language gay science - is a reward: the reward of a long, brave, industrious and subterranean seriousness, of which, to be sure, not everyone is capable." (29)

Joy is the minor science. Reason come to its senses - affirming them, not letting the fire within come to a premature efflorescence and lose its energy, feeding that fire and avoiding the Great Contempt. Of this science - which takes joy in knowledge and affirms its power to further Life - Nietzsche wrote-

"In reality there exists between religion and true science neither affinity, nor friendship, nor even enmity: they dwell on different stars." (30)

Gay science - is more, much more than an art of living, or the art of the living: it is true science as the science of Life: knowledge as power and power as awareness. Truth has no power, only Life does: the power of joy. 'Do not go gently into that good night': that is the last appointment with power which every 'man of knowledge' must keep. With joy.

"Whereof, however obscure the night may be, I await the daybreak"

G. Bruno "Il Candelajo"

PART III-
A FEW SHORT STORIES TO CHEW ON

1. The vacuum does not exist

Horror vacui - is it a form of sickness? The intelligent answer is no - for the vacuous, the empty is nothingness. One might object - no, it is not nothingness but perfect geometric or algorithimic form without content, an envelope without material. Alright, that may be the case, but what allows us such a notion of a perfect container separate from any material content? Now, if the objector has some cunning, soon he or she will take us on to the physical notion that Space is conceivable in a condition of perfect emptiness - zero energy and zero matter. He or she will draw the analogy to a glass empty of water, as if Space were like a metaphysical structure.

Now, we happen to know the objector is wrong - and we have got hir where s/he is most vulnerable. For we know the extent of the ignorance necessary to venture the very notion that Space is somehow divorced from the flux of energy. In a word, from energy. That is what we know, how Space is produced by energy - and how Time too is produced in the same fashion. What we know is that one cannot think the form separately from the content. Hence, we now move to the kill zone - we invite the objector to think the vacuous or the empty as something other than nothingness. If the objector is intelligent, the answer s/he will provide will be to give us a statistical mean for the presence of a tiny grain of mass in cubic kilometers of volume - "there!, there's your content", and for good measure s/he will add "the missing mass needed for our empty Space you shall find it in the neutrinos which, by the way, are today proven to have mass!"

With egg on our faces, we are supposed to withdraw and start again if our heart is strong. Well, we do not really want to go into neutrinos, at least not right away, since we would have to examine in detail the physical theory of the weak interaction and the Kauffman and Bertozzi experiments - something that can hardly be done in one fell swoop. But we know what we know and cannot retreat, neither strategically nor definitively. We could laugh and exclaim - "you tortellini of a fig, how can neutrinos be proven to have mass if we can prove to you that they too do not even exist?". But we are mindful of dialogue and the value of analysis - so we first attack the empty glass metaphor: patiently we inquire whether the form glass is an envelope devoid of material? Of course not, glass is

made of molecular borosilicates in complex crystal matrices. It has a material and an energetic state at temperatures well below its melting point. And we dig in our first knife - what then are the characteristics of that pure Form Space which compare to the material supporting the impure Form glass? Here our interlocutor will become variously puzzled, irritated, angry or pensive - and again, if s/he is intelligent and has a drop of good will left in hir body, s/he will come back with the metaphysical plane of pure intervalar quantities, arguing that Space is part of SpaceTime and its physical properties are geodetic - a pure scheme of matter.

We strain - we thought we knew something - and we are now asked to accept another dimension to reality, or more properly speaking, a totally parallel reality a la Plato, where things are not things but pure Forms, so pure that these Forms are not even numbers but just fuzzy numbers, intervalar numbers, metaphysical numbers. We begin wondering whether there is any sense to communication, to education, to learning, to knowledge itself - since no one ever learned for the sake of learning, but for the sake of acting upon the world, seizing and grasping it. But suddenly all these values, these very basic values have been thrown out the window with the bath water. All went out, the dirty water, the baby and the tub itself!

We are now confronted with a terrible disjunction - we either begin revealing what we know and how we know - or we turn our backs. Teaching/pedagogy or autism? Which will be the one we choose? If proud of our achievements, if sure of our victory, if pissed off at the interlocutor which has now become enemy, if intent on showing off, etc, we immediately will go the route of teaching, the best mask for our attack being the altruism of teaching the right way. But if we know how energy produces Space and Time and what are the physical characteristics of each which prevent any possibility of our thinking of them, or of Space at the very least, as a pure Form devoid of content, we really must have arrived at a threshold where, in turn, we could not give a fig about this inquiry remaining referred to the imaginary of ego-struggles, the supposed subjects of the utterances. Nor, for that matter, could we still valorize education, learning, pedagogy, teaching, science, knowledge, so much as to suppose that the mere transmission of information suffices to learn, to understand, to grasp, in a word, suffices to change anything. It is like the topical standpoint in analysis: bringing the contents of the unconscious into consciousness alters nothing; it may even worsen things in those rare instances when there are contents to be brought forth. So, autism is quite inviting - not easy, but rather peaceful: let's end the communication when there is nothing to communicate, or when there is something to communicate which is only valorized as real or worthy because it is fictitious — the same is to say that, effectively, there is nothing to communicate.

But suppose that in fact we decide to communicate our secrets, in murmur, in a paranoid low

voice like the one that Lou Salomé had the temerity of describing Nietzsche as affecting when he communicated his experience of the eternal return: we would begin by demonstrating how a strict physico-mathematical treatment of energy directly uncovers how energy is a complex of Space and Time properties; that we are not allowed to conceive of Space by the image of the empty glass, an image that denies to Space the same physical properties that a glass itself must have; that the concept of Space is not an imaginary but a (micro)function, at once qualitative and quantitative, of energy; that Space does not exist for all time as an empty structure of abstract geometrical properties - but as the volume of energy which constantly changes from moment to moment, from wave cycle to cycle; that Space, just like Time, is constantly produced and consumed, that it is in a permanent state of flux. And that, finally, no volume of Space can be thought of as empty, since by the very fact that it is Space it is the volumetric form of energy in motion: in other words - the glass is neither empty, nor half-empty or half-full; this is not a matter of semantics where a pactuation exists halfway; the glass is full, full of glassness and full of other things, including water, air or aether; for, where there is no liquid or gas, there is still Space full of energy, full of massfree energy, since that Space is precisely the volume of that energy. So, like our dearest Reich, we need no sparse grains of matter, nor any invocation of metaphysical properties of Space - as if geometry were separable from geography, separable from physical and energetic reality!

And more, much more - since it is not even Space which is full of aether energy - it is aether energy which is full of Space and pregnant with an infinity of Time!

Having arrived here, we again start from the beginning: horror vacui - is it a form of sickness? The intelligent answer is no - for the vacuous, the empty is nothingness. Indeed, there is no vacuum, there is no Form empty of content, there is no such thing as pure emptiness - these are mystical notions, not functions or concepts. They are the easy cop-outs of false knowledge. Funny how those who are sacrosanctly ignorant claim for themselves the mantle of the teacher!

Nothing is nothing because nothingness does not exist. Nothing is not something because something has got to exist without being out of nothing and without being equal to nothing. There's the rub, and there's the sickness, nothing is not a value, nothing is a fiction which most of us conjure up as a value. But that is a convention for sick people. Nothing more, nothing less.

Delving further into the horror of the vacuum - the horror is its utter impossibility: the vacuum is not the least likely or least probable; it is the impossibility of any becoming, and thus precludes its having any being. Hence, what is sick is the love of the vacuum, not its horror. And as far as sickness goes, it has a mode of contagion - spreading the word of nothingness as if it were knowl-

edge of a reality which is nothing, which is empty to begin with - not just metaphysically this time, but actually empty in the mind of men.

How can there be empty realities then? Simple, they are biophysical realities subject to a social or human reality. It is here that metaphysics alone are of consequence - how what only exists in the mind affects the body, but after we have concluded that what is a sickness of the body becomes manifest by the mind taking its imaginary for reality. And, at the force of this mania, and for no lack of trying, eventually reality begins appearing as the mirror of that imaginary. That nothingness has in fact a name and a being - representation and its History: nihilism. It is here that the eternal dissection of a seminal sin is forever to take place - representing God, representing the will of the Despot, representing the people, representing desire, and finally representing nada but the eternal reproduction of subjective representation.

2. Bruno and Mocenigo

Is it legitimate to saddle Giordano Bruno (1548-1600) with a "lack of philosophical good humor", for what is taken to be a christian willingness to give his life for his ideas? In one of his unfairest texts, Nietzsche writes-

"How poisonous, how cunning, how bad every protracted war makes one when it cannot be waged with open force! How _personal_ a protracted fear makes one, a protracted keeping watch for enemies, for possible enemies! These outcasts of society, long persecuted and sorely hunted- also the enforced recluses, the Spinozas and Giordano Brunos- in the end always become refined vengeance-seekers and brewers of poison, even if they do so under the most spiritual masquerade and perhaps without being themselves aware if it (just dig up the foundation of Spinoza's ethics and theology!)- not to speak of the stupidity of moral indignation, which is in the philosopher an unfailing sign that he has lost his philosophical sense of humor. The martyrdom of the philosopher, his 'sacrifice for truth', brings to light what there has been in him of agitator and actor" (31).

Leaving Spinoza aside - did Bruno become a vengeance-seeker, a brewer of poison or devoid of philosophical sense of humor, someone bent on a 'martyrdom for truth'? And at that for a truth which was not his?

After 14 years of wandering throughout Europe, Bruno, an ex-Dominican monk, was invited to Venice by a young nobleman posing as a protector of the arts, whose name was Mocenigo. When Bruno sensed Mocenigo was a vampire, he tried to leave but Mocenigo had him arrested and charged by the Inquisition with atheism, infidel blasphemy, immoral conduct, heresy in the matters

of theology, philosophy and cosmology. Bruno refused to recant his books and his science and rotted in jail for six years in a Papal prison. The entire record of his interrogation and torture has, to this day, never been released by the Vatican. He was sentenced to death and burned at the stake on the Campo del Fiori in Rome, Feb. 17, 1600. Upon hearing his sentence he exclaimed - "Perhaps you, my judges, pronounce this sentence against me with greater fear than I receive it.". When the crucifix was brought to his face, at the stake, he violently repelled it with derision.

Since his books were forbidden by the Index Expurgatorius of August 7, 1603, Bruno has been dismissed as a stage ranter who peddled Copernican ideas, and yet was destitute of science. Nothing could be further from the facts - Bruno alone had outdone Copernicus, Kepler, Newton and even modern astronomy: he had outdone a description of the Solar System which was yet to be accepted, the heliocentric conception where planets describe either closed circles or ellipses around the sun — because he had discovered the motion proper to the sun, a motion which, to this day, has remained poorly understood as the galactic motion of the solar system.

Typically, what most commentators take of Bruno is:

"Bruno's cosmology is contained in his dialogue Del Infinito. In this work he refutes the traditional Aristotelian cosmology and states that the physical universe is infinite and includes an indefinite number of worlds each consisting of a sun and several planets. The earth becomes thus a small star among the others in an infinite universe."

Yet, Bruno did far more than this. He began resolving the riddle of the (vicious) circle long before Nietzsche even posed it to himself. In "Heroic Frenzies", 1st Part, 5th dialogue, he writes -

"C. But what is the meaning of that figure of the sun with a circle inside it and another circle outside of it, and of the motto, Circuit ('It revolves in a circle')?

T. I'm sure I would never have understood the meaning of the figure if the author himself had not explained it to me. Now it must be understood that Circuit refers to the motion the sun makes around the double circle drawn inside it and around it to signify that the sun both moves itself and is moved at the same time.

Granted that those circles express poorly the coexistence of movement and rest, we can nevertheless say that they have been put there to signify a single revolution. And so I am content with the subject and form of the heroic emblem. "

The Circuit is not circular (nor elliptical) because the sun itself is moved - moved with a moving mover (the Aether), not by an unmoving mover (Aristotle and Newton). Bruno, the aetheronaut, no less than Nietzsche aspired to become an astronaut of the Spirit.

So, back to those who write-

"An examination of [Bruno's] actions during this period of exile makes clear that almost all of his misfortunes were brought down upon himself without the Inquisition's help [!!!]. He outraged the faculty at Oxford with his lectures, he became embroiled in violent quarrels over trivial matters, and generally succeeded in alienating those people best able to protect him. His actions during this period reveal the very hallmark of folly, namely repeated failure to act in his own best interests even when reasonable alternatives were available. (...) In many ways, Bruno thrust himself into the flames that rose into the winter skies of the Campo di Fiore on the 17th day of February in 1600."

Isn't this a bit easy? An armchair precursor to the dreaded "inventor's diseases" confabulated by some body eaten away somewhere by the disease of money? Does it not smack of priestly justification? Did Bruno not try to leave Mocenigo's palace? Once arrested, should he have proclaimed himself a dupe just to save his skin? Should he have died instead in abject fear for his life - in bed with his shoes off, or at the stake kissing the crucifix? And was his imprisonment and murder the outcome of his desire to seek vengeance and brew poison? What poison did he brew that to this day his books are basically unavailable, unread and the record of his inquisition still secret - lying in some forlorn vault of the Vatican? Had Nietzsche been arrested in the same fashion and told to recant his philosophy and its plateaus, does anyone believe he would have recanted anything other than in riddles, provocations, mockery and histrionics? Isn't it to the dung the crucifix belongs? Why did Nietzsche sign his Dionysiac letters as Dionysus the Crucified? Isn't Survival the permanent crucifixion of Life? Did Reich also seek his own destruction? And was Artaud a fool when he wrote in his preface to The Theater and its Double - "and if there is still one hellish, truly accursed thing in our time, it is our dallying with forms, instead of being like victims burnt at the stake, signaling through the flames"? Well past the personal drama, it is when the tragedy ends that the real cruelty begins - having to wage wars with open force (Reich did not go far enough, it is not just the tragedy of knowledge...). Wasn't Bruno just another 'suicided of society'? Wasn't he signaling through the flames? If he died with joy and fearless, should we hold that against him?

Indeed, the joyful science - such as Nietzsche would discover it - lies not in finding utility for fictions, facta ficta, but in the usage of signs or doubles to capture and transform the factual without

loss of perspective - deductions may be impugned, so may inductions, perceptions and experimentations. Chances must always be taken - mistakes committed, but for as long as they are made with an open mind and the system deployed to relate terms and relations is an open one - one retains the power to correct errors and self-regulate the experimentation both with theory and the practical, and find a pragmatic stance one can define as a line of life. The world is a multiplicity of percepts and perspectives, but this hardly implies that for an object there are a multitude of perspectives - each existent is essential, and to each thing there corresponds only an adequate idea, there belongs only a function, be that thing a body or a soul, an object or a subject. If it were otherwise, the possibility of knowing would itself be precluded as of all Time. All perspectives are not equivalent.

Nietzsche's assessment in Beyond Good and Evil is poor precisely because the Dionysian type knows that only the noble perspectives can become life-affirmative, in thought and in action. Bruno's fight was the fight of life-affirming knowledge against the Life-denying organ-ization of the body, the Judgement of God and its organic system. Bruno did not die for himself, nor for his knowledge or his truth. He did not die for anything or anyone. He was murdered for his knowledge just as Life is murdered for its power every day in a human world still ruled by the organized emotional plague:

"Beyond the clouds, in the highest region, sometimes when I burn in delirium, for the refreshment and deliverance of my spirit I form a castle of fire in the air" [(32)].

3. What schizophrenics have to teach

There is one more story we would still like to tell - the story of one Heinrich Anton Müller, born in 1865 in Boltingen, Switzerland, from humble origins. Having worked in the hillside vineyards of the canton of Vaud, near the Lake of Geneva, Müller invented an ingenious vine trimmer. However, in the process of trying to patent it, his counsel, agents and sponsor colluded to expropriate his invention - and the lucrative exploitation of his machine was pursued by them and still others. When Müller rebelled against this, he was promptly institutionalized in the psychiatric hospital at Münsingen, near Bern, under the standard pretext that he suffered from paranoid ideas of grandeur and persecution. Seeing himself incarcerated for life for the crime of having invented a machine whose use was of value and profit to others who stole his rights, Müller promised never again to invent another machine which was of use to anybody, in the hope that his machines never again could be stolen, never again be employed for profit, never again be subject to trade and exchange. So, Thévoz writes [(33)] -

"Müller occupied himself with drawings and inventions, the latter with a view to achieving perpetual motion."

This he claimed to have achieved sometime later, in a form that reminds one of the Bessler Wheels. His machines - consisting of many wheels engaged in a ceaseless whirl - recall the contemporary efforts of Man Ray to transform useful objects into useless ones. Müller would have succeeded in doing so with a perpetual motion machine, a machine which, by its constant capture of energy, by its constant performance of movement, should be in principle considered the most useful there could ever be. Yet, the notion that such a machine could exist is at once dangerous for our social system and rejected as foolish, as an impossibility, a dupery. It is dangerous to our social system because there is this common perception that it would make society independent from the oil, coal and nuclear industries - and dangerous because it evokes the notion that if Space is brimming with energy, then power can be had for free. This is also part of Müller's notion - the realization that a perpetual machine ultimately cannot be sold or find a market, even if the inventor is determined to succeed.

But why are such machines rejected as foolish and impossible? Because they raise the specter of getting something from nothing. Yet, consider for a moment what such a machine is - in the words of Thomas Phipps Jr., it begets something for something, even if unequal, not something from nothing! And now consider what it stands for in our social world: perpetual motion has been banned to the asylum, to the freak show - where it still finds a way to sell itself - precisely because everybody, the scientist and the common man, persists in believing that it can only equate to getting something from nothing.

Here is where we find the Müller effect, so to speak, where the scientists can only escape by art, and the artist by science - where the machine of the highest utility is useless for the existing social system. It is only fitting that all of Müller's machines were destroyed by order of the hospital management, without a further thought being given to them. What could a paranoid-schizophrenic possibly have to offer? In Character-analysis, Wilhelm Reich answered that question:

"Schizophrenics are able (...) to see through individual and social matters as intelligently as no other character type. Later we shall see how this lucidity of intelligence in the schizophrenic is one of the major dangers which threaten his existence in present-day society" (34).

4. Esoteric disjunctions of the Real

Spinoza's modes of existence of the single substance essentially referred to the two types of multiplicity that compose the Real: multiplicities in extension (bodies, things), and multiplicities of intensity (duration, thought, perception). Spinoza himself thought that there might be other modes

of existence, unknown in his epoch. And there were indeed, modes of polarization for electric energy, positive and negative, and modes of energy flux, inertial or massbound (matter) versus non-inertial or massfree (Aether). Whereas the first disjunction of modes is intrinsic to the other two disjunctions, all three are distinct with respect to their qualifications of the Real.

Essentially, the aether consists of the whole of reality - since its energy encompasses both what is free from matter (aether in the strict sense) and that which is energy trapped in the form of matter. As massfree energy, the Aether is essentially a double system - in purely energetic terms this means that the primordial function of disjunction which massfree energy obeys is the distinction between the life-affirming and life-denying qualities of the Aether - what Reich called Orgone and Deadly Orgone, or Castaneda called the Circular and Tumbling Forces, or the Animate and Inanimate Energies. At once, the Aether cures and kills, gives health and brings sickness and death. This dualism of 'forces', active and reactive (to speak from a Nietzschean or Castanedan perspective) or of energies (and here we could address the Chi duality of Yin and Yang forces in Buddhism) however is a disjunction that is brought about directly at the level of the immaterial Aether, at the level of massfree energy.

Like others before us, we once thought that this dualism might be coincident with the dualism of positive and negative polarity charges, whether massbound or massfree. The predominance of free negatrons in nature and the affinity of nucleons for positronic charges, the claims that negative ions are beneficial to health and positive ions detrimental, and so on, all suggested that negative charges could be viewed as being beneficial to living systems and positive charges malefic. There remained great difficulties with this scheme - that latent thermal energy, whether bound molecularly as the intrinsic potential energy of a molecule or in an unbound state, most surely constituted a non-electric form of massfree aether energy; that the distinction between non-ionizing photobiological light (low frequency optothermal photons, LFOT) and non-ionizing, free-radical inducing light (high-frequency optothermal photons, HFOT) lacked any reference to electric polarity; and that gravitation also presented no electric polarity.

Instead, we came to realize that the Orgone and Deadly Orgone designations employed by Reich, denoted quite specifically a spectrum of massfree electric aether energy which to this day has remained unknown. OR and DOR were charge phenomena indistinct of electric polarity: the cut-off limit between the two electric aether radiations occurred for charges of either polarity. And, what was much more important, it occurred in a physico-mathematical manner corresponding to the distinction between LFOT and HFOT photons. This immediately led us to understand how any black-body spectrum is in fact the product of an underlying electric radiation that encompasses both DOR

and OR electric fields. The discovery was tantamount to state that, once in an electric form, the electric component of the massfree aether energy was the bringer of both Life and Death. Yet, most of the aether massfree energy also existed radiatively in the form of a non-electric, non-electromagnetic and non-thermally-sensible energy, ie in the form of latent energy. Finding its physical characteristics would be a journey too long to tell at present - but suffices to say that here alone must the most indifferent Inanimate lie.

So then, the critical difference for the massfree electric aether is not at all a matter of positive vs negative ions, of charge polarity, nor even a problem of ions, or massbound charges. It concerns solely massfree charges, their longitudinal radiation fields, and the cut-off frequencies between beneficial and malefic electric waves, since these massfree Aether wave functions do not consist of transverse electromagnetic waves, with their photon analogues, but form instead longitudinal electrodynamic waves that do not obey the relativistic speed limit.

The two electric massfree energy qualities thus form a functional pair where the terms are simultaneously antinomic and complementary, or functionally equivalent. Indeed, we should refrain from taking these functions as principles of sexuation, for instance. They are powers - essentially to give Life or take it away (bring Death). They are powers of sexuality not principles of sexuation. And the power to give Life is also the power of awareness, creating an asymmetry between the two energies in the context of living systems, as one operates by innovation, 'animation', catabolism, and the other by preservation (a form of death), 'inanimation', anabolism.

To the electric dualism of the massfree aether and the corresponding dualism of HFOT and LFOT photobiology, must be added the dualism of massfree versus massbound charge: the disjunction between the physics of a purely energetic world, the 'vacuum state', and the physics of the material world, the world of mass-energy where inertial effects are associated with electric phenomena. Life as a cellular event would never have been possible without absorbing both qualities of the massfree electric energy through organs that work on matter, ie upon molecular aggregates of mass-energy. In this very context, both DOR and HFOT light were as critical for the assemblage of prebiotic, pre-cellular soups of polymers, as OR and LFOT light is for the assemblage of cellular systems.

All organic beings deploy life on this plane of mass-energy and its association with massfree energy (in the form of electric, thermal, gravitic or kinetic modalities). It is precisely by virtue of their organs forming histological continua with differentiated cell types that organic beings employ 'animate' energy to produce (catalyze the formation) and agglutinate chemical substances, covalently and noncovalently, just as bodies employ 'inanimate' energy to freeze and decompose the same substances.

Living systems are in this respect electric, chemical and thermal machines that uptake energy (through skin absorption, respiration and digestion of foodstuffs) by tapping the power of the local Aether. Once we are dealing with macro-molecular complexes of mass-energy we are dealing already with combinations of animate and inanimate energy, complexes of active and reactive forces relating the Aether energy trapped in matter with the massfree aether energy that is channeled through.

All living systems have a particular affinity for the animate component of the Aether, the relation between their bodies and their organs is ordered by this affinity, and - through the means of culture - this ordering is employed to transfix the bodies in a state of overorganization, converting body and organs into organisms. The inner cohesion of animate energy, its capacity to order should however be clearly separated from this organizing or organismicizing tendency - since inner cohesion or immanent consistency is rather a property of the 'excitability' of animate energy. Conversely, inanimate energy breaks down the cohesion of organic functions - disorganizes the organism, a power which for as long as the organic being is strong enough, offers the possibility of new organic relations, of actualizing different assemblages of sense-perception and action - but which, by weakening the organism can just as well bring about illness and death.

5. The utility and usefulness of knowledge

Some may place the value of knowledge in knowledge itself, in the overcoming of ignorance and a better comprehension of nature. Yet, to begin with, nature is not fixed nor a matter of pure forms reducible to geometry. Nature is in permanent flux, and this flux operates by multiplication of functions, by superimposition of motions. So that all that we can at best comprehend are the functions of nature - since it is devoid of finalities or 'reasons', never fixed and always in perpetual variation using discrete gamuts of material. But, more fundamentally, we need knowledge not for its own sake, but for the sake of life and action in the world. To paraphrase Nietzsche, if the joy of knowledge and the usefulness of what is actually known were not united in science - if the alteration and sharpening of thought and perception brought by knowledge were prevented from fusing with the new physical powers and technical capacities brought about by science, of what possible good, or usage or interest would science be?

When one criticizes knowledge for being useless, it is not because there's no use for useless knowledge. Useless knowledge is what the world of Man is full of - from religious confabulation to mythical science. And if science per force must generate error, this error it must keep to a minimum if it is to learn from it. So, yes, science can and has and does produce monsters - and fictions and illusions. But science is all there is to teach us the inner workings of nature. If we do not listen to it, do not treasure it, do not seek to use it to affect a positive transformation of the world, then sci-

ence is made useless - by being unable to learn from its mistakes it becomes forever condemned to error . It is this mechanism alone that generates illusions, as these are needed to justify science in the eyes of the public. Science should need no justification, it should be a condition of an action as much as its instrument. But in the absence of such a situation, science becomes a little knowledge of the Real and a lot of stuffing everywhere - very much useless knowledge, having only the utility of the commodity, dreaming even commodity dreams. Yes, it is not as if useless knowledge was devoid of utility. We have seen how entire systems of false knowledge were created with a religious form - and how knowledge acquired first a political utility (a political use-value), and later an economic utility (an exchange-value). False science, is science still in the garbs of metaphysics. It is useless knowledge that passes for knowledge of the unknown. But it is not as if it has no social utility.

Altogether different is the usage of science to further the processes of self-regulating Life. Since the raw material of Survival is this life, and as is it hardly knows what self-regulation is, let alone a usage of science to further itself - this usage of science we speak of is per force a minoritary one. But here science acquires, not a utility but a usefulness for life and action - not just through a skeptical and negative or critical shattering of myths, fictions, illusions, beliefs, etc, attendant to a cognition that functions as a force acting in the world - but by its positive power to make us see differently, understand better, and transform things.

It is precisely the power to transform ourselves and the world we make with our hands which can be reduced to a sad science condemned to lay smaller and smaller eggs, a science that does not question society, a science that can only proceed by scoring the frequency of this or that type of result, not a science that effectuates a power to discriminate or differentiate, a power to transform, a power that can affirm its errors and mistakes.

When science is reduced to the perspective of its social utility, it becomes science for its own sake, the legitimization of academic, universitarian cadres pursuing their self-reproduction as an essential commodity of the system, in a mercantile and axiomatic relation. Nothing else. A sad utility, as distinct from the gay usefulness of a science, itinerant and functionalist, that subordinates itself, and seeks to subordinate itself, to the active powers of Life. This is what Nietzsche intended with his notion of a philosophical science, the continuation of poetry and art by still nobler means. If knowledge were pure cognition, as Nietzsche puts it, or the value of knowledge resided solely in pure cognition, it would be a matter of sheer indifference. But knowledge is part of a challenge to life, a challenge for more, much more than merely actual knowledge. Still, in that challenge it matters indeed that we learn precisely how to employ science to further the possibility of a different and better life. This learning is at once analytic and synthetic, at once theoretical and practical - it is the only prag-

matic learning which already consists of teaching oneself.

But Physics is very far from this indeed - with its disunified and heavy apparatus it has made impossible, even for the physicist!, to understand how the questions are no longer: how can one understand the relativistic Spacetime?, How can we understand waves of probability?, How can we understand the duality of wavicles?, etc, but rather: how could a pseudo-continuum of intervals understand, describe, capture, a continuum of energy? How could a probability wave comprehend the exact functions of an atomic orbital electron, etc, etc?, How does the wavicle theory botch up any possible comprehension of the superimposition of 'particles' and waves?, etc. For, these simple questions - before all the complication which has taken place in the particle-physics kitchen crystallized - are still those which have not received the answer they deserved - as if science, and Physics in particular, had lost sight of the quests that brought us here. And on those answers hangs everything - whether the usage of science is condemned to an axiomatic utility, or whether it can find and consistently pursue the riddles of Life - and thus succeed in deriving another usage.

The products of science are no less objective than those of art or culture or industry. The function of producing a work predates the adequacy of the work or object produced. Function always determines structure. Galileo only formalized what was already since time immemorial the experimental-inductive method utilized by any animal that fabricates something. But the natural utility of things soon became detached from a social utility - a social use-value that eventually found a quantitative measure of its worth in values of exchange. In this step, all objectifications of any production process acquire a utility that, in the course of History, becomes more abstract to the point that it reduces to the simple and unified utility of producing surplus value to be realized as exchange value. Hereby, social utility acquires the full complement of its utilitarian predicates, and reaches its mercantile sense. It is with plebeian civilization that the criterion of the usage becomes paramount. Paramount, at first, as a matter of axiology, as a use-value - which immediately justifies all subsequent utilitarian criteria. But the historical essence of utilitarianism was the abstract flux and practical value of exchange-value - the perceived utility even of objects that are worth nothing - since any object that circulates has its pathway determined as a function of the axiomatic perception of value that travels attached. The commodity has, in this sense, become a purely perceptual value.

Along these lines, the exchange system retains a simulation of use, a simulation of survival and needs constitutive of every and any organism, which, in the last analysis, is a condition for the continual refurbishing of needs. As if there were any real uses at stake. All in a metaphor of semblance to reality.

And we shall go further - Richter attributes to Picabia and Duchamp the elimination of art as such, as a separate realm of activity, by a solid anti-artistic attack cooked at two, and to Man Ray the function of transformer, converter, a machine to convert useful objects into useless ones. The useful at stake here is the molar utility, the useful which makes a commodity usage of the syntheses of production - the useful which is a function of the preservation of the molar order of gregarity, representation and axiomatics of representation. But likewise with 'Fountain' — it converts a useful machine into a desiring machine, into a useless machine, into an art-machine, the ready-made, for as long as that too will not be reabsorbed by the representation machine of the museum. The conversion is between machines - transforming the molar useful machine into a molar dysfunctional machine, into a machine which is molarly useless.

When it comes to Anton Muller, something else is at stake. We need no reason to suppose that he was aware of Man Ray as his contemporary, to realize that he too sought the transformation of machines subordinated to molar usages into machines that constituted molar dysfunctions. But something else also happens - something which opens the NorthEast passage, so to speak. If Muller's machines are useless because they are devoid of molar utility, and ultimately useless because they cannot be valorized as commodities, that is, realized as exchange-values, it is because they are perpetual motion machines, machines designed simply to move without purpose, or better, with no other purpose than that of motion itself. For absolute motion is what the commodity is ultimately unable to accomplish. All its motions are relative, from spot to spot, whereas absolute motion itself is the only continuum there is. Unlike the commodity, a perpetuum mobile is a machine of absolute motion. It wrenches from the chaos the secret that defeats entropy and death. It wrenches from the chaos the only affirmative use there is, the usage of energy to relay motion, and here too the evaluation of use that corresponds to this other usage of the syntheses of production of the Real - no longer the value of a molar function, no longer a use-value susceptible to capture by systems of representation and axiomatization, but a molecular usage, an evaluation of use which is on a par with the forces responsible for the construction of any reality, inorganic or organic, physical or biophysical, objective and subjective.

Indeed what is the possible use of a perpetual motion machine but a molecular usage, a molecular function - in that, it is at once the most useful machine, the gateway even to the cosmos, and the most vilified of potential commodities?

What Muller uncovers is precisely the nobler usage of the cosmos-machine, this use which is molecular and of use only to what is not a commodified mode of employment. And to make sure that his discovery of perpetual motion remained outside of any possible conversion into a commod-

ity, he ensured that his machines would be of no use to anybody - indeed, Müller's machines do not place us on distant stars, but rather place the distant stars here, with the same irreducibility of utilitarian application as those distant stars have. Hence, all his machines do is to set wheels into permanent rotation. They do not give us a better engine, they do not provide us with inexhaustible power for our commodified endeavours, they do not make a better motor for our cars, etc. They are just wheels in a condition of virtually perpetual motion - living and independent proof of the utter derision in which the rest of the cosmos holds human quests.

REFERENCES

1. Aspden, H (1996) "The contemporary aether", Int Conf on Descartes and Scientific Thought, Perugia, Italy.
2. Whittaker, E (1951)"A history of the theories of of Aether & electricity", Dover Publications, NY, NY, Vol. I, p. 7.
3. Whittaker, op. cit., p. 3.
4. Wahl, J (1965) "L'expérience métaphysique", Flammarion, Paris, France, p. 32.
5. Deleuze, G (1970) "Spinoza: Practical Philosophy", City Light Books, San Francisco, CA, p. 87.
6. Deleuze, op. cit. p. 88.
7. Deleuze, op. cit., p. 89.
8. Galilei, G (1636) "Two New Sciences".
9. Deleuze, G (1993) "The fold, Leibniz and the baroque", Univ of Minnesota Press, MN, p. 117.
10. Wahl, op. cit., p. 30.
11. Prigogine, I & Stengers, I (1984) "Order out of Chaos", Bantam Books, NY, NY, p. 104.
12. Prigogine & Stengers, op. cit., p117.
13. Sklar, L (1974) "Space, time and Spacetime", U of Calif Press, CA, p. 209.
14. Nietzsche, F (1869) "Philosophy in the tragic age of the Greeks", published in 1962 by Gateway Editions, Chicago, IL, p. 89
15. Nietzsche, op. cit., p. 88.
16. Reich, W (1951) "The rooting of reason in nature" in "Cosmic Superimposition", Farrar, Straus & Giroux, NY, NY, p. 282.
17. Deleuze, G & Parnet, C (1977) "Dialogues", Flammarion, Paris, France, p. 77.
18. Castaneda, C (1988) "Author's commentaries on the occasion of thirtieth year of publication of The teachings of D. Juan", Univ of California Press, Berkeley, CA, p. xviii.
19. Nietzsche, F (1888) "The Twilight of the Idols", '"Reason" in Philosophy', #3 (p. 36, Penguin Books, Baltimore, MD).

20. Nietzsche, F (1886) "Beyond Good and Evil", #191 (p. 96, Penguin Books, Baltimore, MD).
21. Nietzsche, F (1887) "Gay Science", #112 (p. 158 of "Joyful Wisdom", Ungar, NY, NY).
22. Nietzsche, F "Will to Power", I, #53, ed. by W. Kaufmann (1968), Vintage Books, NY, NY, p. 33.
23. Nietzsche, "Will to Power", op. cit., I, #54, p. 34.
24. Spengler, O (1928) "The Decline of the West", Oxford Paperbacks, England.
25. Deleuze, G & Guattari, F (1973) "Anti-Oedipus I: capitalism & schizophrenia", Viking Press, NY, NY, p. 371.
26. Reich, W (1953) "The Murder of Christ", Farrar, Straus & Giroux, NY, NY, pp. 104 and following.
27. Nietzsche, F (1883-1885) "Thus Spake Zarathustra", IV, "Of Science" (p. 313, Penguin Books, Baltimore, MD).
28. Nietzsche, F (1886) "Human, all too human", Vol. II, Part I, "Assorted opinions and Maxims", #206 (p. 262, Cambridge Univ press, Cambridge, England).
29. Nietzsche, F. (1887) "On the genealogy of morals", preface, #7.
30. Nietzsche, F. (1886) "Human, all too human", " The religious life", #110
31. Nietzsche, F (1886) "Beyond Good and Evil", #25 (p. 38, Penguin Books, Baltimore, MD).
32. Bruno, G (1585) "Heroic Frenzies".
33. Thévoz, M (1976) "Art brut", Rizzoli International Publications, Switzerland, p. 91.
34. Reich, W (1933) "Character-analysis", Farrar, Straus & Giroux, NY, NY, p. 413.