EXCERPTS FROM

THE WORK/ENERGY CRISIS AND THE APOCALYPSE

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The litany of natural stuffs - petroleum, natural gas, uranium, coal, wood, water, sunlight - apprehension about their limits, joy in their abundance, skepticism about their benefits, pass for the bulk of "analyses" of the "energy crisis" that "we" face. Whereas in the 1950s and 1960s Nature was "under control" and the robots (e.g., Hal in *2001)* were rebelling, now it appears that Mother Nature is turning a new face. Instead of the obedient, invisible and infinitely malleable material of social development, the terrestrial abode seems stingy and treacherously seductive. For the energy crisis is usually traced to two problems:

(a) the "limited" or "finite" amount of fossil and uranium fuels in the earth;
(b) the increasingly "surprising" discovery of interactions between the use of these fuels and their biological and social effects.

Although the analysts place different emphases on these two "problems," their "solutions" usually address both. Indeed, the "great energy debate" (at least what passes for it) is a confrontation between the anti-limitationists, who are anxious about the rapidly approaching abyss of zero-oil-coal-natural gas-uranium and are ready to introduce any "way out," however untried, and the collective interactionists, who argue that the "balance" or "fabric" of Nature is so intricate and fragile (to mix metaphors) that any of the schemes of the anti-limitationists would drive Mother Nature into a schizophrenic breakdown.

From this debate, one would presume that these are momentous times.

They are, but not in the way that is being implied. On the one side, the anti-limitationists cringe in terror at the prospect of a "day the earth stood still" repeated so often that "civilization" (sometimes with the proviso "as we know it") collapses into an age of social anarchy - starvation, rape, murder and cannibalism ("What's new?" we might ask). On the other side, stand the equally apocalyptic interactionists envisioning huge floods let loose by the CO, "hot house" effect, or the end of all biological life due to the depletion of the ozone layer causing a tidal wave of high-energy radiation to penetrate the chromosome linkages and break down the proteins, or a festering mutant jungle released by the radioactive wastes of nuclear reactors. Conclusion: either social anarchy or natural anarchy. "Take your choice," we're told. But must we choose? Are these our alternatives?

This debate, with its apocalyptic overtones, indicates a crucial crisis for capital and its attempt to carry through a major reorganization in the accumulation process to overcome it. The Apocalypse is no accident. Whenever the ongoing model of exploitation becomes untenable, capital has intimations of mortality *qua* the world's end. Every period of capitalist development has had its apocalypses. Here I'm not referring to the microapocalypse of death: everybody dies, and even if everybody dies at the same time (I mean everybody), what's the problem? The earth becomes a cleared tape and why should the angels grieve?

I am talking about those functional apocalypses that mark every major change in capitalist development and thought. For the Apocalypse approached at other times in the history of capital, when (as in the last decade) the class struggle reached a level that jeopardized capital's command.

In the seventeenth century, a pervasive premonition of apocalypse was voiced by the "philosophers," "astronomers" and "anatomists" (i.e., capital's planners) in the face of the revolutionary upheavals of the newlyforming proletariat that was being introduced to the capitalist discipline of work. In this phase, questions of inertia, time and order were paramount. The control mechanisms were manageable only by external forces. Capital's concern with its apocalyptic potentialities can be seen reflected in Newton's theory of the solar system: the planets revolve around the sun, but their revolutions continually deviate from the equilibrium path because of the random, irregular gravitational impulses they communicate to each other. Ptolemy's crystal suddenly looked like a mob that with *this-and-that*, slowly, imperceptibly, became unruly, though it was nominally dominated by the gravitational field of

the sun. The deviations accumulated to a point where some planets would spin off into the stellar depths while the others would dive into the sun's inferno. Hence Newton's argument for the necessity of God's existence, whose function in the universe was to prevent this catastrophe by periodically returning the planets to their equilibrium orbits via a true miracle. The solar system was the "Big Watch" and God was not only the watchmaker but also the watch repairer. Otherwise the mechanism, through its blind obedience to the laws of inertia, would snap and break, however finely wrought. God must intervene to create orderly time from chaotic mixtures of inertia and attraction. Given the universal identification of God with the state in the seventeenth century, it is not hard to decipher Newton's prescription for the state policyvisa vis the apocalypse portended by its "wandering stars," the proletariat. (A prescription Newton embodied in his job as the inquisitor and torturer of counterfeiters for the Royal Mint.)

In the Newtonian period capital's main task is the regularization of time as a precondition for lengthening the working day. Medieval production time was circular and the pacing of work and "rest" fixed by "eternal" seasonal and diurnal dichotomies. Summer and days could not be stretched, winter and nights could not be shrunk at will. Newton and his fellow "century of genius" planners had to create a non-terrestrial work-time that would be the same in winter and summer, in the night as in the day, on earth as it is in heaven. Without this transformation of time, lengthening the working day would be impossible to imagine, much less impose "with fire and blood."

By contrast, the "revolutions" and organizational forms thrown up by the working class in the first half of the nineteenth century spelled the end of a period where profits could be created by stretching the working day to its limit. Capital had to "revolutionize" the technical and social conditions of production to turn the proletarian revolt against work into an intensively productive working day. Absolute time was no more of the essence, productive intensity was. Capital could no more complain that the working class was inert, unmotivated or tending to rest. The class was on the move, scheming, energetic, volatile. If the work-house prison sealed from "the elements" was the first laboratory of work, the working class was clearly blowing out the sides of the container and destroying the experiment. The problem was no more how to confine workers *as long as possible,* but how to transform their energy and revolutionary *heat* into work. Not surprisingly, thermodynamics, "the study of energy, primarily with regard to heat and work," becomes *the* science after 1848.

Thermodynamics begins with Sadi Carnot's attempt to determine the possibilities and limits of creating productive work out of heat and energy when in confining it, it explodes. His leading idea is that if a mass is exploding, you should give it a way out so organized that it will push a piston and thus do work for you. Carnot's analysis focused upon an idealized version of Manchester's "demonic" steam engine, and attempted to determine under what conditions the expansion/compression cycle of a gas would give a maximum amount of work. Carnot's cycle thus became a representation of the cycle of class struggle that was taking shape in the nineteenth century, putting the working class' wage demand at the center of the "business cycle."

Carnot's laws of thermodynamics grew out of his memoir and led, as Ariadne's threads, out of the "crisis labyrinth." For physics is not only "about" Nature and applied just" to technology, its essential function is to provide models of capitalist work. The ultimate nature for capital is human nature, while the crucial element of technology is work. The First Law of Thermodynamics, for example, did not simply recognize that though energy has many forms (not just "mechanical"), each can be transformed into the other without loss. Its consequences impinged on capital's conception of labor power. A more general view of energy was imperative if the technical and social conditions of production were to be "revolutionized," for the old mode of production assumed a fixed limit on the forms of energy that could generate work. This new Law taught capital a generality and flexibility in its productive arrangements that it did not even experiment with in the First Industrial Revolution.

Like Darwin's discovery, Gustav Mayer's first enunciation of the law of the conservation of energy occurred in a typical nineteenth century way: on an imperial voyage to the tropics.

> A sailor fell ill of some lung disease. Mayer bled him, observed that venous blood was a brighter red in the tropics, much closer to arterial, and concluded that metabolism drew less oxygen from the blood in hot climates because maintenance of body temperature required less heat.1

In Mayer's perspective, the sailor's body was the mediator of manifold forms of force that are "indestructible, variable, imponderable." Though the forms of force and energy would change their transformations, they conserved

the basic quantity of production, energy. The concept of energy is thus defined on such a level of generality and abstractness that an enterprising spirit would see the possibility of producing work from novel, untoward sources.

While the infinite multiplicity of energetic forms inspired a tremendous optimism in capital's search for new work forces, thermodynamics laces this high with arsenic: the Second Law. An ominous version goes like this: a perpetual motion machine completely transforming the energy of the surroundings into work without loss is *an impossibility.* The Second Law, however, has even darker consequences than deflating capital's dream of getting work for free (having workers "living on air"). It states that in any work-energy process less and less energy becomes available for work. *Entropy* (the measure of work inavailibility) *increases.* Clausius put it in cosmic form: "the energy of the universe is constant; the entropy of the universe increases to a maximum.2

The Second Law announced the apocalypse characteristic of a productivity-craving capital: *heat death.* Each cycle of work increases the unavailability of energy for work. As the efficiency of the heat engine depends on the distance between heat input and heat output, the Second Law predicts a slow, downhill leveling of heat-energy differences, (on a cosmological scale) until there are no more flows of energy for work. "The world is living on its capital" and all around is the whisper of the impending silence.

This image of an undifferentiated, chaotic world had a two-fold echo: in the rhetoricians of mass culture like Henry Adams ("the so called modern world can pervert and degrade the concepts of art and feeling, and that our only chance is to accept the limited number of survivors - the one in a thousand born artists and poets - and to intensify the energy of feeling within that radiant center"), and in the pragmatic thought of Frederick Taylor.3 The Henry Adams' mourned over the loss of accumulated values that, at best, could only be "saved" in the leveling of social and cultural differences announced by "energy's dissipation" into a heat death apocalypse. Taylor instead saw in this apocalypse the essence of a project: productivity is efficiency. His answer to the second law (if not absolutely, relatively) is not "conservative," it is a "revolutionary" attempt to create a far more efficient organization of work and to perfect the intermeshing of worker with environment. Taylor attempted in practice what Carnot did in theory: test the limits of an efficient transformation of energy into work. In a typical American fashion, he turned to the manmachine. Once again, it seemed that the apocalypse could be averted if Action was taken. This time, however, it was not the action of God *qua* super-state, but capital's planning in its own self-conscious, scientific analysis: scientific management.

Newton's apocalypse and Clausius' apocalypse do not simply have analogical connections with capital's crisis in their respective periods. The theories from which their apocalypses derive from do not merely have contingent or ideological relations with the contemporary, on-going organization of work. *Capitalist crises stem from refusal of work.* Thus, in times of crisis, new analyses of work, new schemes for overcoming resistances to it become imperative. Physics, in this context, does not have a separate content, but provides definite analyses of work and new plans for its organization. Its "models" may appear abstract, but they are directly related to the labor process.

Newton's parable of the transformation of working class inertia into work and his appeal to God *qua* State to restore equilibrium under centripetal and centrifugal pressures is a general methodological scheme. The relation of thermodynamics to work is more explicit. The *work* of thermodynamics and the *work* of capital are no mere homonyms. Capital faces working class resistance to work in continuously new ways as this resistance changes in its power and organization (though it may seem "impotent" and "chaotic"). Capital is concerned with physical work because the labor-process is the transformation of labor-power (energy, inertia) into labor (work). This is the "eternal necessity" of capital; and physics provides models for overcoming "resistances" and measuringrods of levels of crisis. The Apocalypse is an extreme measure of the failure of these models. Capital's problem in the nineteenth century changes from that of Newton's time in the same way the resistance of inert machines shifts into the chaotic energy of random micro-particles. Essentially, however, it remains the same: what is the possibility, limit and method of creating useful work ("order") out of the almost natural evasion, subversion, resistance and covertness or the working class.

Capital's despair is always hypothetical, yet always virtually existent. This is the multiple function of the apocalypse. It serves not only as a parameter for the on-going process of work organization and experimentation, it serves also as a reminder and a threat: a reminder, because capital's control is contingent and revolutionary potentialities exist at each instant; a threat, because it attempts to project the destruction of capital as the destruction of the universe (as in the heat death). As long as the "elements" of the working class are attached to the totality, the

apocalypse is the extreme point where opposites meet in avoidance. It is capital's threat, if we go too far, to take us all down with it. If we annoy God too much, if we agitate too much, if we become too unavailable for work, then the "mutual destruction of the classes" is used as a club to bring us back into line. But must the molecule fear if the engine dies?

What of the "energy crisis" and its apocalypses? The first thing to note is that the term "energy crisis" is a misnomer. Energy is conserved and quantitatively immense, there can be no lack of it. The true cause of capital's crisis in the last decade is work, or more precisely, *the struggle against it.* The proper name for the crisis then is the "work crisis" or, better, the *"work/energy crisis.* "For the problem capital faces is not the quantity of work *per se,* but the ratio of that work to the energy (or labor power) that creates it. Capital is not just a product of work. Capital is the process of work-creation, i.e., the condition for transforming energy into work. Energy has within it a restless activity, an unpredictable microscopic elusiveness, antagonistic, indifferent as well as productive of the work capital so desperately needs. Though the eternal cycle of capitalist reality is the transformation of energies into work, its problem is that unless certain quantitative levels are reached, the relationship expressed in the work/energy ratio collapses. If entropy increases, if the availability of the working class for work decreases, then the apocalypse threatens.

The *forms* the apocalypse takes in this crisis are crucial. They signal both a warning and a specific threat, just as the heat death apocalypse inspired Taylorism and the Newtonian centripetal/centrifugal catastrophes dictated certain features of mercantilist state intervention. What do the anti-limitationists and interactionists allow for decoding the present crisis? The first step in the decoding must lie with "nature." It *appears* that Nature and its stuffs are an independent pole, given and distinct from capital - its "raw" material, as it were. From the exhaustion curves of oil or natural gas it appears that a black hole is absolutely devouring them. But for capital, Nature *qua* Nature is non-existent. *Nature too is a* commodity. You never have oil, or natural gas, or even photons that do not take a commodity form. Their commodity reality is what is crucial. Even when you talk of the Earth or the solar system you cannot speak of a noncapitalist reality. The energy problem is unequivocally a problem of capital and not of "nature" or "Nature and Man." Our problem is to see that capital's difficulties in planning and accumulating spring from its struggle against the refusal of work (the multi-dimensional subversion of the orderly transformation of energy into work). Thus, according to our decoding, through the noise of the apocalypse, we must see in the oil caverns, in the wisps of natural gas curling in subterranean abysses, something more familiar: the class struggle.

H. The Manifold of Work: Anti-Entropy Qua Shit

Entropy can be reduced by information, i.e., by locating pockets of low entropy and incorporating them into the work process; the inevitable reduction in the availability for work can be held at bay. The more the information *and* the less the cost of creating it and communicating it, the more the stalling of Time. But this process can be *reversed,* i.e., the increasing entropy within a work process can be localized *and* expelled. Every production process shits; the question is, "Where is it going to be put?" If this shit, i.e., the material, social, physiological, radioactive, psychological waste that cannot be re-swallowed and re-cycled, is allowed to remain in the vicinity of the production process, each new cycle of production will intensify the entropic rise exponentially. The reproduction of the machine cycle will be clogged by the left over shit, and the costs of returning to the initial state will be so overwhelming that it will outpace the work produced by the thrust stage of the cycle. The net work will fall into negativity, and needless to say, profit will be in jeopardy.

This aspect of capital's struggle against entropy involves the possibility of ejecting areas of high entropy into the surrounding environment without effecting the net work production. For not only must waste be controlled and accidents prevented (the job of the computer controllers); if waste must be created, if little murders must be condoned, then it is crucial that the shit be localized and expelled. The corpses must be buried or burned. We have the final aspects of work: the passive work of absorbing capital's wastes. For in addition to the work of producing, reproducing, informing and controlling, there is the immense work of absorbing, imbibing capital's shit. Not only is capital concerned with transferring as much of the value of the means of production to the commodity product without waste and accident. The work process necessarily also intensify the entropy of its local and global workers. Marx comments on this aspect of work:

> Capitalist production, when considered in isolation from the process of circulation and the excesses of competition, is very economical with the materialized labor incorporated in commodities. Yet, more than any other mode of production, it squanders human lives, or living labor, and not only blood and flesh, but also nerve and brain . . . Since all of the economizing here discussed arises from the social nature of labor, it is indeed just this directly social nature of labor which causes the waste of life and health.29

Capital is more finicky than a cat when it comes to shitting. The whole debate on the location of nuclear plants is an example of this sensitivity, for there are complex considerations arising from the class composition to be found in any particular location. Will they riot if there is an accident, will they get nervous about the transport and spillage of used uranium, will they get "hysterical" when cancer rumors and chromosome damage reports begin seeping in, are they desperate enough to take the tax writeoffs but not so desperate that they won't care and will explode anyway? Certainly it was no accident that TMI was located in the center of the heartland of patriarchy in the U.S.A., surrounded by phallic silos, bearded Amish Jobs and state employees.

At the same time, when capital discovers high entropic sinks in the production process, the expulsion is swift and violent. Need we refer to the execution of workers throughout capitalist development? Why is capital murdering its own labor-power? Why the Auschwitz's and Chile's? Quite simply because certain types of labor power becomes

too entropic for production, they become living shit for capital that must be eliminated. Of course, the direct slaughter of workers is just the most dramatic event in the never ending struggle of capital to beat the odds. The endless string of methods to identity high entropic workers, "weed" them out, "blacklist" them, jail them, starve them and kill them, gag us now, it is too much past midnight! But if there is an institution for localizing, expelling and exterminating entropy, the "criminal justice system" is the one. Its function: to rid the production process of the "elements" that are completely unavailable for work.

There is, however, the work not only of locating high-entropy, and the work of expelling it, there is finally the job of absorbing it. Consider the "jumper." The disintegrating, entropic aspect of the reactor core of a nuclear plant is the radiation that does not go into the production of heat but "escapes." One of the main jobs of the nuclear worker is to absorb this entropy.

There are nuclear workers whose job is just that: to suffer the shit out of the reactor. This is the part-time jumper hired to be sent into areas dense with radioactivity and absorb the full "quota" for radioactivity (absorbed by a regular worker in a year) within a few minutes. He picks up his $100 after twisting a valve and disappears, perhaps to return in a few months, perhaps to discover a suspicious lump ten years later. The "jumper" is an extreme figure, an ideal type; but certainly the *proliferation of chemical and radioactive dump sites across the country has made "fallers" of us all.* For it is apparent that the "squandering of human lives" does not occur only *within* the gates of the nuclear plant or chemical factory, but is as "social" as the labor that produces the radioactive electricity and poisons.

As we are dealing with the asshole of capital, we inevitably must deal with all that is most foul, decaying and frightening: corpses, cancer, executions, slavery, the Gilmorean joke. It is at the lowest level of the institutional hierarchy, at the bottom of our fear as to what they are doing to us, that the basic profit level is guaranteed. It is not because of any melancholic humors that we have wandered here; it is exactly in these dumps of matter, body and nerve that you find the famous "bottom line." It's all in the physics: the efficiency of a heat engine is not only proportional to the work it produces, but is *inversely proportional to the entropy it creates*. The less the entropy the greater the "efficiency," hence the greater the work/energy ratio: the profit.

Prisons are as integral to the production process as the gas that makes the engines go, as the caress that sends one off to the plant, as the print out that tells you of your fuck up. For if there were no dumps of laborpower and constant capital, no way of eliminating entropic contamination, the system would stop. Of course, the capitalist idea is not to end the shit but to control it, dumping it in isolated, unobjectionable places, on unobjecting or invisible populations. Thus *with the energy crisis comes the death penalty.*

This is the last element of the profits crisis and the last reason for the energy crisis response. As the working class through the 1960s and 1970s has increasingly refused to be the dump of capitalist shit, the collective sewer of its entropic wastes, some antagonistic compulsion was in order. Energy price rises immediately put this refusal to absorb the shit on the defensive, for the high cost of energy seems to justify the need for entropy control and for expelling highly concentrated entropy deposits from the production process. Thus the explicit and implicit anti-nuclear movement meets its response: nuclear plants can only pass once energy prices go up. But once Teller's system of nukes and coal electrification is introduced, then the intensification of the mechanisms of control and information in the production process are inevitably realized. Finally, only with such increased prices (imposed by the very investment in this High sector), can the "need" for accepting the disintegrating excretions of the plants be forced down the throats of the surrounding populations. The rate payers of TMI are financing the repair of the plant with increased electricity bills, and the state's increasing pressure to open up the radioactivity dump sites throughout the country is felt by all.