

CHAPTER THREE

TOWARDS ELABORATION OF THE THEORETICAL CONCEPT OF NEGATIVE USE-VALUE (DISVALUE)

OR

THE HEALTH AND ENVIRONMENTAL CONSEQUENCES OF NUCLEAR PRODUCTION

1. Introduction: The Insufficiency of Classical Concepts

In this Chapter I will thematise the health- and environmental consequences of capitalist manufacturing in general, and of nuclear production in particular. To this end I will propose an inversion of two categories that formed a part of classical economic theory, i.e. the categories of *use-value* and *exchange value*. In employing these two categories, classical theoreticians from Adam Smith to Karl Marx had implicitly stressed the creative potential of capitalist manufacturing processes, since these processes were invariably said to result in goods having a dual *value*, contributing to an increase in economic wealth in a double sense. In this Chapter I am going to question the sufficiency of the given economic categories. My argument will be that critical economic theory needs to overcome an inherent bias, a bias which prevents it from systematically analysing the negative consequences of capitalist production. Only an *inversion* of the categories of use-value and exchange value will enable us to fully expose the negative impact of nuclear and other industrial production on human health and our natural environment.

To start, let's recall how Marx defined the categories of *use-value* and *exchange value*. The first term, in his structure of thought, referred to the fact that commodities are generally produced to satisfy concrete human needs. As *use-values*, commodities incorporate a variety of labour, and respond to the urgings of individual buyers. Given the fact that the concept of use-value did not target social human relationships, Marx devoted relatively little energy to highlighting its significance (1). His primary focus of attention, instead, was the concept of *exchange-value*. Contrary to the first concept which was qualitative in kind, the concept of *exchange-value* had a quantitative meaning; it explained the quantitative relationship existing between different market commodities. Behind this relationship between things, however, lay a mutual relationship between those who had laboured to create the exchangeable values. Being eminently interested in economics as a science of the *social* relations between the producers of commodities, Marx chose to primarily elaborate the meaning of commodities as exchange-values (2).

Now, while I agree that Marx's categories of use-value and exchange-value are meaningful tools of economic analysis, their indiscriminate application tends to result in a partial oversight: the neglect of some of the negative properties which are contained in commodities brought onto the market by capitalist entrepreneurs. Further, the given categories also do not facilitate, but complicate our task of assessing the negative

environmental and health effects of the by-products of capitalist manufacturing, i.e. of non-commodity waste. In order to make it possible to systematically discuss and incorporate health- and environmental issues into the debates waged by economic theoreticians, we need to invert the basic categories, and start speaking of the *negative use-value* and the *negative exchange value* of the products and by-products of capitalist industries. Moreover, in focusing the detrimental impact of commodities and of non-commodity waste, my primary focus, as we will see below, will mainly be the inverted concept of negative use-value. For in order to highlight the damaging properties of goods, i.e. those properties which are detrimental to the health of human beings and non-human species, we precisely need to elaborate the concept of negative use-value or *disvalue*.

A radical extension of economic theory evidently is a hazardous undertaking. One easily risks being denounced as a maverick thinker with notions too crazy to be taken seriously. The inversion of basic economic categories is indeed a radical extension of Marxist economics, perhaps the very most radical extension that is required to conceptualise the nuclear sector, the chemical sector, and other sectors polluting and otherwise damaging the conditions of life on earth. Nevertheless, the need for inversion is well illustrated through the example of atomic bombs, which evidently are the most damaging type of commodity ever manufactured by humanity. Anybody having the slightest knowledge of the impact that was created by the nuclear bombs thrown by the US on Hiroshima and Nagasaki, Japan, in 1945, will immediately agree that it is nonsensical to speak of the *use value* of the commodity nuclear bombs, and that sanity demands we analyse the *disvalues* contained in this military means, the properties *hampering* the fulfilment of human needs (3). For even if the throwing of the atomic bombs had concrete meaning for the fulfilment of the US's imperial designs, their '*consumption*' had such a devastating impact on the life of Japanese citizens, that one should properly speak of the bombs' *disvalue* – i.e. of their negative use-value in terms of both their explosive power, incendiary effect and radioactive fall-out.

2. The Concept of Negative Use Value (*Disvalue*) and the Problematic of Inversion

Let's then try to define the meanings of *negative use-value* and *negative exchange-value* as novel economic categories. At first sight, the employment of these categories as inverted categories appears to be a simple thing, and the inversion of existing categories itself seems self sufficient. If the term exchange value expresses a quantitative relationship between things, this can equally be said about *negative exchange value* which too represents a quantitative relationship, be it primarily between different types of non-commodity waste (where negative expenditures have to be made in both cases), and between non-commodity waste on the one hand, and commodities on the other ('negative' versus 'positive' expenditures). Again, it seems self-evident that where the concept of use value refers to the properties of commodities that contribute towards the fulfilment of human needs, - the concept of *negative use value* describes those properties, of commodities and non-commodity waste alike, which form an *obstacle* to the fulfilment of human needs. For instance, the radioactive content of enriched uranium and plutonium, and the radioactive content of their by-products.

A careful reading of the above paragraph, however, already brings out that a simple inversion, in particular in the case of the concept of use-value, will not do. For whereas Marx's discussion of the concept of use-value was limited to the sphere of society's commodities, which sphere he expected to expand and become all-encompassing under capitalism, i.e. ultimately encompassing *all* of society's products, - our discussion of the concept of *negative* use-value can neither be restricted to the sphere of commodity production, nor to that of the sphere of commodity's by-products, waste. In the case of the nuclear sector, for instance, *both* the commodities enriched uranium and plutonium, *and* their by-products, the different types of radioactive waste, possess properties that are detrimental to human health and to the environment. Hence, while the concept of negative use-value may be employed with regard to individual, concretely harmful properties, - it should be employed to scrutinise *both* what detrimental impacts are created by the production of commodities, *and* what damage is done by the generation of non-commodity waste.

Moreover, there is yet another manner in which the field of application of the concept of negative use-value should be broader, wider, than Marx's application of the concept of use-value was. Marx's concept, not coincidentally for sure, referred to the needs of human beings only. It implied quite clearly, that economic theory has a limited horizon, being the horizon of fulfilment of human consumer demand. Hence, the definition of use-value as stated by him. Yet if in our definition of negative use-value or *disvalue*, we would simply seek to create a mirror image of Marx's definition of use-value, we would not capture the full range of negative implications of nuclear production for life on earth. I therefore propose to define the concept of *disvalue* as the composite of all those properties of commodities and non-commodity waste, which are damaging to human health and/or the health of other living beings on earth. An economic assessment of the *disvalue* of nuclear production, for instance, should cover both the sphere of human, and of non-human life (4).

In short, I take the moment of formulation of the concept of negative use-value as a suitable moment to suggest a ***widening of the horizon of Marxist economic science***. Marx, as John Bellamy Foster has recently pointed out in his impressive book on Marx's ecology, was keenly aware of the mutual dependence between human evolution and our natural surroundings, speaking for instance of the '*metabolism*' between agrarian production and the soil (5). Yet in some respects, Marx's structure of thought, perhaps inevitably, continued to be non-ecological, since his views were rooted in those of his classical precursors. Hence his conceptualisation of use-value as a term limited in application to human beings; hence the absence in his theory of a *basic category* to measure the impact of capitalist manufacturing on non-human nature. In proposing the concept of *negative use-value* as an autonomous concept, i.e. as an inverted, yet more comprehensively defined concept - covering all detrimental health and environmental consequences of capitalist manufacturing -, I seek to contribute towards the extension of Marxist theory, and facilitate a *systematic* assessment of capitalism's negative impact on the living earth.

3. The Origins of *Disvalues* in Nuclear Production: Ionising Radiation from Human Intervention

The meaning of the concept of *disvalue* may be highlighted through a discussion of *ionising radiation*, the type of radiation that is at issue in the nuclear production chain. First, radiation is of course not an exclusive result of human intervention, nor is radiation necessarily damaging. Cosmic radiation, primarily from the sun, has bombarded the earth ever since it was formed. It is the principal source of life-energy on earth, along with the energy generated by the heat from the earth's inner core. While cosmic radiation, as Peter Bunyard explains, is composed of a variety, a '*potpourri*', of particles and radiation types, some of which have extraordinarily high energies and penetrating powers, the gases in the earth's atmosphere tend to prevent damaging forms of radiation from reaching the earth's surface (6). Hence cosmic radiation on the whole represents not a source of disvalue, but precisely of value, of '*use-value*'. The example confirms Marx's thesis that both nature and human labour are the source of the use-values contained in the commodities which human beings consume.

The form of radiation which is at issue in the debate on the nuclear sector is *ionising radiation* which is distinguished from non-ionising radiation, in that ionising radiation alters the atomic structure of substances which it encounters while travelling. Concretely: ionising radiation is so intense that it strips electrons away from their position around an atomic nucleus (7), altering the atom's chemical characteristics. The given effect of ionising radiation, more commonly termed '*radioactivity*', is accompanied by the release of particles and energy. Ionising radiation thus is destabilising, and since excessive exposure to this form of radiation is damaging to both human and non-human life, - substances containing ionising radiation may be characterised as containing a negative use-value, or *disvalue*. Like use-values, these *disvalues* exist in nature itself, and are not exclusively the result of human intervention in nature. Most radioactive particles encountered in nature are the decay products from uranium and thorium (8).

Now, the main risk deriving from an expansion in the amount of ionising radiation subsequent upon nuclear production, is that human beings and other species get over-exposed to this form of radiation. Radioactive materials are abundantly present in the earth's soil. For instance, according to Peter Bunyard, the Earth contains about a *thousand* times as much uranium as gold! In consequence, human beings are everywhere exposed to ionising radiation to a certain extent. On average, the exposure rate is just under 2 *millisieverts* per year, with exposure rates of up to 30 *millisieverts* per year in thorium-rich places (9) (further on the measurement of exposure to radioactivity, see section below). Nuclear production adds, and greatly adds, to the amount of ionising radiation which living beings are exposed to, for in course of the manufacturing processes in nuclear reactors and other nuclear production facilities, some one thousand radioactive elements reportedly are created artificially (10). Since a part of these radioactive materials either exist for very long or do have very intense ionising effects, the danger of over-exposure is real.

In other words – production in the nuclear sector emanates in *disvalues*, in the form of numerous new radioactive materials which have a damaging impact on the health of humans, and of other species in nature. These *disvalues* are to be sharply distinguished from whatever use values are created in the sector, i.e. from the electricity which is used for consumptive purposes, to sustain human life. Like use-values, the presence of *disvalues* should not be ascribed to human manufacturing processes alone, for *disvalues*

existed in nature before, and independently from human intervention in the form of nuclear manufacturing processes. Nevertheless, since the aim of human production is to facilitate human subsistence and increase societal welfare, the creation of *disvalues* in the nuclear sector stands counter to the very aim of economic production. The issue of ionising radiation surely illustrates, that an economic theory which only considers commodities as use-values, and ignores that those commodities may contain *disvalues*, contributes to creating a false image of capitalist manufacturing processes and their social and environmental consequences.

4. Ionising Radiation: Detrimental to Human Health

Scientific knowledge about the effects of ionising radiation remains limited, even more than half a century after the initiation of nuclear production. Yet knowledge has gradually expanded. Here I wish to briefly state some of the main human health consequences that are understood. The first point, widely publicised among the broad public, is that ionising radiation increases the risk of cancer in human beings. These risks are not equivalent for different parts of the human body. As Peter Bunyard states, ‘different tissues in the body have different sensitivities regarding the risk of developing fatal cancers’. According to the ratings recorded by him, testes/ovaries, lungs and breasts are relatively sensitive, showing ratings of 25%, 12% and 15% respectively (11). In any case, given the fact that ionising radiation can result in *fatal* cancers, i.e. in the death of human beings affected, - the *disvalue* of this form of radiation is undoubtedly large. Ionising radiation can result in the very opposite of the fulfillment of human needs.

Further, scientific research has clearly brought out that babies and unborn children are extra at risk from ionising radiation. One wellknown empirical indicator is a larger incidence of childhood *leukemia* in areas surrounding nuclear reprocessing facilities. The existence of a direct connection between ionising radiation and childhood leukemia was established through the research work undertaken by Dr. Alice Stewart in the aftermath of World War ‘Two’ (12). Other empirical evidence indicating that children are specially sensitive to the effects of ionising radiation is the increase in thyroid cancers in children noted for areas in the former Soviet Union affected by the Chernobyl nuclear accident (13). Children may also be victimised through hereditary disorders, caused by damage to the sex cells of the parents resulting in genetic and chromosomal abnormalities (14). Here we are speaking of the *disvalue* of nuclear production for future generations, - about an effect that again is the diametrically opposite to one of the primary aims of economic production, i.e. the sustenance of human life on earth.

Capitalist policymakers in the past have tried to mask or belittle the effects of ionising radiation in several different ways. One is by maintaining that high doses of radiation are damaging, while low doses presumably are not. High doses of radiation are reflected in tangible signs of illness, such as severe headaches, diarrhoea, the reddening or blistering of the skin, fall-out of the hair and unconsciousness (15). On the other hand, the effects of low radiation doses are not reflected in immediate, physical signs of illness, and they may take years to germinate into physical illnesses in people irradiated. Nevertheless, radiation scientists in capitalist countries have gradually come to accept that even low doses of ionising radiation can be damaging to human health. As Peter Bunyard states, ‘the consensus now is that we cannot assume any threshold dose, and

even very low doses put us at risk from cancers and from passing on congenital malformations' (16). This amounts to the upgrading of the health risks, the *disvalue*, of ionising radiation.

Another problem is that while systems of measurement have changed over time, several systems continue to be employed side-by-side. The academician K.A.Gourlay has argued that the simultaneous use of different measurement systems has only contributed towards greater confusion about the effects of ionising radiation among the public at large (17). Thus, the 'effective radiation dose' for humans was previously measured in terms of the 'rem', but is now more commonly expressed in terms of the '*millisievert*'. Yet both terms, reflecting very different quantitative measurements, continue to be in use. Meanwhile, the International Commission on Radiological Protection (ICRP), a body projected as being the ultimate authority on the subject, over the last 60 years has *dramatically reduced* its recommended dose limits. Its guideline for people occupationally exposed to radiation, for instance, changed from a maximum of 75 *rems* in 1931. According to Peter Bunyard, by 1987 it had been reduced *1,500 times* compared with that figure, to 0.05 *rems* (18)! This surely is no indication of a consistently cautious attitude, of scientific precaution, on the part of the ICRP, but rather indicates a profound historic bias against recognizing the *disvalue* of ionising radiation.

5. Nuclear Production and Workers' Ill Health

I now will shortly discuss the *disvalue* of nuclear production in terms of its detrimental impact on workers' health. To this end I will focus on the very first stage in the nuclear production chain, i.e. on uranium mining, and on the incidence of lung cancer and other illnesses among workers employed to extract uranium ore. Uranium ore as found in the soil is, as indicated previously, already radioactive, and so are the various decay products of uranium emerging in course of the process of extraction. Key example of the latter is *radon* gas, and its decay products, the *radon* 'daughters', which diffuse into the atmosphere and readily lodge in human lungs. Other decay products from uranium ore are, for instance, uranium-238 and radium-226, which are inhaled in the form of dust, and can similarly lodge in our lungs (19). Thus, a variety of radioactive substances can effect the health of uranium mine workers, in particular where the latter have to toil in poorly ventilated, underground mines. Conventional methods of underground mining have been a key form of uranium mining historically.

Now, the health hazards of uranium mining are well recorded in the literature on nuclear production. A number of investigations, carried out in different countries, have for instance shown a relationship between an increased incidence of death due to lung cancer and employment in uranium mines. Such reports exist, amongst others, for uranium mines in the US, Canada and Czechoslovakia (20). A summary of health hazards for uranium mine-workers is given by Sumner, Hu and Woodward. The authors highlight the increased risk of lung cancer for the workers, due to the radiation exposure during the excavation and handling of the ore. They further refer to other forms of cancer that may result from uranium mining, such as skin cancer due to prolonged exposure to ore dust, and stomach cancer possibly associated with the ingestion of dust (21). Another health hazard mentioned by the same authors is the inhalation of silica dust, generated by hard

rock drilling, which can lead to a reduced function of the lungs (*silicosis*), and can eventually result in death by asphyxiation (22).

Now, it may be noted once again that the mine-workers' exposure to ionising radiation is to be ascribed both to nature's characteristics, and is an effect of human intervention in hazardous layers of the soil. The uranium ore itself exhibits high levels of damaging radiation, and exposure to *radon* decay products already occurs when the miners are surrounded by the uranium ore in underground galleries. Still, the effect on the uranium miners is, of course, consequent upon human intervention in nature's own, subterranean processes, in the form of the construction and operation of uranium mines worldwide. For it is mining, milling and all consecutive manufacturing stages in the nuclear sector, that lead to increased exposure to *ionising radiation* for workers, and for the population at large. Hence, we can speak of a *disvalue* of uranium mining, i.e. of a negative use-value of uranium ore extraction reflected in significant human health risks. Such a mode of speaking surely is very unconventional, but it does help enforce a more serious consideration of the issue of health risks than bourgeois economic theory has historically displayed.

Lastly, while the extraction of uranium ore thus has a *disvalue* for the workers employed in the mines, this is not necessarily expressed in a reduced use-value of the uranium ore for the capitalists purchasing this raw material from the mine-owners. The latter may conveniently ignore the negative health consequences of uranium mining for the workers, - certainly where these drawbacks are not reflected in the exchange-value of the uranium sold to the given capitalist entrepreneurs. Nevertheless, the detrimental health impacts incurred by members of the workforce during the phase ... **P** ... of the capital circuit of mining capital need to be recorded and assessed as a *disvalue*, a negative use-value, of uranium ore. For exposure to ionising radiation from uranium and its decay products, as stated, can lead to a variety of illnesses, including lethal illnesses, which health risks should decidedly be recorded as the impact of human intervention in nature: the given hazards evidently would not exist without the resolve of capitalist policy makers to mine the uranium ore.

6. The Impact of Dumpings in the Sea - *Disvalue* for Humans and for Non-Human Nature

We now need to address the topic of negative use-values in *non-commodity waste* from the nuclear production chain. A description of some of the practices pursued by policy makers with regard to waste-‘management’, will serve to underline the significance of the concept of *disvalue*, and will illustrate at the same time that nuclear policy makers tend to be callous. A pointed example of harmful disposal methods is that of the dumping of radioactive waste in the world's oceans. Though this practice was ultimately to be prohibited under international law, - for some three decades and up to the early 1980s, the United States, Great Britain and other nuclear powers dumped massive quantities of nuclear waste, contained in drums, at different places in the oceans, including at sites near the US's California Coast, at spots near the US's Atlantic Coast, in the English Channel, and in the North-Eastern part of the Atlantic ocean. The dumping in last mentioned area, in which 8 countries took part, were coordinated by the nuclear

energy agency of the OECD, the body representing the common interests of Northern industrial states (23).

What health and environmental damages have these dumping practices resulted in, what has been their proven *disvalue*? A clear cut example demonstrating, in my view, that dumped nuclear waste generates negative use-values, is that of the canisters deposited near the Farallon Islands, located some 37 kilometers off San Francisco's Golden Gate. A 1961 study already revealed that 36% of the drums dumped were damaged. According to another study, published by the US's Environmental Protection Agency EPA, radioactivity in the bottom sediments of the Farallon island dumping sites was *2 thousand times* greater than 'background radiation' (24). Other dumping practices, such as the huge dumpings carried out in the North-East of the Atlantic in 1980/1981, may not have affected life on the oceanic bottom as immediately, but will do so eventually, since corrosion of the canisters cannot be prevented, and radioactivity will sooner or later be released. There can thus be little doubt that, oceanic dumpings do lead to an increase in *ionising radiation* in those parts of the oceans where dumpings of non-commodity nuclear waste have been carried out.

Nuclear policy makers have suggested that the quality of human life has not been affected by the ocean dumpings, since the oceans ensure a '*wide dispersal*', '*diffusion*' of any negative effect. Critics, on the other hand, have insisted that the radioactivity released will eventually take its toll. The dumping site near the Farallon Island, for instance, proved to be a site of intense oceanic life, and human consumption would therefore be affected through the food chain in the oceans. The approach seeking to establish interlinkages between various forms of life, in the oceans and elsewhere, has come to be known as the '*critical pathway*' approach. The approach by now is a methodology which institutions, such as the OECD, have accepted as valid. Yet the approach is a method which is quite in line with traditional economic thinking. For though an analysis, bringing out that the fish we eat is radioactive due to nuclear dumpings, may well affect the exchange value of the fish we consume, this in itself states little about the damaging impact of the dumpings on the quality of life for non-human species in the oceans.

The concept of *negative use-value* formulated in this paper is at variance with the *critical pathway* approach. The concept fully supports the critique which K.A.Gourlay has formulated of last mentioned approach. As K.A.Gourlay points out rightly, the concept of critical pathways in itself does not suffice for the calculation of risks. For one – it does not tell us how much radioactive contamination is passed from one species to another, 'how much is retained, how much is excreted', etc. (25). More importantly, the concept has the effect of '*directing our attention to the end of the chain*', i.e. to the impact upon human health only (26). This means that the concept, although apparently formulated from an ecological perspective, ultimately betrays the very same bias as the concept of use-value in classical economic theory. We need, instead, a *comprehensive* assessment of the disvalue of the dumpings in the seas and oceans. To be able to take stock both of all the short-term and the long term implications for humans *and* for the various species living in the seas, we need an approach that questions the negative health impacts for both.

7. The Concept of Negative Use-Values And the Explosive Potential of Weaponry

Let's now return to the question of the negative use-value of nuclear *commodities*. Here, and unlike the case of drums with radioactive waste discussed in the previous section, *disvalue* is present side-by-side with the use-value contained in the very same commodities. Natural uranium that is extracted from the earth burdens human beings with ionising radiation, at the same time while being procured to serve as a raw material for the production of energy. Again, enriched uranium, being uranium in a processed form, continues to contain both *disvalues* and a use-value. In the civilian economy, it is concretely used for the manufacturing of fuel elements for nuclear reactors. Yet given its radioactive properties, enriched uranium is detrimental to human health and to the environment. Thus, and contrary to what classical economic theory has taught us, commodities sold on the capitalist market do not necessarily contain a use-value alone, but may well contain *dual*, i.e. both positive and negative properties. Use-value and disvalue may co-exist.

Now, the concept of negative use-value has a further significance in economic theory, i.e. in relation to the negative properties of *military goods*, of weaponry. These goods, like any civilian goods, appear on the capitalist market as commodities, hence possess exchange value. Further, a part of all weaponry does contain a use-value, i.e. properties which at least potentially could be used for the enlargement of human welfare. For instance, the steel employed to make tanks, and the bauxite used as a raw material for the construction of fighter planes, quite clearly possess use-value, for as raw materials steel and bauxite can serve concrete human needs. Yet a part of all weaponry, such as gunpowder, bullets made for rifles and pistols, bombs dropped from military planes, missiles with nuclear warheads, etc., contain *disvalues*. What these components of means of destruction share in common, is that they contain the explosive potential, the hitting power and/or other negative properties of the weaponry. In short, the *disvalue* of military commodities lies in the components containing their damaging potential.

We may note here in passing that weapons do occupy a special place in the economic theory of waste. In a separate paper, I do sketch the contrast between non-commodity waste and waste in the social sense of the term (27). Arms and armament systems under capitalism do combine *double identities*, i.e. the identity of a commodity, i.e. of market ware, and the identity of waste in this sense that the commodities procured to manufacture the weaponry are wasted natural and human resources. Here, in the context of the discussion on disvalues, we further mark that all weaponry possesses a '*split identity*'. For on the one hand, weapons do form a type of commodity containing negative use-value, but on the other hand that disvalue is not reflected in the military commodity as a whole. The disvalue is reflected only in that component of the weaponry that holds the damaging potential. Hence my remark about the split identity of weaponry - a remark which is directed at the mutually contradictory features of different component parts of this capitalist commodity.

Let's, lastly, proceed to describe the case of commodities containing a *twofold* negative use value. This is the case of nuclear material employed for the construction of atomic weaponry, for instance plutonium. Plutonium as stated previously has been

assessed as being the very most toxic material on earth, minuscule quantities of which can result in cancer for humans (28). This negative property of plutonium can take effect without plutonium being actually '*consumed*', without its use as a raw material in the process of manufacturing, or without any other actual use. But plutonium when inserted in the nuclear pit of an armament system has a further negative property, one which expresses itself when the weaponry is employed in practice, in the course of war: its extraordinarily large explosive potential. This disvalue re-enforces, but is yet to be differentiated from plutonium's other major disvalue, i.e. its radioactive properties. The commodity military plutonium thus has a *twofold* negative value, which characteristics were most dramatically demonstrated when the US dropped its plutonium bomb on the city of Nagasaki in Japan, in 1945.

8. The Twofold *Disvalue* of Atomic Bombs: Hiroshima and Nagasaki Revisited

Let me, then, explain the insufficiency of the concepts of classical economic theory through a brief description of the devastations wrought when atomic bombs were '*consumed*'. Any attempt to describe in a few paragraphs what happened when US-pilots dropped nuclear bombs, one uranium and one plutonium bomb, on Japan, will inevitably fall far short of covering the full truth. Yet only few facts need to be cited to illustrate how absurd it is to speak in general of the '*use value*' of nuclear arms. In the first hours after the bombing of Hiroshima at least 75.000 people lost their lives. 'Most were disintegrated immediately by the fireball; the others died shortly afterwards from burns, blast and shock' (29). The eventual death toll from the explosion is estimated to have been some 200.000 persons. In Nagasaki over 40.000 people reportedly perished within just seconds after the dropping of the atomic bomb. Used less than four years after the construction of nuclear weapons had been decided upon by the US - the Hiroshima and Nagasaki bombings demonstrated to the world that nuclear weapons are weapons of *mass destruction*. Products with a similar or a greater disvalue than these bombs had never been created before.

The *disvalue* of the weapons further did not exist solely in the destruction of many Japanese human lives. In Nagasaki, all unprotected living organism perished instantly within a radius of three-fifth of a mile from the place of the blast. In Hiroshima, the effect on horses, chicken, birds, insects, flowers, plants, trees and other forms of life was equally devastating. This, the elimination of different forms of non-human life by the use of nuclear arms, too needs to be highlighted by critical economic theory. Then, buildings in both cities were ravaged. A diary written by a survivor from Hiroshima describes how its author three days after the event came to realise that almost all the city's buildings had been wiped out. 'Nothing remained except a few buildings of reinforced concrete. ... For acres and acres the city was like a desert except for scattered piles of brick and roof tile. I had to revise my meaning of the word destruction....' (30). Is it necessary to state more facts in order to prove the point that weaponry does represent a *negative use-value*, that the employment of nuclear arms in particular is extraordinarily damaging to human and non-human life? Is any more evidence required to illustrate the insufficiency of classical economic theory?

Above I have already referred to the *twofold* negative value of plutonium bombs, to the fact that nuclear arms aside from their explosive potential hold a second kind of *disvalue*, being their radioactive content. Thus, the Hiroshima and Nagasaki blasts were followed by the dispersion of radioactive dust. Fission products engendered in the course of the nuclear explosion were scattered everywhere. In consequence, *ionising radiation* became a second, silent killer, hunting down and slaying survivors of the two ghost cities for many years to come. This second killer, moreover, does not just take the lives of human beings, but has an monstrous effect on non-human forms of life too, illustrating the point that the concept of negative use-value should be understood in an all-encompassing sense. Clearly then, the atomic bombs dropped on Hiroshima and Nagasaki contained a twofold disvalue, two forms of negative use-value, - being their extraordinary explosive and incendiary potential and their radioactivity. Neither can be expressed within the framework of thinking of classical economic theory.

Classical economic theory, in pretending that all manufacturing results in the creation of '*values*', conveniently skipped any critical discussion of the damaging properties contained in commodities. Most strikingly, the theory evaded any critical discussion of the disvalues of military goods. Thus, it conveniently skipped debate on the negative properties of the very commodities which helped capitalist powers gain world hegemony! The absurd implications of a theory which ignores the disvalues contained in military goods are clearly evident in the case of nuclear arms. In the parlance of classical economic theory they simply contain '*use value*' and '*exchange value*', as if the massive destruction that is wrought when nuclear arms are used, are minor, annoying side-effects without implications for theory! In fact, as evidenced by the Hiroshima and Nagasaki experience, nuclear arms contain *twofold* negative properties, a twofold disvalue, since as arms they do possess a huge explosive potential, and as military/civilian nuclear material they contain radioactive properties with damaging consequences for human health and our natural environment. Atomic weapons are the ultimate illustration of the insufficiency of classical economic theory.

9. Conclusion:

Major Challenge for Critical Economic Theory

In this Chapter I have tried to show how a non-mechanical, creative inversion of economic categories makes it possible to expand the purview of economic science, and integrate issues relating to the health- and environmental consequences of manufacturing into the science's theoretical debate. Two basic concepts of Marxist and pre-Marxist classical economic thought, which were rejected by neoclassical thinkers, proved to be an appropriate starting point for the conceptualisation of the damaging properties of both natural and human products, i.e. the basic concepts of *use-value* and *exchange value*. Those categories, as stated above, were employed by Marx, following his classical precursors, to explain the *dual nature* of commodities, i.e. to designate their significance as means for the fulfilment of concrete human needs and as means for their owners to obtain access to other commodities. It is unfortunate that, while these concepts were abandoned by later bourgeois theoreticians, the possibility of a creative expansion in their application has rarely been posed.

Marx's concepts of use- and exchange value surely continue to be appropriate tools for economic analysis. However, if uncritically applied, they do complicate our task of exposing the negative health- and environmental consequences of capitalist processes of manufacturing. An assessment of these detrimental effects requires, as stated above, an inversion of Marx's categories. It necessitates the employment of the concept of *negative use-value* (or *disvalue*), to designate the (potentially) negative impact of market goods and their by-products upon the fulfilment of human needs. And it needs the concept of *negative exchange value*, to designate the financial costs that may arise from the negative properties contained in capitalist (by)products. Armed with these new concepts, we can for instance undertake to evaluate the potential and actual impact of nuclear waste and of other forms of non-commodity waste containing damaging properties. But we can also evaluate, as suggested above, whatever negative properties are contained in market commodities. A pointed instance elaborated was the case of the explosive potential and of other damaging properties of arms, which constitutes the *disvalue* of military commodities.

Further, the concept of negative use-value (henceforth to be designated with the letter code - **WU**) in particular serves to expand our horizon of thought. Here, I believe, it will not do merely to promote an *inversion* of Marx's original category. The term should not only be employed to expose the negative human health effects of nuclear, chemical and other manufacturing processes. If the concept of disvalue be applied in a mechanical fashion, we would once again fail to highlight the '*metabolic*' relationship between human beings and their natural environment. Moreover, a narrowly constructed concept of negative use-value would not only be disrespectful towards other forms of life on this planet, it would also result in blindness towards consequences which ultimately boomerang onto human societies themselves. The concept of negative use value or *disvalue*, then, should be employed as a truly environmental concept. It needs to refer both to the damaging effects of products and by-products for human beings and to the damaging impact on other forms of life. The inverted concept should be *more inclusive* than the concept from which the inverted concept is derived, i.e. the concept as employed in classical economic thought.

Lastly, the importance of the concept of negative-use value admittedly appears to be rather restricted in time, - in contradistinction to the concept of use-value. Whereas the latter concept, as conceived in Marxist theory, referred to the properties of goods produced throughout the history of human societies, the concept of negative use-value obtains its relevance, becomes a necessary tool, *in view of the contradiction between use-value and exchange-value under capitalism* (31). For it is precisely in course of the rise of the capitalist system that production for the fulfilment of human needs recedes into the background as a secondary aim of human production. It gradually becomes superseded by profit making as the principal aim. Hence, contrary to the original concept of use-value, the concept of *disvalue* applies to the production of goods in a relatively short period of human history. Nonetheless, the inverted concept is crucial to understanding contemporary economic processes, as it helps us elaborate and clarify the destructive impact of the capitalist system, a system in which the disvalues of commodities and of non-commodity waste are frequently and grossly overlooked.

References:

(1) for Marx's employment of the term use-value, and for his defence of it as an appropriate category in economic theory, see S.Groll, 'The Active Role of 'Use-Value' in Marx's Economic Analysis' (in: John Cunningham Wood (ed.), *Karl Marx's Economics: Critical Assessments* – Croom Helm, New York, 1988, p.653); for a discussion on commonalities between human and animal needs, see Ted Benton, *Natural Relations. Ecology, Animal Rights & Social Justice* (Verso/New Left Books, London, UK, 1993);

(2) Marx stated his own views on use-value and exchange-value succinctly in the very opening section of Chapter I of *Capital I* – see Karl Marx, *Capital. A Critique of Political Economy. Volume One* (Progress Publishers, Moscow, USSR, 1977), p.43-48; for a summary of Marx's conceptualisation, see also Paul Sweezy, *The Theory of Capitalist Development* (Monthly Review Press/K.P.Bagchi (reprint), New York/Calcutta, 1991, p.26-28); for evolutionary, respectively dissenting assessments of Marx's employment of the given terms, see Roman Rosdolsky, *The Making of Marx's 'Capital'* (Pluto Press, London, United Kingdom, 1977, Ch.3, 'Karl Marx and the Problem of Use-Value in Political Economy', p.73) and Isaak Illich Rubin, *Essays on Marx's Theory of Value* (Black & Red; Detroit, USA, 1972), Ch.11, 'Content and Form of Value', p.197; for the differentiation between use-value and exchange-value made by Marx's precursor Adam Smith – see Adam Smith, *An Inquiry into the Nature and Causes of the Wealth of Nations. Volume I* (J.M.Dent & Sons/E.P.Dutton & Co., London/New York, 1931), p.24/25;

(3) for a brief account of the devastations caused by the atomic bombs thrown on the cities of Hiroshima and Nagasaki, Japan, in 1945, see John Cox, *Overkill. The Story of Modern Weapons* (Penguin Books, Middlesex, England, 1977, Ch.1, p. 15-27);

(4) for the discussion regarding the 'intrinsic' value of non-human beings in Nature among contemporary environmental philosophers, see eg. Hugh P.McDonald, John Dewey and Environmental Philosophy (State University of New York Press, Albany, New York, USA, 2004);

(5) John Bellamy Foster, *Marx's Ecology. Materialism and Nature* (Monthly Review Press, New York, USA, 2000); on the theme of man-nature metabolism, in the context of the discussion on technology, see also Reiner Grundmann, *Marxism and Ecology* (Clarendon Press, Oxford, United Kingdom, 1991);

(6) see Peter Bunyard, *Health Guide for the Nuclear Age* (Papermac/Macmillan Publishers, London, United Kingdom, 1988), p.33;

(7) Peter Bunyard (1988), op.cit, p.17;

(8) ibid, p.15;

(9) ibid, p.35;

(10) ibid, p.15;

(11) ibid, p.22;

(12) ibid, p.26;

(13) see Paul Benkimoun, 'Le Cancer de la Thyroïde. Une Maladie Rarement Mortelle' (*Le Monde*, May 21-22, 2000, p.23);

(14) Peter Bunyard (1988), op.cit., p.27;

(15) ibid, p.16;

(16) ibid, p.23;

(17) see K.A.Gourlay, *Poisoners of the Seas* ((Zed Books, London, United Kingdom, 1988), p.175/176; according to Gourlays, 'The existence of two systems enables those in authority to bamboozle the public – in the interests of science and mathematical accuracy – by playing the Fun-with-Figures game and by making non-common-sense semantic distinctions.';

(18) Peter Bunyard (1988), op cit., p.23/24;

(19) see David Sumner, Howard Hu and Alistair Woodward, 'Health Hazards of Nuclear Weapons Production' (in Arjun Makhijani, Howard Hu and Katherine Yih (ed.), *Nuclear Wastelands. A Global Guide to Nuclear Weapons Production and its Health and Environmental Effects* – The MIT Press, Cambridge, Massachusetts/London, 1995, p.87);

(20) see Katherine Yih, Albert Donnay, Annalee Yassi, A.James Ruttenber and Scott Saleska, 'Uranium Mining and Milling for Military Purposes' (in Arjun Makhijani, Howard Hu and Katherine Yih (1995), op.cit., p.105);

(21) David Sumner, Howard Hu and Alistair Woodward (1995), op.cit., p.90-93;

(22) *ibid*, p.77;

(23) the erstwhile policies of the Nuclear Energy Agency (NEA) of the OECD are described in the book published by a Dutch group of activists in preparation of direct actions against oceanic dumpings of nuclear waste carried out in the early 1980s – see *Geen Atoomafval in Zee en Nergens Niet* (No Dumpings of Nuclear Waste into the Sea, Nor Anywhere Else – Uitgeverij Lont, Amsterdam, the Netherlands, 1982), p.97;

(24) see K.A.Gourlay (1988), op.cit., p.196;

(25) *ibid*, p.179;

(26) *ibid*, p.180; for 'mainstream' application of the concept of 'pathways', i.e. used with reference to the impact on humans only, see eg. OECD, *Environmental Activities in Uranium Mining and Milling. A Joint Report by the OECD Nuclear Energy Agency and the International Atomic Energy Agency* (OECD, Paris, France, 1999, p.12);

(27) Peter Custers, 'The Conceptualisation of Waste in Critical Economic Theory. Discours on Non-Commodity Waste and on Waste in its Social Sense' (Amsterdam, the Netherlands, August/September, 2001);

(28) Frank Barnaby, 'Nuclear Legacy in a Plutonium Economy' (*The Corner House Briefing Paper*, Sturminster Newton, United Kingdom, November, 1997); Peter Custers, 'Nuclear Production and Economic Theory. Characteristics of the Sector' (Paper Submitted to the Anti-Nuclear Convention, New Delhi, India, November, 2000);

(29) John Cox (1977), op.cit., p.23;

(30) *ibid*, p.21;

(31) Paul Sweezy following Marx has insisted on the fact that the contradiction between use-value and exchange-value under capitalism grows; thus, in his principal theoretical work he stated that 'a contradiction between the ends of production regarded as a natural-technical process of creating use-values, and the ends of capitalism regarded as a historical system of expanding exchange value does exist. Not only does it exist; it constitutes the fundamental contradiction of capitalist society from which all other contradictions are ultimately derived (*italics mine*).' – Paul Sweezy, *The Theory of Capitalist Development* (Monthly Review Press/K.P.Bagchi, New York/Calcutta, 1991), p.172; see also John Bellamy Foster, *The Theory of Monopoly Capitalism. An Elaboration of Marxian Political Economy* (Monthly Review Press, New York, USA, 1986, p.77).

