Debate on Dialectics:

The Dialectics of Nature

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This is a contribution of an applied scientist to a debate between philosophers on the dialectics of nature. It is a reply to Richard Gunn’s paper in February’s Marxism Today. Reading that paper I find myself a child in philosophy, but perhaps a child is needed to cry out: "The Emperor is naked."

Nature and Man

It is not clear whether or not Gunn agrees that "the world is in a continuous dynamic flux", whether the parenthesis "Heraclitean" is intended to be derogatory or which philosophical pejorative is incurred by Engels for maintaining that "this is borne out by modern natural science". For a materialist "nature" must mean matter in motion, or rather, in view of Einstein’s equation $e = mc^2$ (interchangeability of mass and energy), matter-motion. While I would agree with Gunn that concepts such as "the conflict of man with nature" are poetic or romantic, throughout his paper there runs the concept of an opposition of man to nature. Man in all his activities and social organisations is part of, and cannot stand in opposition to or be a detached or external observer of nature.

Interaction there certainly is; but it is between man and the rest of nature just as the different parts of nature interact with each other. As for ‘technical mastery’ it is at most incomplete and extends over only a part of external nature. Successful moon landings do not preclude the possibility of "unforeseen accidents" in the future; organisms inimical to man evolve new resistant strains. Moreover, in the subdivisions of nature and society there are no hard and fast lines (cf. Dialectics of Nature, p. 212); there are only differences in the degree to which man’s conscious or unconscious activities participate, with a graduation from almost nil (cosmology) to almost 100 per cent (human society).

Even in the natural sciences there is a distinction between the observatory and the laboratory, between observing light from a distant star which set out on its journey before the Earth existed and the controlled purposive experiment. And even this distinction is not hard and fast; the study of the moon, Mars, and Venus is moving from observatory to laboratory.

Dialectics

Dialectics comprises essentially the general laws of change that are all that is common to things that have in common only that they change. The affirmation of the dialectics of nature is the affirmative answer not to Gunn’s question "Is nature dialectical?" but to the question "are the laws of change, which were first enunciated for the evolution of concepts and the developments of human history, particular cases of general laws valid for all changes, motion and developments irrespective of the extent of man’s intervention?" Gunn avoids both the unequivocal negative reply and the positive affirmation of an alternative proposition. This is the classical stand-point of agnosticism.

Gunn devotes three of his 16 columns to what he calls one of the most controversial questions in Marxian scholarship, but which is artificial and irrelevant. It is artificial because it is created by those who want to discredit Engels, but still to be considered Marxists and are therefore forced to postulate disagreement between Engels and Marx. Thus, against one positive statement of accord is set a list of conjectures headed by the agnostic argument that there is no evidence of disagreement but it cannot be proved that there was none. The question is irrelevant because it is propositions and not their proponents that are important.

Semantics and Science

Several of Gunn’s arguments are in essence semantic. That is that the use of a word is confined to a certain meaning or connotation as, for example, in his passages on ‘negation’ and ‘contradiction’, but his arguments are semantic absolutism. Scientists have to use the words of everyday currency, but are never constrained by their etymological derivations. Our ever-expanding comprehension of the things and processes of nature entails a continuous enlargement of the scope and enrichment of the content of the concepts.
embodied in the words. Thus, the atom, from Democritus to Dalton was a concept, with little more content than the indivisibility implied by the etymology of the word.

Today, atoms can be seen, counted, weighed and measured, and are no longer purely conceptual. These modern developments began with the abolition, i.e. the negation, of the indivisibility of atoms, not conceptually, but first by observing them split spontaneously and then by splitting then using man-made devices. But we still call them atoms.

Again, since the time when the concept of number first arose out of counting, there has been a series of developments in each of which mathematical operations previously considered to be illicit became legitimised. The whole history of these developments is summarised in one remarkable equation, $e^{\pi/2} = -1$. Once new scientific facts or practices achieve general currency, new meanings or extensions of meanings of words are accepted without dissent because scientists recognise the futility of semantic arguments.

'Historicity' and Time

It was the section on historicity of nature in particular that prompted the last sentence in my opening remarks. Here Gunn sallies forth bravely to demolish Engels in new clothes tailored by Kojeve. The statement "Nature has its history in time" would appear to be the truism that the world was not always in the past, and will not always be in the future, the same as it is today, and is the denial, as Engels puts it, of the "absolute immutability of Nature" (Dialectics of Nature, p. 24).

But Gunn deems it unacceptable to a materialist on the authority of Kojeve's propositions about time. These are that "as opposed to biological or cosmic time there is historical time, characterised by the primacy of the Future, with the specific structure Future -> Past-> Present, i.e. structured in terms of the teleological purposive character of human practice. In nature without mag there would be not time but only space of four dimensions."

In so far as anything intelligible can be discerned in all this, it appears to be wrapping in obscurity what was stated with simple lucidity by Karl Pearson and quoted in Materialism and Empirio-Criticism (p. 234) by Lenin, who characterised it as "idealism pure and simple". Time, not divisible into species and structureless, is the constituent which is common to all motions, changes and developments and appears in their mathematical models as the universal independent variable. Many misconceptions arise from propositions which synthesise motion out of instead of analysing it into space and time. Spatial relationships have a temporal content (e.g. the Fitzgerald contraction, the Heisenberg uncertainty principle, distances measured in light-years).

Reflectionism

I do not like Gunn's terminology but will use it in order to concentrate on the main issue. He is opposed to reflectionism according to which "Concepts and perception are reflections, copies, or mirror images of the external world", but agrees that "a connection exists". To say that a cart and a horse are connected is to be neutral as to which comes first.

The historic fundamental overriding issue of materialism versus idealism is the question of primacy in the relationship between perception or concept and the material (i.e. 'external') world. Words such as 'reflection' or 'image', whatever semantic objection may be raised, represent an unequivocally materialist stand-point. With 'anti-reflectionism' we come once again to agnosticism.

Transformation of Quantity into Quality

Gunn correctly requires the law to be testable and proceeds to test not the law but its converse and not in any real situation but in a hypothetical one of his own creation, an X. Even accepting the converse formulation one has to say "produce an X". It is hard to envisage a physical situation in which a quantifiable parameter can increase indefinitely without a critical condition (dialectical leap) occurring.

The whole trend of modern science runs counter to the discovery of Xs; on the contrary, limiting values have been established for what might have been previously considered to be Xs, e.g. the upper bound to velocity set by the speed of light. In any case an X or a number of Xs could only establish a domain or domains of non-applicability leaving a wide and extensive domain where the law does apply, such as will justify the description general, confirming, incidentally, Engels's views on "eternal truths" (cf. Anti-Dühring, p. 100).

That scientists, often "Monsieur Jourdain's", of dialectics, as observed by Engels (Dialectics of Nature, p. 68), accept this as a law of nature is borne out by the following quotation from a textbook on the strength of materials by a lecturer at the Royal Naval College: "We must recognise that we have here another instance of that universal quality of the world whereby a continuous quantitative change results in a sudden qualitative change." (Strength of Materials, p. 290), by John Case, Edward Arnold, 3rd ed., 1938.)

Still we have yet to satisfy Gunn's requirement that "the conditions under which the law comes into operation must be specified". Yes, but not in
some abstract, formalistic manner, but in relation to real situations. That is to say, each individual application has its own mechanism whereby the transformation is effected. Thus the boiling point of water and the breaking stress of a particular grade of steel are well defined, but no one imagines that they have anything in common other than being examples of the dialectical leap.

Let us now see how Engels actually formulated the law. In the *Dialectics of Nature* (p. 63) he writes "in nature, in a manner exactly fixed for each individual case, qualitative changes can only occur by quantitative addition, or quantitative subtraction of matter or motion (so-called energy)".

The dialectical leap is but one manifestation of this law; I will end this paragraph by asking what could be more evocative of the word 'qualitative' than colour, musical pitch and timbre? Who is unaware of the relationship, in precise numerical terms, of colour and pitch to wave frequency and timbre to number and intensity of harmonics?

**Negation of the Negation**

The 'objection' to this law, discussed by Engels in *Anti-Duhiring* is naturally deemed by Gunn to be "very cogent" for it is, as before, a substitution of the converse for the law. Engels himself notes in his reply to the objection discusses the application of the law to a process of nature. It is obvious that throughout this passage he is dealing with human actions as, in *Anti-Duhiring*, he had every right to do. The passage is written in the first person, active voice. In the penultimate paragraph (p. 159) he calls the negation of negation which is a simple doing and undoing a "childish pastime".

When he does refer to nature he reverts to the third person and writes: "Each class of things therefore has its appropriate form of being negated in such a way that it gives rise to a development." However, it would be as well to dispose of this 'objection', invalid though it is, by considering events in which even Gunn’s philosophical categories, chemists call the 'happenings' which are their concern 'actions' and 'reactions'). Many reactions cannot proceed without the presence of a substance called the catalyst which nevertheless remains unchanged at the end of the process. But the catalyst is first broken up into its constituent parts (ions), i.e. it is negated. The ions then enter into a series of reactions with those of the primary substances. At the end, the primary substances having been transformed, the ions of the catalyst re-emerge and recombine (the negation of the negation).

The second example is the crystallisation of an amorphous solid which is first dissolved or fused, i.e. its solidity is negated; the liquid is then resolidified, the negation is negated, and the substance emerges in a higher, i.e. crystalline, form. That precisely determined conditions are necessary is attested to by the rarity of diamonds amidst an abundance of carbon.

**Interpenetration of Opposites**

Here Gunn provides me with no targets, except perhaps his brief reference to the term 'contradiction', which has already been considered. But a positive affirmation needs vindication of all the three main laws. I call to mind another Monsieur Jourdain of Dialectics, a Professor of Civil Engineering who used to refer to the 'Natural Law of Cussedness'. By this he meant, and illustrated with several examples, that whenever forces or effects tending to change a system come into operation, forces or effects opposing that change are automatically engendered. Despite the animism of his terminology, he was affirming the operation of the law of interpenetration of opposites in natural science.

The most familiar example is that of mechanical frictional resistance to motion. If a gradually increasing tractive force is applied to a body it will not move at first because an equal frictional force in the opposite direction is set up. However, at a certain stage a dialectic leap occurs, the frictional force cannot exceed a certain critical value, and motion ensues which depends on both the tractive and the frictional forces. Yet many people overlook the fact which is most significant for the dialectics of nature: the contradiction that the friction that opposes the motion is at the same time a necessary condition for the motion to occur, as anyone whose car has skidded or who has tried to drive off on soft ground after heavy rain can testify.
Summary

The case against Engels and later Marxists, of whom the most notable is Lenin, is agnosticism in new clothes. The fabric out of which these new clothes have been woven is a mixture of semantic rigidity, substitution of converse for proposition, false targets, mystical nonsense, and non-sequiturs. The wearer of clothes made from such fabric, like the Emperor, is naked.\(^1\)