MARCELLO PERA

IN PRAISE OF CUMULATIVE PROGRESS*

The progress of science is generally regarded as a kind of clean, rational advance along a straight ascending line; in fact it has followed a zigzag course, at times more bewildering than the evolution of political thought.

A. Koestler

1. THREE PROBLEMS CONCERNING CUMULATIVE PROGRESS

According to a view which is so widespread and reasonable as to seem a truism and which we may call the classic conception, science is a form of knowledge that grows continuously. Certain authors have even gone so far as to maintain that science is the only intellectual activity which is progressive and that progress may be used as a demarcation criterion for scientific knowledge. Kant was perhaps the first to explicitly voice this point of view. He maintained that a form of knowledge is only on the "secure path of a science" when, amongst other things, the various thinkers add their result to those of previous thinkers and are not obliged, each time, to begin right from the beginning, as happens in metaphysics (see Kant 1787, B VII).

According to the classic conception, the progress of science is cumulative. The common explication of cumulative progress (CP) is that a later theory $T_2$ is progressive in relation to a previous theory $T_1$ when $T_2$ explains all the facts explained by $T_1$ and something else as well. Whewell would seem to have been the first to give systematic expression to this cumulativist and retentionist idea of scientific progress when he upheld the view — which he also attempted to demonstrate figuratively in his "Inductive Tables" — that, in theory change, "the earlier truths are not expelled but absorbed, not contradicted but extended".

and that "the history of each science, which may thus appear like a succession of revolutions, is, in reality, a series of developments" (Whewell 1857, p. 8).

As is well known, the concept of cumulative progress has recently come under various forms of attack. It has been called a "dogma" (Laudan 1976), or it has been seen as a myth or an unreasonable demand. To be more precise, the attack is threefold. Certain authors (Grunbaum 1976, Feyerabend 1975) claim that CP – when referred to theory change – is, in the first place, impossible; others (Kuhn 1962; Feyerabend 1975; Laudan 1976, 1977, 1981) maintain it is as impossible logically as it is inadequate historically; others yet again (Feyerabend 1965) are of the opinion it is not even desirable.

In actual fact, CP sets three quite separate problems:
- is it possible?
- is it adequate?
- is it desirable?

The first problem is whether the (syntactical and semantical) conditions on which CP is based can be satisfied; the second is whether the history of science effectively demonstrates that scientific theories follow one another and grow in conformity with the notion of CP; lastly, the third problem is whether there are good reasons for taking CP as a selection criterion between rival theories. To say "no" to the first question obviously implies saying "no" to the other two. Whereas saying "yes" to the first problem is compatible with saying either "yes" or "no" to the other two.

In this paper I shall maintain 1) that CP cannot be logically confuted on principle; 2) that CP is inadequate from a historical point of view, but any other model is also inadequate; 3) that, lastly, CP is still a good criterion for the heuristics of theory construction.

Even though it is not my intention to rehabilitate the optimistic classic conception – which surely needs revision – I am forced to recognize that my ideas on the subject of scientific progress may seem conservative. They very probably are. I have had the opportunity once before, concerning the conditions of scientific progress, to say that, to a certain extent, I am advocating an old solution to an old problem. (Pera 1983) However, in these times of anarchy, I should like to remark that often the best wine is to be found in old barrels.