A Review of Alexander Rosenberg’s “Causation and Teleology in Contemporary Philosophy of Science

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Abstract
Since Francis Bacon pioneered research into logic and method of science in the fifteenth century and the consolidation of that effort by philosophers and scientists interested in the rational character of science, there has been intense focus on causation, explanation and prediction in science. Professor Alexander Rosenberg’s essay and this review on it are notches in that broad spectrum of discourses on scientific causation, explanation and prediction. This review seeks to probe not only the breadth of Rosenberg’s inquiry into these most important questions in philosophy of science but also the viability of his findings and conclusions. Thus this review will show the points of strength and weakness in Rosenberg’s essay which besides its brief foray into causation and explanation in general philosophy of science examines in the main the legitimacy and viability of the extension of the methods of physical sciences into the life (biological) sciences and social sciences under the inspiration of unity of science thesis. Rosenberg declaims such extension or methodological reductionism as it is more popularly called.

Introduction
The manner of presentation of this paper shall take the form of laying out a sketch of the intellectual background which shaped the issues, giving an explicative analysis of the key notions of “causation” and “teleology”, a faithful rendering of Rosenberg’s exegesis of the running debates on the issues, and finally, a range of criticisms which shall run pari passu with my own personal insight into the debates.

Two main traditions can be distinguished in the long history of scientific explanation. The point of difference is the conditions which an explanation has to satisfy in order to be scientifically valid. The two traditions are usually characterized as causal and teleological explanations or alternatively as mechanistic and finalistic explanations. The history of these two traditions as discussed here is restricted to the philosophy of scientific method which is the centre-piece of this entire discourse.

By mid-nineteenth century, the natural sciences were already established on the intellectual stage. Then came some humane studies which, under the aegis of Auguste Comte and John Stuart Mill, were aspiring to be admitted to the status of scientific inquiry. This claim of the humane studies to being scientific crystallized the debate about the relationship between natural sciences and these humane studies as to their amenability to empirical inquiry. This debate came to be linked with the earlier traditions of mechanistic
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and teleological explanations; the mechanistic applying to the natural sciences and the teleological to the humane studies.

Auguste Comte, first, and later, J.S. Mill labored to absorb the humane studies under the rubric of mechanistic or empirical inquiry, thus the emergence of the so-called social sciences. Their stock-in-trade in this effort became their doctrines of unity of method, mathematical ideal-type of science and general covering laws of explanation.

A reaction to Comte and Mill came in the form of an anti-positivist philosophy of science which, unmistakably, is a resurrection of the old tradition of teleological explanation. A current better name for this anti-positivist stance, according to G.H. Von Wright which I wholly accept is hermeneutics. Early representatives of this type of thought included Droysen, Dilthey, Simmel, and Max Weber. These thinkers rejected the methodological monism of positivism and refuse to view the pattern set by the exact natural sciences as the sole and supreme ideal for a rational understanding of reality. Many of them emphasised a contrast between those sciences which, like physics, chemistry or physiology aim at generalization about reproducible and predictable phenomena; and those which, like history, want to grasp the individual and unique features of their objects.

It is against this existing intellectual background that this discourse of causation and teleological in contemporary philosophy of science is shaped. Although the definitions of causal and teleological explanations have been anticipated above, some explicative analysis of the notions are still not out of place.

**Causal and Teleological Explanations**

Causal and teleological explanations have generated so much controversy that one can come up with a treatise on it. But for the purpose of this paper, it suffices to make a brief delineation of the concepts. First, we deal with causal explanation. Here, there is on one hand, a tradition of ‘causal’ which has its origin from Hume and reached a climax in the Hempel’s deductive-nomological model of explanation. Causal explanation in this tradition is seen as an inference derived from correlations of events. That is, scientific explanation is the ability to logically connect some events to other events by means of laws.

On the other hand, there is a tradition of causal explanation which seeks to go beyond the mere correlations of events. This tradition which is the realist approach focuses on the ontology of the situation. Under this tradition, to say that “gravity causes bodies to fall” does not mean that we predict that bodies will fall on the basis of their being placed in a gravitational field. On the contrary, “Gravity causes bodies to fall” has us envisage this process: the sun transfers its momentum to a surrounding gravitational field which, in turn, transfers its momentum to bodies; and this transference is manifested by their falling. Hence causal explanation in this tradition means narrative accounts of change that describe the transference of a quantity from the cause object to the effect.

Teleological explanation, on the other hand, asserts that a particular state of affairs obtains in order to enable some entity to attain a goal. It purports to determine past events by reference to future ones. In other words, the explanandum is explained not by any antecedent, but by its consequence, the goal-state. This type of explanation is most easily
expounded in relation to biology. Biological organisms are systems which tend to preserve a rough constancy in certain of their features, thanks to mechanisms (called ‘homeostatic’) which counteract incipient deviations from the norm. This fact can be expressed in teleological laws such as: “Human beings (tend to) maintain a body temperature of about 37°C” ⁶. In this connection, the idea of teleological explanation is that such laws, which express the tendency of a system to maintain a so-called goal-state, explain operations which help to maintain that State. Thus, if one were to ask why human beings shiver and sweat, the teleological explanation would be that they do so in order to maintain the normal body temperature of 37°C. The phrase “in order to” here does not imply purpose, only that the organism is so constituted that it does tend to maintain the normal body temperature by means of various mechanisms including sweating and shivering. So much for the definition of key concepts of causal explanation and teleological explanations.

A Review of Rosenberg’s Causation and Teleology in Contemporary Philosophy of Science.

Alexander Rosenberg in the work under scrutiny employed the type of causality associated with Humean- Hempelian tradition which has been defined in the foregoing. He did not seem to be concerned with the nuances of characterizing causality. His essay took off with Auguste Comte’s positivism stating its purported three stages of development: the theistic stage in which natural phenomena were explained as reflecting divine wills; the metaphysical stage in which natural phenomena were explained by reference to abstract concepts like powers and causes; and finally, scientific stage in which phenomena were explained by reference to physical laws of nature.

Rosenberg acknowledged that though physical explanations have supplanted teleological ones in the natural sciences in keeping with Comte’s prognosis, statements of teleological kind and explanations have continued to figure in biological and social sciences supposed to have been assimilated to physical sciences. He writes:

To the extent that parts of the life sciences and most of the social sciences are committed to teleological claims about the objects and systems which they treat, these disciplines seem to reflect either a serious counter-example to Comte’s vision of the general direction of human knowledge, or a blot on our claim to have finally and fully transcended allegedly unscientific modes of thought ⁷.

Rosenberg goes further to tell us that the search for resolution of the poser in the quote above has resulted in two radical traditions: On tradition has argued that the appeal to intentions, goals and purposes in the explanation of human and quasi-human behavior is ineliminable and essential, and that therefore the human sciences are different in kind from the natural sciences. The second tradition while agreeing in the ineliminability of theological explanation in the social sciences, deduced from this that these disciplines are without cognitive significance and called for total reconstruction on non-teleological bases.

Rosenberg faults these two opposing radical traditions and avers that contemporary philosophy of science has provided a lee-way. It does so by tending to sustain the
legitimacy and intelligibility of teleological statements and explanations but only by showing that their intelligibility and legitimacy is founded on their compatibility with, and ultimately by their reduction to, statements and explanation of the type familiar in physical sciences.

Having, so to say, laid out the high points of the controversy in causal and teleological explanation, Rosenberg sets out to review efforts of philosophers of science in the nineteen forties and early nineteen fifties towards the development of teleological and causal explanations. He takes up the works of R.B. Braithwaite and Ernest Nagel.

According to Rosenberg, the problem with which Braithwaite’s paper “Teleological Explanation” began was to give an account of the nature of teleological explanation which will resolve philosophical difficulties about the apparent determination of the present by the future which such explanation seem to accommodate, without breaking the usual determination principles of science. Rosenberg continues that Braithwaite concurred that explanations in terms of reasons, desires and beliefs prove no difficulty in regard to the life sciences. However, such explanations fail in regard to non-conscious and non-sentient systems. Rosenberg concludes by arguing that, according to Braithwaite, goal-directedness in these non-conscious systems can only be accounted for in terms of what he called the plasticity of their behaviour, where “plasticity” can be given non-teleological characterizations.

Leaving the efforts of Braithwaite and turning to the work of Ernest Nagel (namely, The Structure of Science), Rosenberg tells us that Nagel’s concern was “whether the appearance of teleology in biological science and its absence from the physical science entails any absolute autonomy of the former subjects from reduction to the latter?” Nagel answers this question in the negative because his idea is to reduce all teleological explanations to non-teleological ones. Rosenberg turns next to Carl G. Hempel’s paper “The Logic of Functional Analysis” by which Hempel aims to determine to what extent the explanation of some typically recurrent activity by appeal to its contribution to the preservation or development of an item satisfies the standards of deductive-nomological explanation. Rosenberg evaluates Hempel’s efforts at reducing teleological explanation (functional analysis) to deductive-nomological explanation by asking what a statement of the following form means: “the heartbeat in vertebrates has the function of circulating blood through the organs”.

According to Rosenberg, Hempel points out that “function” cannot merely mean “effect” in this context or else we should have to assent to the allegedly false statement that “the heartbeat has the function of producing heart sound”, since it obviously has that effect. Clearly, an item’s function is one of an item’s effects, but it is not just any or each of an item’s effects that we denominate a function, and we need to add something further to our analysis in order to capture the sense of “function”. This difficulty, Rosenberg contends, made Hempel realize at long last the futility of attempting to accommodate functional analysis to the standards of deductive-nomological explanation.

Thus, Rosenberg argues that, in Hempel’s view, given the information contained in a functional analysis, we cannot predict how a particular system will satisfy a given need,
i.e. what member of Q will obtain in S unless we know so much about S that a functional analysis of S’s behaviour becomes superfluous.

Furthermore, Rosenberg points out that functional analysis is weakened by the use of such key terms like “need” and “adequate functioning” in a non-empirical manner; hence, rendering the premises of a functional explanation untestable even if we can surmount the problems of vagueness in prediction. Rosenberg concludes his evaluation of Hempel’s paper afore-mentioned by saying that the problems of reduction of functional analysis to deductive-nomological explanation constrained Hempel to begin to entertain the view that functional characterization should proceed in the direction of ultimate elimination or at least eliminability of teleological language from properly scientific discourse as earlier suggested by Nagel.

Having reviewed the theoretical contribution of Braithwaite, Nagel, and Hempel towards the development of valid models of explanation in physical and social sciences, Rosenberg summarized the result of the debates amongst the said philosophers to be that: on one side, a group of philosophers embraced Braithwaite’s and Nagel’s claims in regard to biological and social science without considering any consequences which result from the autonomy of these subjects from the physical sciences; on the other hand, another group of thinkers brain-storm regarding the implications of claims of Braithwaite, Nagel and Hempel for the doctrine of unity of science, especially in connection with the methodological and conceptual status of the social sciences. Rosenberg after noting these disparate schools of thought, expressed with some sense of relief that it is a mark of philosophical progress that both schools of thought have struck some synthesis, and now tend to accommodate each other.

Rosenberg seems to have painstakingly categorized the contemporary debate on causal and teleological explanation for he now shifts from works of the 1940s and 1950s to those of the 1960s and 1970s. And here, he picks up Charles Taylor’s *Explanation of Behaviour*. Taylor’s work, Rosenberg tells us, is a sustained argument for the conclusion that as a matter of empirical fact, it is more likely than not that human behaviour is different in kind from that of inanimate objects and cannot be accounted for, even in principle, by appeal to considerations of the kind which explain the operation of inanimate phenomena. Rosenberg argues that it is easily understandable that the thrust of Taylor’s argument is diametrically opposed to the Comtean program with respect to teleology. Thus, his (Taylor’s) central claim that the choice between teleological descriptions of human behaviour and causal descriptions is exhaustive and exclusive. This claim leads Taylor to the conclusion that irreducible teleological explanations are unavoidable in the explanations social sciences must offer, and this fact makes a difference in kind, a metaphysical difference between animate and inanimate objects.

Rosenberg, in his historical mapping of the debate over causation and teleology, highlights reactions against Taylor’s thesis as already mentioned above. These reactions focus on a derivation of Taylor’s thesis, that is, the argument he advanced against a reduction of teleological laws to physical laws a la Nagel. The most important of these reactions which Rosenberg chooses to treat at some length is that of Larry Wright namely, “The Case against Teleological Reductionism”. In this work, Larry Wright suggested that
the attempts to translate teleological claims into non-teleological claims (as sought by Nagel) fail just because the latter reflects a substantial presupposition that is absent from the former: that is, the assumption of determinism. Although Wright seemed to suggest that this fact undercuts the program of philosophers like Nagel and Braithwaite, in fact it is one shared by both sides of the controversy, at least in the sense that no analysis of teleology should be incompatible with this principle.

On the other hand, exponents of non-teleological reduction certainly do feel free to offer analyses of teleology which are incompatible with the denial of causal determinism. This is of course simply a reflection of the fact that the falsity of this assumption would destabilize the whole empiricist program for the analysis of, and correct methodology in non-teleological natural science. Rosenberg concludes his account of causation and teleology in contemporary philosophy of science by suggesting that the subject of teleological characterization and its assimilability to causal description shows no signs of losing interest among philosophers. Underpinning this interest is the fact that there is considerable convergence among philosophers in this discourse.

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The entire gamut of Rosenberg’s account of “Causation and Teleology in Contemporary Philosophy of Science” is reflective indeed of the contemporary debate on the issues. His account rightly represents the two main parties to the controversy: On one hand, there is the party ably represented by Peter Winch (1958), which maintains that there are no parallels between social and natural sciences since the former involves human actions with meaning and deliberation; on the other hand, there is the tradition following upon J.S. Mill which maintains that there are parallels between social and natural sciences and hence seeks to generalize and predict human behaviour.

Notwithstanding Rosenberg’s success at duly capturing the contour and tone of contemporary debate on causation and theology, his work suffers from some logical and conceptual weaknesses and oversight or neglect of some substantive questions. In the first place, it was not clear from Rosenberg’s work that he is aware of the contemporary nuances of meaning of the concept “causation” as has been well articulated and enunciated in Jerald L. Aronson’s The Realist Philosophy of Science, 1984. To the extent that Rosenberg did not inform on this, he leaves his discourse beclouded by conceptual mists. As enunciated by Aronson, there is Humean idea of causation adopted by logical positivists and there is the realist idea of causation. The Humean idea of causation holds that a cause is an event which occurs before the effect event. This means that causal relations are more than just occurrence of events. Contrary to the Humean view, it is not enough to show one event followed another in order to establish that a causal relation has taken place; more must be shown, even if it can be demonstrated
in addition that these two types of events are correlated. Realist concept of causation then implies that causal connections and theoretical entities such as particles in physics have the same ontological status.

It will be noted that the point of difference between Humean - Hempelian causation and realist causation is that the former takes it that to explain causation is to predict an event; while the later rejects the former and maintains that there is something necessarily ontological about a causal situation. A further weakness of Rosenberg’s essay is that it is presumptive of the legitimacy of teleological explanation. It judges the legitimacy of teleological explanation by its increasing use in the life sciences and the social sciences in the twentieth century. He seemed to believe like most functionalists that in showing some item to have a social function, they have explained its existence. According to Malinowski, for example, functionalism “aims at the explanation of anthropological facts at all levels of development by their function”11. Yet the explanatory value of functionalism is a controversial question. Causes, reasons, and motives are all alike in that they exist antecedent to the explanandum; a feature which, indeed, seems to be necessary to their capacity to explain. But the contribution of a social item to societal survival clearly cannot exist prior to that item’s existence.

Meanwhile, Rosenberg is also as presumptive of efficacy of scientific explanation itself as he is of the legitimacy of teleological explanation. The point being raised here is whether the sciences do really explain? There is a historically influential objection to the claim that the sciences do in fact explain12. On this I will quote the words of E. W. Hobson in extensor thus:

The very common idea that it is the function of Natural Science to explain physical phenomena cannot be accepted as true unless the word ‘explain’ is used in a very limited sense. The notions of efficient causation, and of logical necessity, not being applicable to the world of physical phenomena, the function of Natural Science is to describe conceptually the sequences of events which are to be observed in Nature; but Natural Science cannot account for the existence of such sequences, and therefore cannot explain the phenomena in the physical worlds, in the strictest sense in which the term explanation can be used. Thus Natural Science describes, so far as it can how, or in accordance with what rules, phenomena happen, but it is wholly incompetent to answer the question why they happen13.

On a positive side, Rosenberg offered an admirable reconciliation between the two radical traditions, namely, those who maintain that teleological explanation in human and quasi-human disciplines are ineliminable and essential and that therefore human sciences are different in kind from the natural sciences; and those who argue that teleological language are ineliminable in the social sciences and have inferred from this that these disciplines are not cognitive and require reconstruction on non-teleological bases. According to Rosenberg, contemporary philosophy of science has tended to accommodate teleological explanations by their reduction to statements and explanation of the sort familiar in the physical sciences. This procedure in one fell swoop removes the
methodological or metaphysical barrier between the human and physical sciences and upholds the unity of science program. Meanwhile, Rosenberg’s position in his quote above that the continued employment of teleological explanation in the life sciences and social sciences is either a serious counterexample to Comte’s vision of the general direction of human knowledge or a blot on our claim to have finally and fully transcended allegedly unscientific modes of thought mocks the reductionist program and it’s concomitant unity of science thesis.

Conclusion
Rosenberg’s essay is particularly useful in the way it acquaints the new reader or refreshes the mind of the matured reader with the history and themes of the debate on causation and teleology in contemporary philosophy of science. It has a further advantage in demonstrating that the increasing use made of teleology in the life (biological) sciences and social sciences proves “either a serious counter-example to Comte’s vision of the general direction of human knowledge, or a blot on our claim to have finally and fully transcended allegedly unscientific modes of thought”. These ominous observations of Rosenberg should serve as reflection points for the exponents of methodological reductionism and unity of science thesis; what with the increasing waves of philosophical postmodernism.

References
2. Ibid. p.4.
3. Ibid. p.5
8. Ibid. p. 57.