

## PREFACE

Human discourse, whether ordinary, scientific or moral, is characterized by an abundant use of causal terminology. We constantly use causal words - not only explicit references to causes and effects, but also verbs that imply the concept of cause. Some verbs, like 'producing,' 'generating,' 'determining,' 'bringing about,' are blatantly causal. Many transitive verbs, such as 'breaking,' 'dropping,' 'cooking,' implicitly refer to causal relations. Breaking a twig is causing it to break; dropping something is causing it to fall, and so forth.

In science, explanations often refer to causes or to causal connections. Indeed, the predominant objective of science may be characterized as the systematic description of or the search for causal relations. In moral discourse, the concept of moral responsibility, which is involved in all moral reasoning, inherently refers to the idea that individuals in some way are the cause of their actions. Similarly, debates between lawyers before a court of law concern the question whether a particular human action (or the omission thereof) was the cause of some particular damage or harm. Lawyers must show beyond the shadow of a reasonable doubt that there is a real causal link between some action and some damage.

The fundamental importance of the concept of causation, both to our ordinary practical concerns and to our scientific descriptions of the world, has led some philosophers to the extreme view that causation is so basic as to refuse all further analysis (Scriven 1966; Taylor 1966; Anscombe 1971; Fales 1990). Others, such as Bertrand Russell (1912), took to the other extreme, by arguing that the concept of causation better be abandoned in scientific discourse because it ought to be seen as the unfortunate result of an anthropocentric projection of our confused conception of human agency and power. According to Russell, "... the word 'cause' is so inextricably bound up with misleading associations as to make its complete extrusion from the philosophical vocabulary desirable [...]. The law of causality [...] is a relic of a bygone age" (Russell [1912] 1991, 119).

Most contemporary philosophers hold a position that lies somewhere between these two extremes. They respect the central role of the concept of causation in our understanding of the world, and they share the conviction that, problematic though the concept may be, it can be analyzed. I too share that belief and, though I think all philosophical views regarding causation

suffer from a basic misconception, I too will try to elucidate the nature of causation.

My primary objective in this book is to clarify the ontological question, which in my view concerns *causation* - or the production of an effect by its cause - rather than *causality*, which is the relationship between cause and effect. The distinction between causation and causality is of paramount importance in this study. More specifically, I hope to show that many of the unsatisfactory aspects of the existing theories regarding causation are related to the failure to respect this distinction. Breaking a glass is something quite different from the relationship between the 'cause' of the shattered glass and the shattered glass.

Our experience of causation is closely related to a certain type of our experience of signs. Our experience of fire causing smoke is connected to our experience of smoke being the sign of fire. The search for causes is always related to the experience of possible symptoms, which are both the effects and the signs of some cause. When the first plane crashed in the World Trade Center, most witnesses saw the horrible event as a sign of some dreadful human error or some fatal mechanical failure; but when the second plane crashed, no one doubted that the crash was the symptom of some terrorist plan. Given the major role of signs in our experience of causes, the scant attention paid to this close relationship between signs and causes in contemporary discussions may itself be regarded as the symptom of a rather remarkable blind spot in the prevailing views of causation. And thus, an approach to the problem of causation from the point of view of an adequate theory of signs is long overdue. My hypothesis is that Peirce's semeiotic provides the best available instrument for working out such approach.

Though C.S. Peirce (1839-1914) has never written a work devoted to causation, his innumerable papers and manuscripts contain many valuable insights on the subject, most of which have not yet sufficiently been recognized by the contemporary philosophical community. Thus, my first objective is to make a critical analysis of Peirce's conception of causation. My second objective is to develop a novel approach to causation, based upon the semeiotic of Peirce.

I will briefly explain how the various chapters contribute to these objectives.

Philosophical theories are always answers to questions that have arisen within a certain historical context. Understanding a philosophical problem therefore requires some historical perspective. *Chapter 1* therefore will consist of a review of some important moments in the historical evolution of the concept of causation, which will enable us to better understand the contemporary debates on causation. It will be shown that the complex

history of the concept of cause is marked by two decisive milestones: (I) the Aristotelian-scholastic conception, according to which causes are the active initiators of some change, and (II) the scientific conception, according to which causes are inactive nodes in a law-like chain of implication.

The modern concept of cause will be shown to be the unfortunate result of the interplay of these two conceptions. According to the first conception, 'A is the cause of B' means 'A is the active initiator of a change in B.' According to the second conception, the same expression means: 'Given the occurrence of B, A must necessarily have occurred.'

Any analysis of causation must take into account the tension between these two aspects of our concept of causality. In the chapters 3 – 6 I hope to show that C.S. Peirce provides us with some basic insights for an alternative theory which may resolve this tension.

*Chapter 2* provides an overview of the contemporary accounts of the *concept* of cause. The function of this chapter is twofold: first, by offering a clearer view both of the qualities and the shortcomings of the contemporary approaches, it will allow us to better appreciate the relevancy of Peirce's conception of causation; secondly, the conceptual analysis as put forward in this chapter will function as a rough guide to the ontological analyses provided in the later chapters.

The contemporary views on causality may roughly be reduced to five different approaches. According to (1) the 'necessary and sufficient conditions approach,' a cause may be described as follows: an event A is the cause of an event B if and only if A is a necessary part of a complex set of conditions C, while C is a sufficient but non-necessary condition of B. For instance, a short-circuit is said to be the cause of a certain fire because – though by itself it would not be a sufficient condition of the fire – it is the decisive factor in a set of circumstances (including, for instance, the presence of combustible material) which, while not being a necessary condition, is a sufficient condition for the fire to occur. The fire could indeed have been caused by a different set of circumstances; but given this set of circumstances, the short circuit, which is a constituent element of that set, was the decisive factor.<sup>1</sup>

According to (2) the 'counterfactual approach,' a cause is simply an event without which another event would not have occurred. Thus, saying that a nail was the cause of my flat tire, is saying that, were it not for the presence of the nail, my flat tire would not have occurred.

According to (3) the 'instrumental approach,' a cause is an event or state of affairs that can be manipulated so as to bring about or to prevent another event or state of affairs. Saying that a defective gene is the cause of a certain tumor is saying that the illness can in principle be cured by repairing the

defective gene, or that we could bring about the illness by damaging the gene.

According to (4), the ‘probabilistic approach,’ an event A is the cause of an event B if and only if, given an event A, the probability that B occurs is greater than if A had not occurred. Thus something is the cause of cancer inasmuch as it increases the probability of the occurrence of cancer. This approach may be seen as a ‘soft’ version of (1), which in effect states that the occurrence of event A involves the probability value of 1 that event B will occur.

The ‘singularistic approach’ (5) is characterized by the idea that causal relations are irreducibly individual, rather than instantiations of universal relations. Thus, one may describe the cause of an event B as the one single event (A) that occurs closest to and immediately preceding event B. For instance, the cause of the fire was the short-circuit because the short-circuit was the one single event immediately preceding the fire. Moreover, the short-circuit, in combination with other circumstances, was the sufficient condition for the outbreak of fire.

It will be shown that, though each of these approaches highlights important aspects of the concept of causality, none is ultimately quite satisfactory. Moreover, a number of the most stubborn problems plaguing the modern analytical approach will be discussed and, by the same token, an attempt will be made to list the requirements that must be met by an adequate theory of causation. This will involve a discussion of issues such as (1) the question of continuity in time and space between cause and effect, (2) the question of the probabilistic nature of causal laws, (3) the relationship between causation and time, (4) the direction of causation, (5) causation and ‘agency,’ (6) teleology, (7) the relationship between uniformity and causation, and (8) the universality of causation.

The first two chapters will provide the framework in which Peirce’s approach to causation is particularly promising.

*Chapter 3*, which is devoted to Peirce’s theory of final causation, is a key chapter of this book. In view of the generally anti-teleological attitude of most scientists, Peirce’s defense of teleology seems outdated and even reactionary. But Peirce does not merely defend teleology, he revolutionizes the concept, and by doing so, he revolutionizes the entire concept of causation. In the first part of chapter 3, Peirce’s conception of final causation will be analyzed. An important aspect of that conception derives from his conviction that the rejection of final causation by most contemporary philosophers is due to a grave misunderstanding of the concept. The second part of the chapter illustrates the latter point by providing a Peircean critique

of Ernst Mayr's conception of teleology, which is widely accepted among philosophers of science in general, and philosophers of biology in particular.

The basic point of Peirce's critique is that final causes are not future events, but general possibilities, and that the hallmark of final causation is its being a basic characteristic of every process. More specifically, Peirce's theory explains (1) that the final state of a process may be reached in different ways, and (ii) that a process is irreversible.

Peirce argues that, far from being two different types of causation, efficient and final causation complement each other in as much as each act of causation has both an efficient and a teleological component. Likewise, he argues that the distinction between purely mechanic and teleological processes is misguided because each and every process has a more or less important teleological aspect. Moreover, in his view, all causation involves an aspect of irreducible novelty, which is related to 'objective chance'.

Peirce's theory is helpful in laying bare the fallacies inherent in three of the most important premises of nearly all contemporary discussions regarding teleology, including Ernst Mayr's. Final causes are often rejected because they are, erroneously, thought (i) to be individual events that (ii) retroactively influence the present (backward causation), and (iii) do so in a strictly determinate manner.

Thus, if my analysis is correct, Ernst Mayr's rejection of final causation is based on a fatal misunderstanding of the nature of teleological processes. Moreover, if I am right then Mayr's distinction between genuinely end-directed or teleonomic processes and seemingly end-directed or teleomatic processes is essentially without foundation, for both require an explanation by final causation.

*Chapter 4* deals with Peirce's account of natural classes, a topic which at first may seem irrelevant to the problem of causation. To understand its relevance, one must know that Peirce's analysis of the concept of natural classes is entirely related to the concept of final causation. Peirce holds that causes and effects cannot be mediated by final causes (or 'laws') unless they belong to a natural class. Thus, an adequate explanation of Peirce's conception of causation requires an account of his conception of natural class. Conversely, Peirce's conception of natural class must be considered within the perspective of final causation.

Peirce's theory of natural classes involves at least two important insights: (1) all classification is related to some purpose, and (2) natural classifications differ from artificial classifications in as much as the former are related to the final causes of the things themselves.

Peirce's conception may be summarized as follows: all things belonging to a particular class do so in virtue of some 'essence' and some additional



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