GOOD CONNECTIONS: CAUSATION AND CAUSAL PROCESSES*

I. INTRODUCTION

Clearly the concept of a ‘causal process’ has something to do with the concept ‘causation’. Two events, or facts, or states of affairs are connected by the relation causation when the first is the cause of the second and the second is the effect of the first. A causal process, such as an apple decaying, or an atom decaying, or a billiard ball moving across a table, is typically distinguished from a pseudo process, such as a shadow moving or a spot of light moving across a wall. A pseudo process, as distinct from a causal process, does not contribute to the causal structure of the world (Dowe, 1996; Salmon, 1984).

But what is the conceptual connection between ‘a causal process’ and ‘causation’? The natural answer is that causal processes are to be analysed or explained in terms of causation. For example, the distinction between a causal process and a pseudo process can be explained by the fact that two distinct temporal parts of a causal process are related by the relation of causation, whereas two distinct temporal parts of a pseudo process will not be connected by the relation of causation. Thus, according to this view, causal processes are analysed in terms of the relation of causation.

But some philosophers, such as Bertrand Russell and Wesley Salmon, have taken the explanation to go in the other direction. These philosophers have argued that causation needs to be analysed, or explained, in terms of causal processes. For example, Salmon writes,

"Focusing upon processes rather than events has, in my opinion, enormous heuristic (if not systematic) value. As John Venn said in 1866, ‘substitute for the time honoured ‘chain of causation’ so often introduced into discussions upon this subject, the phrase ‘rope of causation’, and see what a very different aspect the question will wear’. (1984, p. 183)"

I take it that we should read Salmon as saying here that there might be “systematic value” in analysing or explaining causation in terms of causal processes. After offering his ‘at-at theory’ of causal processes, Salmon comments,

"It is tempting, of course, to try to reduce causal processes to chains of events, indeed people frequently speak of causal chains . . . The point of the ‘at-at’ theory, it seems to me, is to show that no such question about the causal relations among the constituents of the process need arise. (1984, pp. 156–7)"

The motivation for taking this approach seems to be a frustration with philosophical attempts to say what causation is, in particular certain frustrations that arise from the..."
Humean tradition of accounting for causation in terms of regularities. By focusing on causal processes rather than the relation between events, Salmon hopes to circumvent these difficulties. Bertrand Russell had adopted the same approach, as we shall see in the next section, although his motivation was somewhat different.

In this paper I will attempt to defend this approach by defending a non-causal analysis of causal processes. A ‘non-causal analysis’ is an account of causal processes which does not appeal to the concept of causation; which is required or else the account of causation in terms of causal processes would be circular. This defence comes in two parts. Firstly, I defend a non-causal theory of causal processes – the conserved quantity theory – against some objections which focus on the question of identity through time. These objections are dealt with in sections 2–5. Secondly, I answer an objection to the claim that causal processes are adequate to explain or account for causation. This objection, which concerns so-called ‘preventings and omissions’, is dealt with in section 6.

2. RUSSELL ON CAUSAL LINES AND IDENTITY

Bertrand Russell’s 1912/13 paper, ‘On the Notion of Cause’, is famous for the quote,

The law of causality, I believe, like much that passes muster among philosophers, is a relic of a bygone age, surviving, like the monarchy, only because it is erroneously supposed to do no harm. (1912, p. 1)

In that paper Russell argued that the philosopher’s concept of causation involving, as it does, the law of universal determinism that every event has a cause and the associated concept of causation as a relation between events, is “otiose” and in modern science is replaced by the concept of causal laws understood in terms of functional relations, where these causal laws are not necessarily deterministic.

In a later book written in 1948, entitled Human Knowledge, Bertrand Russell outlines a similar view but does so in language which is much more flattering to causation. He still holds that the philosophical idea of causation should be seen as a primitive version of the scientific idea of causal laws. However, his emphasis now is on certain postulates of causation which he takes to be fundamental to scientific (inductive) inference. A key postulate concerns the idea of causal lines or, in our terminology, causal processes. Russell’s 1948 view is that causal lines replace the primitive notion of causation in the scientific view of the world, and not only replace but also explain the extent to which the primitive notion, causation, is correct. He writes,

The concept “cause”, as it occurs in the works of most philosophers, is one which is apparently not used in any advanced science. But the concepts that are used have been developed from the primitive concept (which is that prevalent among philosophers), and the primitive concept, as I shall try to show, still has importance as the source of approximate generalisations and pre-scientific inductions, and as a concept which is valid when suitably limited. (1948, p. 471)

Russell also says, “When two events belong to one causal line the earlier may be said to “cause” the later. In this way laws of the form “A causes B” may preserve a certain validity.” (1948, p. 334). So Russell can be seen, in his 1948 book, as proposing the view that within limits causal lines, or causal processes, may be taken to analyse causation where causation is understood as the philosopher’s concept of a relation between events.

So what is a causal line? Russell writes,