One of the biggest threats to scientific realism is the pessimistic induction argument. The pessimistic induction can be seen as recruiting the history of science to the anti-realist cause. However, realists have responded by attempting to reclaim the history of science. In “Pyrrhic Victories for Realism” Stanford argues that these attempts ultimately are self-undermining. The realist strategies employed to counter the pessimistic induction may secure a claim to the history of science, but only at the cost of abandoning the central tenets of realism. Stanford argues that realist attempts to give a causal account of reference fall victim to what he calls the “trust argument”. That is, in giving an account of reference that achieves historical continuity of theoretical terms, the realist still cannot give us any reason to trust that our current theories will not end up like their predecessors. In the following paper I will argue that the trust argument can be avoided, on the grounds that there is reason to trust our current theoretical terms latch onto reality. To do this I will first look at the pessimistic induction argument, and why realists may attempt to respond by turning to a causal account of reference. I will then explain why Stanford claims such accounts of reference fail. I will then turn to explain why Stanford's trust argument can be avoided.

The pessimistic induction argument presents a challenge for advocates of realism that draws upon the history of science. Realists maintain that the empirical success enjoyed by our best current theories is best explained in virtue of those theories being approximately true. That
is to say, the reason our current theories are empirically successful is because they have latched on to some aspect of reality. The pessimistic induction argument draws attention to the “parade of eminently successful theories that have nonetheless been subsequently rejected” that can be found in the history of science (Stanford 2003, 553), and challenges the realist to give some reason “we should not believe that the same fate awaits our current theories” (Stanford 2003, 533). Stanford notes that the pessimistic induction has prompted “realists' attempts to block or blunt this historical challenge by engaging the details of the history of science itself, but also the first serious efforts to recruit those details to the realist cause” (Stanford 2003, 554). Laudan's articulation of the pessimistic induction attacks the realist claim that "if a theory is successful, we can reasonably infer that its central terms genuinely refer" (Laudan 1996, 111). Laudan attempts to cast doubt upon this claim by offering a "range of once successful, but (by present lights) non-referring, theories" from the history of science (Laudan 1996, 114). This is part of an attack on a larger realist claim that the central terms of our best current theories genuinely refer.

The reason this attack on reference threatens the realist, is because it is closely related to the concept of approximate truth. As Laudan is quick to point out, "a realist would never want to say a theory was approximately true if its central terms failed to refer" (Laudin 1996, 121).

Thus Laudan's list of successful theories that we now consider to be non-referential is a threat to the idea that the success of our best current theories are approximately true. This is due to the close relationship between the approximate truth of a theory and that theory's central terms ability to genuinely refer.

Stanford explains that “one strategy of realist reply to the historical challenge suggests that... the [pessimistic induction] exaggerates the extent to which the central terms of the
rejected past theories... should be judged non-referential by present lights” (Stanford 2003, 555). This is because Laudan requires that the descriptive claims theories make about their central posits be accurate in order for those theories to refer successfully. The realist of course can appeal to causal rather than descriptive accounts of reference in order to loosen the descriptive accuracy requirements for successful reference. Stanford gives some examples of realists who have attempted to employ a causal account of reference in defending realism against the pessimistic inductions. Hardin and Rosenberg have argued for a causal account of reference, additionally Kitcher has also argued for a more refined causal account of reference (Stanford 2003, 555-556). Stanford claims that both of these efforts manage to secure historical continuity of reference, but fall victim to the trust argument, that is, they give us no reason to trust that they currently or previously ever latched on to any element of reality. I will now quickly explain some of ideas behind the differences between a causal account of reference as opposed to a descriptive account.

A causal account of reference would allow us to say that the descriptive claims theories make about their central posits must be accurate in order to achieve successful reference. Such central posits refer to causal roles they play. For example, our descriptive claims about the term “electron” do not need to be accurate in order for “electron” to pick out some element of reality. On a causal account “electron” refers, for example to “whatever entity that is responsible for the tracks in the cloud chamber”. This is opposed to a descriptive account of reference in which “electron” refers to “an elementary particle”, as well as other such descriptions we have of electrons. This kind of causal account of reference secures a history of successful references. For example “because we regard the electromagnetic field as playing the causal role attributed to
the ether by earlier physical theories, the realist may hold... 'that “ether” referred to the electromagnetic field all along’” (Stanford 2003, 556)(Harden and Rosenberg in Stanford 2003, 556). Kitcher also endorses a causal theory of reference as a response to the pessimistic induction, yet the version Kitcher advocates can be seen as a refinement of the pure causal account offered by Harden and Rosenberg described above. Kitcher's version is notable because it allows for partial reference success and failure for terms.

Both of the aforementioned approaches to reference attempt to deal with the historical challenge posed by the pessimistic induction by constructing accounts of reference that allow the central terms of our past theories to remain referential. Thus the realist can maintain that the success of our current theories is best explained by having central terms that genuinely refer. The strategy here is to use a causal account of reference to loosen the restrictions required for a central term to be genuinely referential. In doing so, the realist establishes referential continuity through history. However, Stanford claims, that while these approaches “[secure] a history of successful reference for terms in discarded theories” they do so “only by divorcing their reference from the question of the accuracy of those theories and thus abandoning the specifically theoretical beliefs of the very sort for which the realist hopes to convince us to share her realism in the case of current theories” (Stanford 2003, 556). Stanford concedes that the realist may be successful in providing an account of reference that preserves referential terms' historical continuity. However, Stanford argues that such an account is unsuccessful in establishing any reason to trust that our current theories are saying much about reality at all. This follows from the fact that such an account of reference allows the central terms of our previous theories maintain their referential status, despite being radically misguided. The
The challenge for the realist is, even if the central terms do refer, it seems they do not refer in the way the realists want to argue they do. The causal accounts of reference given above make it hard for the realist who wants to claim that we are in a better position now, than we were in the past to give the anti-realist any reason to trust that our central terms genuinely refer. Stanford wants us to see that in attempting to establish referential continuity and trying to use the historical record to support realism, the realist actually ends up giving the anti-realist even more grounds to claim that the history of science is in fact on the side of the anti-realist (Stanford 2003, 556). I will now go on to argue that this is not actually the case, but before doing so I should clarify a few points.

The challenge Stanford presents, is not unlike the historical challenge presented by the pessimistic induction argument. Stanford focused his attack on specific realist attempts to answer the pessimistic induction, and in this paper I have focused on two such attempts that both involve the notion of reference. Both offer a causal account of reference as a defense against the historical challenge by claiming that the central terms of our theories refer to causal roles of entities. This saves realism from the charge that many successful theories would not be considered referential by present standards, as those theories' central terms refer not to descriptions, but to casual roles. Stanford then argues that even given this account, there seems to be no reason to believe that current theories are any better off than those of the past. My argument is to claim that the realist does not need to resort to a causal account of reference to answer the pessimistic induction in the first place, and thus Stanford's trust argument can be avoided. However, I must then show how the historical challenge presented by pessimistic induction can be met. That is, if there were previously empirically successful theories that we
now consider to be non-referential, I must provide reason to believe our current theories are referential. Thus, I must show that the realist need not be haunted by the “ghostly historical procession” of once successful theories, that in present lights seem to be inconsistent with our current theories (Stanford 2003, 554).

The appeal of a causal account of reference was that it attempted to make the ghostly procession of once successful central terms, maintain continuity. However, divorcing reference from descriptions altogether seems problematic, and others have claimed a pure causal theory is of little use in the defense of realism (Cummisky 1992, 21). Some favor a hybrid account of reference that maintains some descriptive elements (Cummisky 1992, 21). I believe some element of descriptive content is probably necessary, and that even a wholly descriptive account of reference does not raise a problem for realism. In fact, realism may want to grant that the central terms of previously successful theories no longer refer, that the history of science is filled with dead referential terms. However, rather than be haunted by the ghosts of the history of science, the realist can enlist these ghosts as a way of answering the pessimistic induction.

Firstly, by keeping some descriptive element in our account of reference, we can avoid the trust argument presented by Stanford, because we are granting that our references have in fact failed in the past. Stanford's trust argument concerns accounts of reference that attempt to divorce reference from descriptive accuracy. In conceding that some descriptive element is required in our account of reference we place ourselves outside of the scope of Stanford's argument. Now we must face the pessimistic induction argument head on. My argument follows the argument articulated by Fahrbach in “How the Growth of Science Ends Theory Change”. Fahrbach explains that:
[The pessimistic induction] asserts that many of our current successful scientific theories will be refuted, because in the history of science there were many successful scientific theories that were later refuted. To argue against [the pessimistic induction], I started from the observation that the amount of scientific work done by scientists has grown exponentially over the last 300 years, doubling every 15–20 years, which implies that almost all scientific work ever done has been done in the last few decades (the last 50–80 years)... during the time in which most of the scientific work has been done, our most successful scientific theories have been entirely stable. (Fahrbach 2008, 154)

This argument looks at the historical record, and takes note that despite many of our theories having been abandoned, the examples offered by anti-realists tend to be “over 80 years old” (Fahrbach 2008, 154). And according to Fahrbach, most of our scientific work has been done in the last 50-80 years. Thus, the examples invoked by the pessimistic induction are not particularly representative. My argument follows from these ideas. However, I am arguing less generally against the pessimistic induction. I am arguing that terms that were once believed to be referential that are now considered non-referential need not be seen as a threat to realism at all, and can actually be seen a reason to believe our current theories are referential. Our current theoretical terms are more likely to be referential now than their predecessors because we have the benefit of knowing what terms turned out not to refer, and our current terms have been more stable than those before it.

In conclusion, I believe I have shown how realists can avoid the trust argument presented by Stanford. Firstly, the problem is avoided by not resorting to a purely causal account of reference. Some descriptive elements must be maintained. While this move evades the trust argument, it also forces the realist to face the historical challenge presented by the pessimistic induction argument head on. The pessimistic induction argument attempts to recruit the ghosts
of theories that were once successful but now seem non-referential in order to haunt the realist. Rather than let the ghosts of non-referential terms haunt the realist, I suggest we follow Farhbach in saying that there really is not much to be haunted by. It seems that there is a reason to believe our theoretical terms refer now, as most of our scientific work has been done in the past 50-80 years, and our scientific terminology seems to be quite stable. Thus our we have reason to put more faith in our current theoretical terms.

Works Cited:
