First Name Last Name

*This is an example of a student draft essay on a topic similar to one we are doing in Essay 2. There are some structural differences but essentially this is very much like the analysis section of our essay.*

English 101

Professor Fulton

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The “Hockey Stick”: Criticisms and Counter-Arguments

From when it first appeared in the Intergovernmental Panel on Climate Change’s 2001 report, Michael Mann’s controversial “hockey stick” graph has attracted its fair share of critics and supporters. Anthropogenic climate change has polarized viewpoints on both sides of the aisle since its earliest days of study, HMMMMMMM. However, perhaps more controversial than the findings themselves have been the discussions of researcher personalities, statistical accuracy, variety of data use, and concerns for the future.

Perhaps the only thing more divisive than the ‘hockey stick’ at the time of its publication was its author. It can be argued that if a different voice had brought such truths to light, the reception may have been less dramatic. According to geochronologist and discoverer of thermohaline circulation Wallace Broecker, Mann’s scientific reputation is questionable as “he won’t listen to anyone else” in regard to his research (Pearce 91). In addition, Mann is known for his “thin skin”, and reputation to “react strongly...as he has in the past” (Pearce 92). The prototypical image of a calm and collected professional is a long-standing stereotype of modern science, and Mann’s willingness to allow his choler to come to the fore certainly did not help his case during the ‘climategate’ scandal, nor during the initial response from publications critical of his work. These concerns over a ‘novice’ researcher weighing in on the issue of anthropogenic climate change would have to be addressed in order for research to continue.

Despite attempts to remain transparent, at times scientific research can lead to debates over the content of a researcher’s character, over their contribution to a field of study. Michael Mann is one of those researchers, and his passion for his work would find him getting “into hot water defending it too hard in places where he shouldn’t”. But passion should not be an indicator of insincerity, as many of his colleagues “accept that he is honest if hot-headed” (Pearce 94). It is likely that some of Mann’s apprehensiveness resulted from fears that third parties were acting to discredit or otherwise impede his ongoing research. Research into climate change was controversial at the time for the “hockey stick”, with many opponents of such a damning statement of human progress. As such, the desire for a closed and easily overseen research team is logical and it is altogether understandable that members of such a project would have qualms about the unchecked release of information that could be detrimental to ongoing research if it were to “fall into the hands of those who might...try to distort things” (Pearce 83).

First published in Energy and Environment, a 2003 paper by retired mathematician Steve McIntyre and environmental economist Ross McKitrick questioned the combination of data and statistical accuracy utilized by Michael Mann. The paper found issue with the foundational scientific mechanics that lead to Mann’s findings, some of which “involved sorting and aggregating...smoothing the result...any graph of real temperatures would have been much less smooth” (Pearce 92). It was this sticking point of ‘smoothness’ that most alarmed climate change critics, owing to the idea that the dramatic upward spike in temperature shown by Mann’s graph was atypical of established weather patterns. The idea that that global temperatures had remained constant for centuries, only to be violently disrupted by human industry raised the eyebrows of sceptics around the world. Therefore, McIntyre and McKitrick believed that the increase, or ‘blade’ of the ‘hockey stick’ was evidence of some deliberate action by Mann to create an artificial result, one that would not stand up to the rigors of repeated experimentation.

A scientific theory is only as good as the experiment that supports it, and if said experiment cannot reliably produce a repeatable set of consistent data, then the theory quickly loses credibility. Such is often the fate of theories, many of which are never heard from outside of the labs in which they are tested. However, Mann’s findings have withstood this gauntlet; “upwards of a dozen studies...have produced reconstructions...all have a hockey stick shaft and blade” (Pearce 94). Although variables such as blade height and shaft smoothness can differ to small degrees, and even the margin of error originally presented in Mann’s graph has been portrayed as smaller in subsequent studies, the core result of the ‘hockey stick’ remains. While a scientific theory is never truly finished with testing, a respected body of complementary work speaks volumes as to it’s validity; far more than the untested hypotheses of amateurs. Progressive and new ideas are the fuel of the sciences, and as such, new techniques must be tested before they are allowed to become commonplace.

Dendroclimatology is a comparatively recent addition to the scientific toolkit, when considering other temperature recording methods, and as such the reliability of tree ring data is worth scrutiny. This issue of reliability was a key part of McIntyre and McKitrick’s criticism, as they cited the noticeable divergence problem that has emerged in the second half of the 20th century, as “most tree ring data sets do not reflect the warming seen in thermometer readings” (Pearce 93). If inaccurate data is used, a scientific theory is born with a crippling flaw, one that repeated experimentation will only make worse. As such, the removal of unreliable and inaccurate data will more properly represent the theory, leading to a more refined, and hopefully correct outcome. However, untested methods are not in themselves untrustworthy, and such short-sightedness can produce the opposite of what is desired: an even more flawed creation.

By excluding the controversial bristlecone pine data used in the original ‘hockey stick’ graph, McIntyre and McKitrick did not replicate Mann’s work. A conclusion that geoscientist Dr. Caspar Ammann arrived at after his own study, finding that “the M&M case boiled down to...whether tree rings should be included, not...a mathematical flaw in Mann’s analysis” (Pearce 94). This lack of adherence to the established methods of scientific experimentation resulted in aaathe criticisms of McIntyre and McKitrick to come under fire. In fact, regardless of uncertain patterns, “most scientists believe...divergence is a result of some other human-caused factor” (Pearce 93). Therefore, Mann’s conclusions of clear evidence for anthropogenic global climate change persist, and are in a way reinforced by his critics. Any anomalous scientific finds are worth further study, even if only to disprove them to be entirely ordinary. Further research is required to understand the changes that affect the world, regardless of the implications or consequences that said research may bring. However, anomalies do occur throughout history, and should not be discounted; for history has a pattern of repetition.

There is evidence of decisive environmental shifts in Earth’s ancient past, but how these changes pertain to our current ecological situation is still being researched. One of the byproducts of Earth’s natural carbon cycle is the release of carbon dioxide into the atmosphere, a process that can prove to be more than the regulatory system of plants, soil, and water can handle, resulting in an effect known as climate sensitivity (University...). An easily identifiable result of this heightened sensitivity is the measured warming of the atmosphere, such as during the Paleocene, which bore witness to the final ages of the dinosaurs, or the Eocene, which ended with a major extinction event. However, even these catastrophes of aeons past developed over the course of thousands, if not millions of years, and as such, the question may not be as simple as originally believed, as the effects of “adding such large amounts of carbon...would be much greater today” (University...). Perhaps it is not enough to ask what we are doing to harm the environment by itself, but in what ways are we drastically accelerating the process? While we may be far from living on a toxic world such as Venus, whose runaway greenhouse effect has made it hostile to life as we know it, caution in our actions and how they relate to the greater biosphere remains advisable.

Works Cited

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