

THE TREE RING CIRCUS

by John Dawson



SPPI REPRINT SERIES

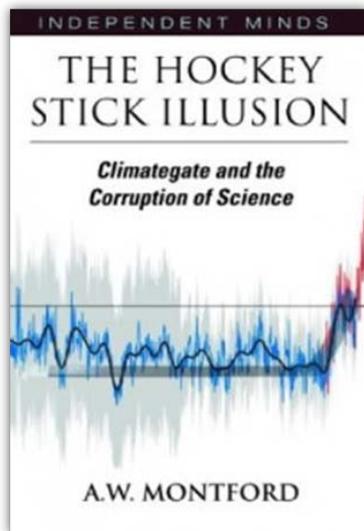


August 18, 2010

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by John Dawson | July/August 2010

The Hockey Stick Illusion is the shocking story of a graph called the Hockey Stick. It is also a textbook of tree ring analysis, a code-breaking adventure, an intriguing detective story, an exposé of a scientific and political travesty, and the tale of a herculean struggle between a self-funded sceptic and a publicly funded hydra, all presented in the measured style of an analytical treatise. The hero of the story is Steve McIntyre, honourably assisted by fellow sceptics, especially by Ross McKittrick. The villain is Michael Mann, dishonourably assisted by global warming alarmists, especially by his “Hockey Team”. The bare bones of the Hockey Stick story are as follows.



In its First Assessment Report published in 1990, the Intergovernmental Panel on Climate Change (IPCC) presented the conventional view of climate history: that around a thousand years ago there was a Medieval Warm Period, followed by a Little Ice Age, followed by the Current Warm Period that has not yet reached the temperatures experienced during the Medieval Warm Period. In 1995 the IPCC's Second Assessment Report presented that view again but introduced some doubt about the Medieval Warm Period, suggesting that further investigation was required. It had dawned on global warming crusaders that the Medieval Warm Period was a huge problem for the Anthropogenic Global Warming (AGW) hypothesis and that fame and fortune awaited a scientist who could get rid of it.

The scientist who took the prize was a brash and ambitious American paleoclimatologist, Dr Michael Mann. With two of his more senior colleagues, Mann set about investigating the earth's temperature over the last millennium by scouring the world's research projects that had detected past temperatures by way of temperature “proxies” such as tree rings. The amount of data they collated and the sophistication of their statistical analysis, claimed Mann, ensured that their conclusions would be more “robust” than those of previous studies. Their first peer-reviewed paper (MBH98) was published in the prestigious journal *Nature* in 1998 and their second (MBH99) was published in *Geophysical Research Letters* (GRL) in 1999. The graphed summation of these papers wiped the Medieval Warm Period and the Little Ice Age out of the picture and replaced them with a flat-lined handle declining slightly from 1000 to 1900 then bending upwards into a twentieth-century blade of rapidly rising temperatures.

This “Hockey Stick” graph was immediately seized by AGW crusaders. Typical of the reaction was that of Gerry North of Texas A&M University who enthused: “The planet had been

cooling slowly until 120 years ago, when, bam!, it jumps up ... We've been breaking our backs on [greenhouse] detection, but I found the 1000-year records more convincing than any of our detection studies." Almost overnight the Hockey Stick became the new gold standard of paleoclimatology.

As we now know (or will know after reading *The Hockey Stick Illusion*) what glittered was not gold but fool's gold. The Hockey Stick was not "robust". It was the product of a pseudo-scientific mindset, faulty data selection, erroneous data identification, dubious statistical methodology, flawed mathematics, a perverted peer-review process, a frenzied propaganda campaign and unscrupulous defence mechanisms. But so insatiable was the demand for this product that it swept all before it and challengers into the sceptic sin-bin.

Michael Mann was an incorrigible scientist, but he was an indomitable politician. His hegemony over paleo-climatologists, peer reviewers, journal editors, and some key politicians and lobbyists was none too subtle but amazingly effective. He quickly became a referee for eleven scientific journals and three grant programs, he was appointed scientific adviser on climate change to the US government, and he appeared regularly in the media. His crowning achievement was his appointment by the IPCC as contributing author of a number of chapters of the Third Assessment Report, and lead author of its "Observed Climate" chapter.

As Hans von Storch understated it, to have a scientist who already dominated a debate also authorising the key review of that debate was a sure road to trouble; the situation demanded the involvement of scientists who really were independent. As McIntyre stated it, this situation would be entirely unacceptable in a commercial situation, and in fact *illegal* outside a banana republic.

Since it would have been too blatant, even for Mann, to have his own paleoclimatology papers as the only ones to be taken seriously in the IPCC report, he sought the collaboration of paleoclimatologists from the University of East Anglia's Climatic Research Unit who had been doing tree ring analysis for many years. So Mann and his American colleagues joined forces with Phil Jones and his English colleagues to form an informal alliance that came to be known as the "Hockey Team". After some initial argy-bargy the pecking order was sorted out: Mann was captain, Phil Jones vice-captain and the team's all-for-one-and-one-for-all effort and prestige were harnessed to spearhead the cause of galvanising the world's attention on "the great moral and economic challenge of our time", as Kevin Rudd described AGW alarmism.

While expressing doubts and concerns amongst themselves from time to time, the team was driven inexorably on by Mann's bluster about their common commitment to "the science" and the need to fend off dark forces he imagined being aligned against them by big energy companies, and references to the support the team could count on from unidentified "friends in high places". But the team was driven past the point of no return—the scientists' reputations and careers became so attached to the Hockey Stick that its defence overwhelmed their professional integrity and scientific objectivity. Time and again the goal

of enshrining the Hockey Stick as the robust “consensus” view took precedence over due scientific process and disclosure.

The English members of the team produced some tree ring graph lines that could be added to Mann et al’s graph to bolster its intergovernmental credentials. When evidence of the Medieval Warm Period became apparent it was rationalised away as likely to be localised rather than worldwide. When proxy tree ring graph lines declined inexplicably in the late twentieth century they were cropped short and replaced with instrumental lines—sometimes the replacement was noted, sometimes it was hidden. Borehole studies that showed higher temperatures during the Medieval Warm Period than during the Current Warm Period were shunted out of the picture, except for a consolation prize of being used to demonstrate rising temperatures since the Little Ice Age.

When the Third Assessment Report was released to great fanfare in 2001 the Hockey Stick was its centerpiece, appearing seven times in the report. The version that appeared in the “Synthesis Report”, as the finale to its “Summary for Policy Makers”, was particularly awesome. A single line traced northern hemisphere temperatures along a nine-century handle, then bent upward through the twentieth century, then continued skyward through the twenty-first century to make a blade nearly as high as the handle was long. The graph’s caption began:

Variations of the Earth’s surface temperature: years 1000 to 2100. From year 1000 to year 1860 variations in average surface temperature of the Northern Hemisphere are shown (corresponding data from the Southern Hemisphere not available) reconstructed from proxy data (tree rings, corals, ice cores, and historical records). The line shows the 50-year average, the grey region the 95% confidence limit in the annual data ...

The Hockey Stick was quickly adopted as the AGW crusaders’ banner. It appeared on posters, PowerPoint presentations, in schools, on trucks, and in 2002 it was referred to in a pamphlet sent to every household in Canada to promote ratification of the Kyoto Protocol. In his documentary *An Inconvenient Truth*, Al Gore showed it as dramatic “evidence” and claimed that all scientists agreed with its message. Others said: well, all *legitimate* scientists anyway. And woe betide any scientist or politician who disagreed.

A few scientists and statisticians and journalists and politicians refused to be cowed. Not many of them were financed by public institutions. None involved in the Hockey Stick war were financed by big energy companies, despite the mantra recited by the likes of Mann and Gore that they all were. (Personally I think sceptics *should* be financed by big business as a counterbalance to the almost limitless public funding for climate alarmism.) Steve McIntyre had worked for a mining company, but his work on the Hockey Stick was done from home and was self-funded.

During his career McIntyre had applied his Oxford education in mathematics to data analysis and the auditing of statistically analysed surveys of prospecting and mining projects. When he retired he educated himself in paleoclimatology, then decided to cast an auditor’s eye

over the Hockey Stick. This required that he examine the data on which the research papers were based and the methods that had been employed to analyse it, so he e-mailed Michael Mann to ask for them.

Mann responded politely and arranged for a colleague to send some data. It was not enough data to do a proper audit, but it was enough for McIntyre to start detecting significant problems with the Hockey Stick, which he started exposing on the web. From then on his requests for the information required to audit papers were ignored, fobbed off, delayed, obstructed, belittled, rejected or grudgingly complied with in part. He doggedly persisted with the frustrating time-consuming process of politely pursuing researchers, their employers, journals and freedom-of-information claims, in order to gain access to information that should have been made readily available according to the policies of the journals and institutions involved. With a few exceptions the non-disclosure reality confounded the full-disclosure policy that is essential to the pursuit of scientific truth.

With only part of the data and procedures available to him, McIntyre's first task was to fill in the gaps as best he could by working backwards from the graphs to try and figure out how they had been arrived at. This task made me think of a code breaker with a coded message and some idea of what it might mean who then has to decipher what the code is. Not until he had broken the code could McIntyre start examining what it had been used to do and analyse whether its results were valid. This required many hours of trial and error using sophisticated statistical analysis programs—at least they sound sophisticated to a layman like me.

McIntyre's discoveries were numerous, and startling, and damning. When he started posting them on the web, the Hockey Team scathingly dismissed them as ignorant nonsense that would never get past a peer review; but as soon as McIntyre and fellow Canadian Ross McKittrick had their first peer reviewed paper (MM03) published in *Environment and Energy* the debate escalated into a Hockey Stick war. Mann furiously orchestrated a campaign of denunciation and sabotage. His "friends over at *Nature*", as he called them, treated McIntyre and McKittrick particularly badly, accepting their paper, delaying it, then rejecting it and publishing Mann's exculpatory corrigendum instead.

While their paper was languishing at *Nature* the Canadians were constrained from responding to attacks by the team. Mann declared that a paper by Scott Rutherford "completely discredited" MM03. But in 2005 McIntyre and McKittrick had their second paper published in *Energy and Environment* (MM05EE) and another one in *Geophysical Research Letters* (MM05GRL) and another one in a Dutch magazine. Mann's response was to claim that *Energy and Environment* was not a legitimate scientific journal and that MM05GRL had "managed to slip through the imperfect peer review filter at [GRL]". He didn't explain how he knew this about the allegedly confidential peer review process, but thanks to Climategate we know the sort of influence he could wield over that process, and what sort of filter he had in mind.

The war that raged between McIntyre and the hydra, in the journals, on the net, and in the media, came to a head, to one of them at least, when Mann once again refused to disclose his computational codes. As long as McIntyre had to rely solely on the codes he had broken, Mann could claim that he hadn't got them right, so McIntyre asked Mann to provide the right ones—and was again refused. Hence Mann's stance amounted to: *no one can understand my methods and reproduce my results without my codes, and I am not going to allow anyone else to examine or use them.*

When Mann's ridiculous statements on this matter (for example, that big oil companies were behind the request and that he would not be intimidated) were reported in the *Wall Street Journal* the tussle became political. The key politicians involved were Joe Barton, a sceptic, and Sherwood Boehlert, an AGW alarmist. To cut a long story short, Barton set up the Wegman committee to investigate and Boehlert set up the North committee to investigate.

The Wegman panel was made up of three statisticians from three different universities, none of whom had any professional connection to paleoclimatology or the AGW debate. The North panel was made up of eleven paleoclimatologists and two statisticians, most of whom had been professionally connected to the IPCC or the Hockey Team, some of them closely connected. So this jury was well and truly stacked in Mann's favour. He acknowledged this to Keith Briffa in an e-mail urging him to appear before it as a witness:

I think you really should do this if you possibly can. The panel is entirely legit[im]ate, and the report was requested by Sherwood Boehlert, who as you probably know has been very supportive of us in the whole Barton affair ... The panel is solid. Gerry North should do a good job in chairing this, and the other members are all solid. Christy is the token skeptic, but there are many others to keep him in check.

But despite its AGW bias, when the North panel presented its report in June 2006 it acknowledged that the Hockey Stick's depiction of temperatures before 1600 was invalid. It reported that the Hockey Stick depended on bristlecone pine proxies that "should be avoided for temperature reconstructions". That its reliance on single validation statistics was unacceptable. That its short-centring methodology was biased, towards a hockey stick shape. That it used methodology that was "unconventional" and "problematical" such that it "introduced certain distortions"—that is, was wrong. And more. It concluded that: "Some of these criticisms are more relevant than others, but taken together, they are an important aspect of a more general finding of this committee, which is that uncertainties of the published reconstructions have been underestimated." This was a highly euphemistic summary of the report's specific findings. The panel made no criticism of McIntyre or McKittrick or of the papers they presented.

Since the Wegman panel had not been stacked with AGW crusaders with allegiances to the team or the IPCC, and since its brief was confined to Mann's Hockey Stick rather than to climate history as such, its report was not compromised like the North report. (A brief summary of its findings may be found [here](#).)

The Wegman report identified a hard core of seven authors and a “social network” of forty-three authors with direct ties to Mann, and reported that this network had compromised independent research, perverted the peer review process, and so tied researchers to their public positions that they had become incapable of reassessing them. It criticised the team’s isolation from mainstream statisticians in other disciplines, and its grudging and haphazard release of the data required for verification of its findings. Most importantly it found that “the decentered methodology” used to produce the Hockey Stick “is simply incorrect mathematics”, that the Hockey Stick has “a validation skill not significantly different from zero”, and that its obliteration of the Medieval Warm Period and contention that the 1990s was the hottest decade in a millennium were “essentially unverifiable”.

The team attacked the Wegman report on the grounds that it was not peer reviewed, which was ridiculous since it was a peer review—a proper independent one by three of the most distinguished statisticians in the country. And they made maximum use of the wiggle room in the North report summary. Although it had validated McIntyre and McKittrick’s criticisms of Mann’s data selection and methodology in the body of the report, its brief was to form an opinion about the world’s temperatures over the last 2000 years, and the panel was not about to explicitly contradict the IPCC in this regard. It got around the conflict of interests by deciding that there was evidence *other* than Mann’s Hockey Stick that twentieth-century warming is “para-normal”. What they didn’t do, however, was to scrutinise that “other evidence” very carefully, because of the examples they presented, all bar one included bristlecone pines in their data sets, which they had agreed should not be used. It was in fact those bristlecones and other “Mannian parlor tricks”, as McIntyre called them, that produced the hockey stick effect in all their “other evidence”.

McIntyre argued that the North report’s reference to twentieth-century paranormal warming made it “schizophrenic”, and that its logical conclusion should be based on two premises: (1) the Hockey Stick constituted the empirical base of the 2001 report’s findings; and (2) the North panel had “agreed with the Wegman findings, as they testified to the House Subcommittee under oath” that the Hockey Stick had been comprehensively discredited. But North and his panel were too committed to the AGW crusade to accept the logical conclusion that the IPCC’S 2001 report was critically compromised.

You would think that two bombshells like the North and Wegman reports going off in the bowels of battleship IPCC would sink it to the bottom of the deepest ocean and scatter the team like flotsam. But such was the head of steam that powered it that it just kept sailing with barely a wobble. Anyone who confined their attention to the mainstream media (Murdoch press excepted) would be left with the impression that the North report was a triumphant vindication of the Hockey Stick and the Wegman report was a beat-up by sceptical politicians in the pockets of the big energy companies. Mann lost his position as lead author of the climate history chapter of the IPCC’s Fourth Assessment Report, but he was replaced by Keith Briffa, one of the stalwarts of the Hockey Team. Mann was kept on as a contributing (and no doubt highly influential) author.

The team was, however, forced to drastically modify the Hockey Stick for the IPCC's report that was released in July 2007. The Hockey Stick graph that had appeared in the 2001 report was conspicuous by its absence. In its place was a graph of spaghetti strands that reintroduced the Medieval Warm Period, but showed it in a way that diminished its significance compared with the Current Warm Period. The report did not, however, admit that the 2001 Hockey Stick was wrong; in fact it went out of its way to avoid leaving that impression. It noted that McIntyre and McKittrick's criticisms of the graph "may have some theoretical foundation, but Wahl and Ammann (2006) also show that the impact on the amplitude of the final reconstruction is very small". Given the fact that the IPCC was fully cognisant of McIntyre and McKittrick's published papers, of the Wegman report, of the North report, and of the fiasco that was the Wahl and Ammann paper (it had to skirt around its own rules to even mention it, let alone place such untoward weight on it), this statement can only be considered a scandalous indictment of the IPCC's integrity. It was clearly determined to whitewash Mann and the Hockey Team and showed no compunction about manipulating the evidence in order to do so. Nevertheless, the fact that the straight handle with angled blade graph had disappeared was a significant, albeit unacknowledged, back-down. Of the thirteen spaghetti lines in the IPCC's 2007 graph, only eight extend from the Medieval Warm Period to the Current Warm Period, and if they were the only lines shown the Medieval Warm Period would look much the same as the Current Warm Period with a Little Ice Age in between—which would not a hockey stick make. Furthermore, according to McIntyre's analysis, all the graphs involved suffered from one or more of the flaws that he had exposed and had verified by the North and Wegman verdicts.

The illusion of a hockey stick, however, was created by the other five lines, particularly by two that were darker and thicker than the rest. The only problem was that these two at least had no business being there at all. One that swooped up from 1500 to 2000 was derived from borehole temperatures. But if a borehole line was extended back in time it would show a higher Medieval Warm Period than the Current Warm Period. The other that started at 1856 recorded instrumental (thermometer) readings. Since it could not be extended back through the millennium it should not have been included in the graph. Why not stick to the same methodology through the whole millennium? If you have to switch from apples to oranges to get the result you want there is something drastically wrong with your method or your result or both.

It is, argued David Holland:

obvious nonsense [to] claim that historic reconstructions are evidence that one period is warmer than another when the reconstructions cited cannot replicate the instrumental record of the actual decades which they are alleging to be warmer. The evidence would be speculative if the divergence problem was unknown, but knowing it makes the evidential value of the reconstructions nil.

One by one the spaghetti strands that the IPCC presented were discredited by McIntyre's work. Michael Mann, however, was not yet done. In September 2008 the BBC announced to great fanfare that he and his colleagues had revived the Hockey Stick in a new paper to be

published in *Proceedings of the National Academy of Science (PNAS)*. *Nature* announced triumphantly that it would silence Mann's critics because it produced a Hockey Stick that didn't rely on tree rings. Not only had this paper been thoroughly reviewed and revised and reviewed again but it complied with the North report's recommendations, including the publication of the data and codes used. This latter was good news, the long overdue reward for McIntyre and McKittrick's dogged struggle that never should have been necessary. But the reasons why their pursuit of full disclosure had been resisted so vigorously for so long were soon to become apparent.

Over the years McIntyre's website www.climateaudit.org had become a hub for sceptical scientists and statisticians, from retired professors, to beleaguered academics, to whiz kids. Consequently the work of analysing the AGW alarmists' releases of allegedly "new" research results did not fall entirely on the shoulders of McIntyre and McKittrick. So when a link was posted to Mann et al's new paper, sceptical minds clicked into gear and statisticians' programs clicked on around the globe. It didn't take them long to make some interesting discoveries. First, a Czech physicist pointed out problems with Mann's theoretical approach; just minutes later a Greek professor of hydrology noted more. It was noted that the R2 statistic was absent, despite the fact that the North committee had agreed that it was required to verify the reliability of a reconstruction. McIntyre discovered that Mann was still using a statistical technique that could create a Hockey Stick effect out of red noise. An ecologist and a retired professor of statistics pointed out that Mann's presentation of a forty-year smooth right up to the present day was mathematically impossible; another statistician discovered how Mann padded future data with past data in reverse. Finally suspicion was cast on the peer review—finally for that first day's work, that is.

Incredibly, when McIntyre started looking into the tree ring proxies used, the same series that had been discredited were sitting there, including bristlecone pines! Given the fact that this species had been explicitly rejected as a reliable proxy, even by the North report, its inclusion blatantly flaunted the paper's Hockey Stick bias. Some new proxy series had been added, but hardly any of them showed modern warming, so the Hockey Stick effect relied on all the old suspects. Except for one striking addition—proxies taken from the sediments of four Finland lakes by a Dr Tiljander were shown by Mann as indicating hockey sticks with marked twentieth-century rises in temperatures. But, as the Tiljander evidence was analysed, travesty spiralled downward into farce.

An examination of Tiljander's research revealed that the twentieth-century proxy upturns had nothing to do with temperatures; they were the result of ditch digging. Furthermore, whereas Tiljander had explained that higher x-ray scores indicated *lower* temperatures, Mann had interpreted higher x-ray scores as indicating *higher* temperatures. So it was this upside-down graph that had demolished the Medieval Warm Period (that had been acknowledged by Tiljander) and replaced it with a hockey stick. If these errors seem incredible, Mann's determination to make good use of them regardless beggars belief.

Mann had acknowledged the ditch-digging factor but had used an extraordinary argument to defend the inclusion of the Tiljander proxies regardless of this distorting factor. He

claimed that the ditch-digging anomaly didn't matter because according to his sensitivity analysis the Hockey Stick effect would remain the same even without these Tiljander proxies! Why not just excluded the Tiljander series then, or its distorting twentieth-century readings? Montford managed to maintain his customary restrained tone in order to answer that question this way:

The big selling point of Mann's new paper was that you could get a hockey stick shape without tree rings. However, this claim turned out to rest on a circular argument. Mann had shown that the Tiljander proxies were valid by removing them from the dataset and showing that you still got a hockey stick. However, when he did this test, the hockey stick shape of the final reconstruction came from the bristlecones [and other discredited data and methods]. Then he argued that he could remove the tree ring proxies (including the bristlecones) and still get a hockey stick—and of course he could, because in this case the hockey stick shape came from the Tiljander proxies [and discredited methods]. His argument therefore rested on having two sets of flawed proxies in the data set, but only removing one of them at a time. He could then argue that he still got a hockey stick either way. As McIntyre said, you had to watch the pea under the thimble.

This was by no means Mann's only pea-and-thimble trick. He outdid "Mike's Nature trick" that had been used to infamously "hide the decline" in late-twentieth-century proxy lines. This time he didn't hide the decline, he showed a rising mirror image of the decline. A second statistical method that turned red noise into a hockey stick shape was found. A complicated filtering of proxy lines favouring those that added to the Hockey Stick effect was discovered. A proxy line designated as being temperatures in Africa turned out to be rainfall in Spain, and when corrected it altered the temperature of the eighteenth century by 0.5 degrees. These afflictions, remember, got past the vaunted peer review process with flying colours. They were perpetrated and reviewed by people who, according to Dr Andrew Glikson in his debate with Joanne Nova (see [Quadrant Online](#)) should be trusted in the same way we trust doctors and airline pilots!

The PNAS stated it would accept comments on Mann's new hockey stick paper provided they were received within three months and were no more than 250 words—which was barely enough to list the number of the problems that had been uncovered, let alone prove them. McIntyre and McKitrick chose to point out how conventional statistical methodology would show that the uncertainty bounds of Mann's reconstruction prior to 1800 were infinitely large, which meant that his graph prior to that date was worthless; and then to list the most important of the other problems. Mann was given equal space to reply, which he filled with his usual bluff, bluster and belligerence: McIntyre and McKitrick were "amusing", they raised "no valid issues", their claims were "unsupported ... bizarre ... [of] no merit". Which is exactly the sort of response he made to McIntyre and McKitrick's first paper in 2003, and on every subsequent occasion they presented their findings, before being forced to surreptitiously concede point after point, camouflaging his back-downs with rationalisations, obfuscations, and unscrupulous attacks on the sceptics' ill-motivated lack of appreciation of his higher methodology—methodology that suggested, for instance, that it

didn't matter that he got the Tiljander proxies upside down since they correlated to temperature readings!

The last chapter of *The Hockey Stick Illusion* canvasses the Climategate e-mails as they relate to each of the preceding chapters. But despite the book's subtitle this chapter adds very little to the story, except a postscript to this effect: *boy, how right the suspicions of McIntyre and his merry sceptics were!*



John Dawson is the author of *Washout: On the Academic Response to the Fabrication of Aboriginal History*, and is a frequent contributor to *Quadrant*.

Source: <http://www.quadrant.org.au/magazine/issue/2010/7-8/the-tree-ring-circus>.

Cover photo of Michael Mann from climategate.com.



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