

Figure 5. Temperature station at the Marysville, California fire department surrounded by heat sources.

From "Is the US Surface Temperature Record Reliable?" Anthony Watts

REFERENCES (other than links given above).

Climate Change: The Facts. A collection of articles by various authors including Delingpole, Lindzen, Watts.

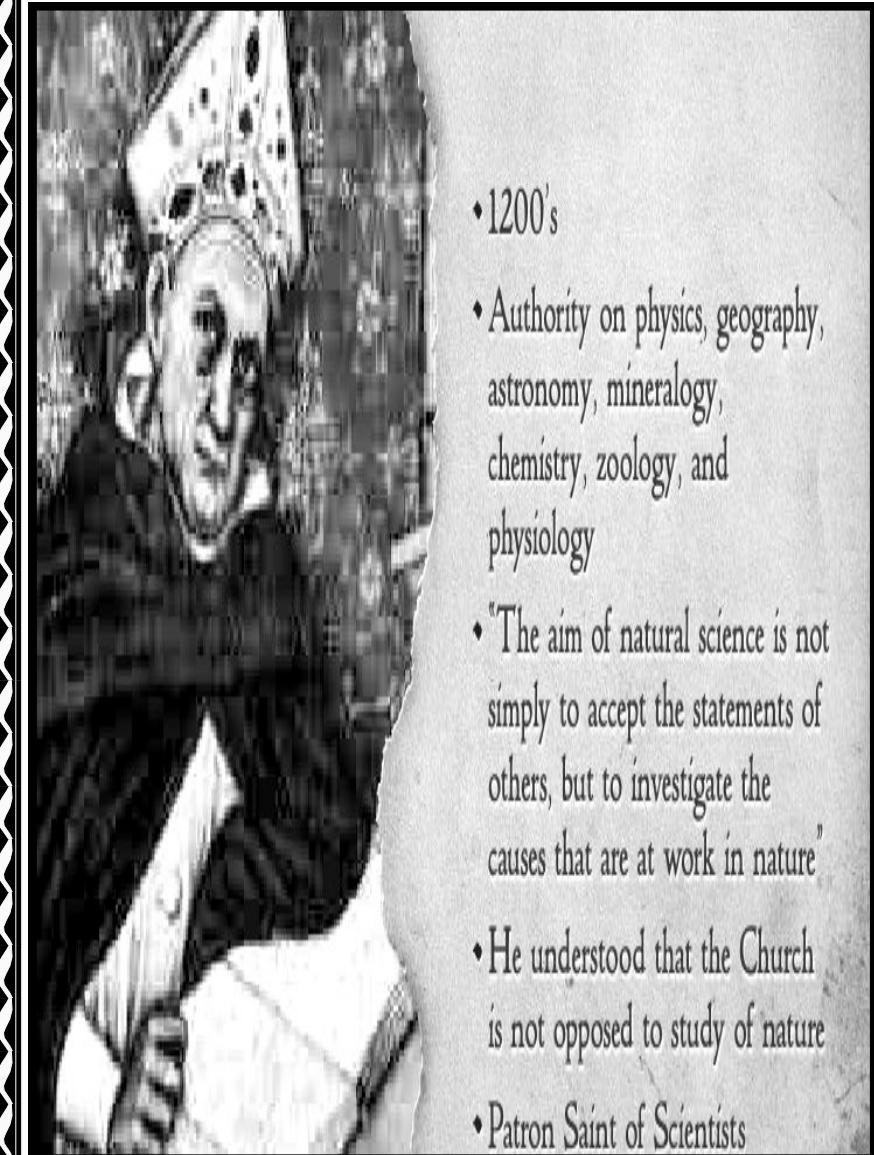
A personal note: I've been involved over the past 60 years as both reviewer and reviewed for papers and grant proposals. When allowed, I've given my name as a reviewer, and have been thanked on a few occasions by authors for pointing out errors that, if not corrected, would have prevented publication. I myself have had more than one paper rejected because of legitimate errors, and in fact, on one of these, I rewrote the paper according to the reviewer's comment, including a major factor I had neglected and invited the reviewer to be a co-author. (This was indeed possibly one of the few good pieces of work done in my scientific career, and I've been fortunate--one of the equations in the work has been used often enough that it is a "name" equation cited without footnotes.)

From a series of articles written by: Bob Kurland - a Catholic Scientist

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## *Catholic Physics - Reflections of a Catholic Scientist - Part 43*

Scientific Integrity: Lessons from Climategate.



## Scientific Integrity: Lessons from Climategate.



"The Scientific Method is a wonderful tool as long as you don't care which way the outcome turns; however, this process fails the second one's perception interferes with the interpretation of data." Christina Marrero

INTEGRITY: "The quality of being honest and having strong moral principles; moral uprightness.." Oxford Dictionary

"...if you're doing an experiment, you should report everything that you think might make it invalid—not only what you think is right about it: other causes that could possibly explain your results; and things you thought of that you've eliminated by some other experiment, and how they worked—to make sure the other fellow can tell they have been eliminated." Richard Feynman

### INTRODUCTION

Our graduate research group director, E.B. Wilson, Jr., would occasionally give homilies at the group's afternoon tea about what character traits a good scientist should have. The most important of these was scientific integrity--honesty and openness in doing the

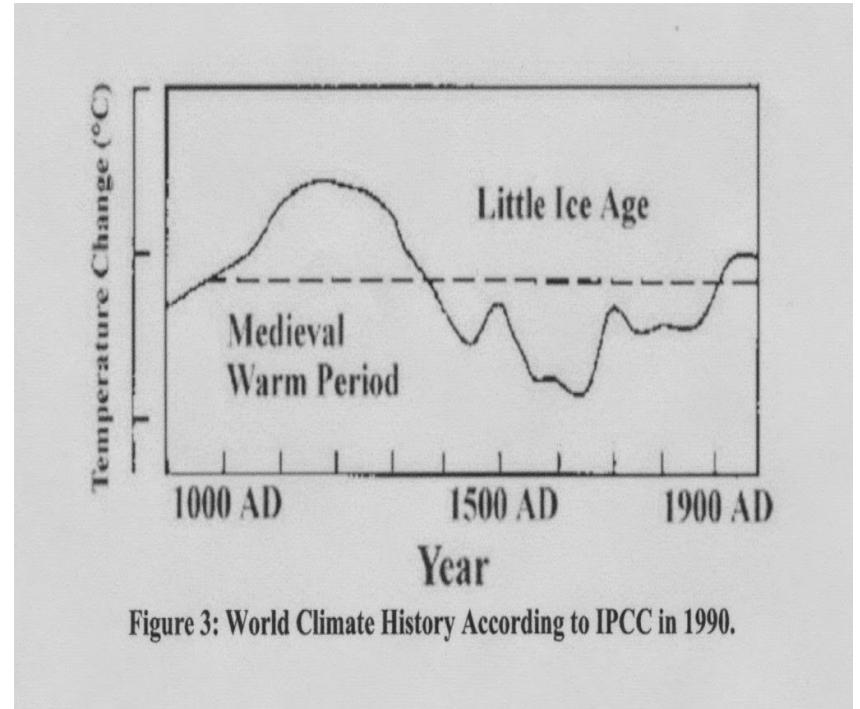


Figure 3: World Climate History According to IPCC in 1990.

From Ross McKittrick, Hockey Stick article:

The basic form of the above graph correlates well with earth bore core measurements and indirect measurements of solar output.

One last point: I don't regard current temperatures taken by government agencies to be that accurate given the haphazard distribution of weather stations (near urban environments, near pavements, air-conditioning outlets,...) as the picture below illustrates:

boards who were not on board with the AGW dogma (again, see the link ClimategateKeeping in Climategate and the Corruption of Climate Science.)

In my view the most reprehensible of these partisan attacks was the effort to get a skeptic, Chris de Freitas, sacked from his job at the University of Auckland. See Climategate 2 and the Corruption of the Peer Review Process.

I'll leave it to the reader to judge whether the principles of scientific integrity outlined at the beginning of this post were followed by these proponents of AGW.

#### WHY I DON'T BELIEVE THAT AGW IS HARMFUL

In the late 1980's the notion of AGW was very attractive to me. However I read papers by Richard Lindzen (Alfred P. Sloan Professor of Meteorology at M.I.T.), Frederick Seitz (former president of the National Academy of Science), Fred Singer, Willie Soon and Sally Baliunas that convinced me as a physicist with some statistics background, that many more factors are involved in climate than CO<sub>2</sub> re-radiation, and that the non-linear differential equations involving heat transfer, cloud cover and condensation aren't going to be approximated as a predictive tool by computer models.

Moreover, my wife (a historian with Medieval Period her specialty) pointed out to me that there was a Medieval Warm Period (MWP--a period from about 800 AD to 1300 AD), historical evidence that temperatures higher than those predicted by the AGW computer models existed--Greenland was called that because, presumably, it was green. (The hockey stick model was presumably designed to belie the existence of the MWP and the Little Ice Age that followed it.) The MWP was followed by a Little Ice Age, a cool period from which we are now recovering. It is ironic that a graph of historic temperatures in an early 1990's publication of the IPCC showed the MWP and the Little Ice Age:

research and reporting the results, and the capacity to be the severest critic of one's own work. I agree--the ability to stand aside, to evaluate one's own research objectively--not as a parent would his child, but as a stern judge--is critical to the progress of science. And a concomitant trait is the capacity to accept valid criticism. These qualities are necessary for one's research to stand the test of time.

When I first started this post I wanted to examine what might be textbook cases for a study of scientific integrity, focusing on the Climategate exposé of 2009 and the McIntyre/McKittrick analysis of the so-called "Hockey Stick" results of Mann et al. (It is not my purpose here to debate the merits of Anthropogenic Global Warming (AGW)--there is an addendum at the end of the post that summarizes my own views). As I developed the thesis it occurred to me that a broader issue was involved: how do ethical considerations limit and define scientific goals? Should researchers--presumably in pursuit of a greater good--modify or bend precepts conventionally given for doing science? Should ethical considerations define boundaries for scientific research? These issues will be addressed in subsequent posts.

#### REPLICATION OF RESULTS--CRITICAL FOR GOOD SCIENCE

A critical condition for science to progress is that experiments be replicable; the dross has to be discarded if the gold is to be retained. By this replicability requirement the first reports of cold fusion and polywater were shown not to be valid. And of course by "experiments" we include computer modeling that is to predict future events predicated on the assumptions of the model. In order for experiments and computer models to be replicable, there has to be free access to data and to the computer programs used. If you're to find out whether a computer model is correct and consistent you have to be able to use the same input and programs that the original researcher used.

If we examine some of the emails from the Climategate file and comments from McIntyre and McKittrick, who tried to replicate the Mann "Hockey Stick", we might wonder whether this requirement was acknowledged by proponents of AGW. Here are just two excerpts:

Jones (Head of CRU) to Wahl (NOAA) and Ammann (Natl. Ctr. for Atm. Res.): "(T)ry and change the Received date! Don't give those skeptics something to amuse themselves with."

Jones to Schmidt (NASA Goddard Institute) cc Mann: "The FOI (Freedom of Information) line we're all using is this, IPCC is exempt from any countries FOI...The skeptics this Even though we...possibly relevant info the IPCC is not part of our remit (mission statement) therefore we don't have an obligation to pass it on."

More emails and fuller versions are given in a Wall Street Journal article.

Here are some comments from Stephen McIntyre (from his presentation at Ohio State University, 2008) about difficulties getting data and programs to replicate Michael Mann's Hockey Stick calculation.

"I thought that it would be interesting to look at the underlying data, rather as I might look at drill data from a mining promotion. Business was slow and I browsed the internet for a due diligence package. I could not locate such a due diligence package nor the underlying proxy data for MBH98. Out of the blue (I was then a Canadian businessman unknown to climate scientists), I emailed Michael Mann, the primary author, inquiring as to the location of the MBH98 proxy data. To my astonishment, Mann replied that he had "forgotten" the exact location, but that an associate would locate it for me. The associate said that the data did not exist in any one location, but that he would get it together for me. I was dumbfounded. Here was a study that had been on the front page of the IPCC study, used in brochures sent to every household in Canada and there was no due diligence package."

See also Climategate: The Smoking Gun and Climategate: hide the decline for a more detailed analysis by Anthony Watts (a programmer) of the deficiencies; for problems with temperature data stations as well as artificial corrections and deletions as applied to such data--see the links above.

#### PERVERSION OF THE PEER REVIEW PROCESS

The peer review process\* is an essential mechanism in contemporary science to throw out the dross and keep the gold. In order to be effective, it has to be applied objectively, without prejudice due to preconceived political, economic or theologic standards. When such considerations enter into judgment of scientific work, the scientific method is tossed out the window. Examples are shown in excerpts from Climategate emails (see "ClimateGateKeeping" in Climategate and the Corruption of Climate Science [by David Pratt])

"The skeptics appear to have staged a 'coup' at 'Climate Research' ... My guess is that Von Storch [one of the editors] is actually with them (frankly, he's an odd individual, and I'm not sure he isn't himself somewhat of a skeptic himself) ... I think we have to stop considering 'Climate Research' as a legitimate peer-reviewed journal. Perhaps we should encourage our colleagues in the climate research community to no longer submit to, or cite papers in, this journal." Michael Mann, March 2003, commenting about an article by Soon and Baliunas.

"I will be emailing the journal to tell them I'm having nothing more to do with it until they rid themselves of this troublesome editor" Phil Jones, again referring to the editor von Storch of Climate Research

These are just two of many examples in which an effort was made (sometimes successful) to remove members of editorial

eliminates one set of data (high-altitude from Idaho) and uses a segmented principal component analysis, as in the original paper.

There is also a figure in McKittrick's article (not reproduced here) that shows how they obtained a temperature (tree-ring proxy) rise in the latest years from random noise data, using a selection pattern presumed to underly the original hockey stick results.

Examples can also be had from excerpts from the Climategate files, emails and comments on computer programs (see CRU's Source Code: Climategate Uncovered , HarryReadMe files for full texts):

"I've just completed Mike's Nature trick of adding in the real temps to each series for the last 20 years (ie from 1981 onwards) amd (sic) from 1961 for Keith's to hide the decline."

In two other programs, briffa\_Sep98\_d.pro and briffa\_Sep98\_e.pro, the "correction" is bolder by far. The programmer (Keith Briffa?) entitled the "adjustment" routine "Apply a VERY ARTIFICAL(sic) correction for decline!!"

Plotting programs such as data4alps.pro print this reminder to the user prior to rendering the chart: "IMPORTANT NOTE: The data after 1960 should not be used. The tree-ring density records tend to show a decline after 1960 relative to the summer temperature in many high-latitude locations. In this data set this "decline" has been artificially removed in an ad-hoc way, and this means that data after 1960 no longer represent tree-ring density variations, but have been modified to look more like the observed temperatures."

"NOTE: recent decline in tree-ring density has been ARTIFICIALLY REMOVED to facilitate calibration. THEREFORE, post-1960 values will be much closer to observed temperatures than (sic) they should be which will incorrectly imply the reconstruction is more skillful (sic) than it actually is. See Osborn et al. (2004)."

When McIntyre and McKittrick's attempt to replicate the "Hockey Stick" failed (see below) Mann said the original data and programming weren't used but refused to supply those:

"Mann also objected that we did not exactly replicate his computational steps or sequence of proxy rosters. No one had ever replicated his results, and we now know others had tried but were also unsuccessful. To date we are the closest anyone has been able to come in print. We were not bothered by Mann's response on this point, but it did seem pointless to differ over trivial issues. So we requested his computational code to eliminate these easily-resolved differences. To our surprise he refused to supply his computer code, a stance he maintains to today. As for the proxy sequence, in building his PCs it turns out he had spliced together a number of different series in order to handle segments with missing data in the earliest part of the analysis. This was not explained in his Nature paper so Steve had not implemented it in the emulation program. We requested identification of the splicing sequence, which Mann refused to provide..."Ross McKittrick, What is the Hockey Stick Debate About?

Is this making an open, dated, signed lab book with your results and calculations available to all, as we were enjoined to do as graduate students?

#### THE CARDINAL SIN: FUDGING DATA

The Oxford Dictionary gives the following definition of "fudge":

"Adjust or manipulate (facts or figures) so as to present a desired picture". This would include altering given data to make it fit a hypothesis or discarding data that doesn't fit;

inserting fictitious data or data not relevant to the hypothesis, for a better fit;

cherry-picking data , taking selected data from a set that will fit and ignoring data that doesn't;

In this context I'll discuss first McIntyre and McKittrick's attempt to replicate the famed "Hockey Stick", the cornerstone of the IPCC dire predictions of the effects of AGW, and then cite just a few of the many relevant emails and computer program comments revealed in the Climategate documents. I'll not give a detailed account, but only a summary and show some figures that justify McKittrick's and McIntyre's report that the hockey stick is, to put it charitably, not a compelling statistical analysis. If you read both papers you can judge whether the statistical treatment, Principle Component Analysis (PCA) was adjusted, data were selected and replaced, in other words, whether "fudging" (as in the above definition) occurred:

"How do we know 1998 was the warmest year of the millennium?"  
Stephen McIntyre.

"What is the 'Hockey Stick' debate about?" Ross McKittrick.

Here are some figures to illustrate the above:

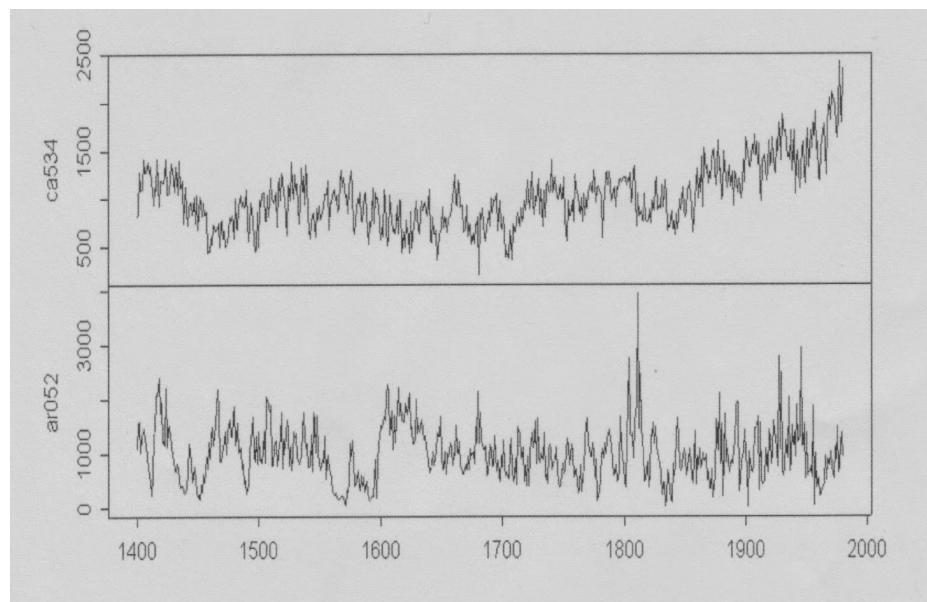


Diagram from Ross McKittrick Hockey Stick article:

Illustrated in the figure on the prior page the left are plots of two tree ring sizes (used as proxies for temperatures) one from California (top), the other from Arizona. The x-axis is time, from about 1400 to present. In the original hockey stick paper the top data set is presumably given 390 times the weight of the bottom. One can see how this will force a huge temperature rise.

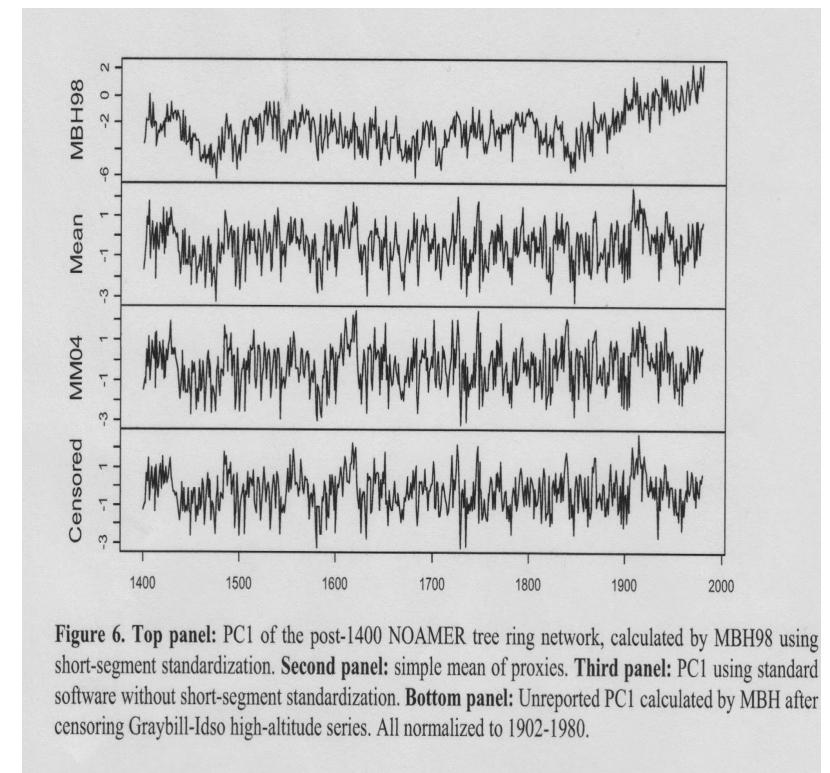


Figure 6. Top panel: PC1 of the post-1400 NOAMER tree ring network, calculated by MBH98 using short-segment standardization. Second panel: simple mean of proxies. Third panel: PC1 using standard software without short-segment standardization. Bottom panel: Unreported PC1 calculated by MBH after censoring Graybill-Idso high-altitude series. All normalized to 1902-1980.

From Ross McKittrick, Hockey Stick article:

In the figure to the left the top plot is data using the presumed principal component analysis of the original hockey stick paper. The second down from the top is the simple mean of data. The third down is obtained with a conventional principal component analysis (no segmentation). The fourth down